The Relationship Between Rural-Urban Migration and the Agricultural Output of the Philippines

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Abstract — *This paper explored the relationship of rural-urban migration to the total agricultural output in the Philippines. The researchers wanted to know if there is a relationship between the independent variables: rural-urban migration, average agricultural wage, number of employed people in agriculture, and inflation rate, and the dependent variable, which is agricultural output, and how these explanatory variables affect the dependent variable. Data used are from the years 1988 - 2018. The researchers used a quantitative research design and multiple regression to find out the relationship between the dependent and independent variables. The findings of the study answer the purpose of this paper. It has been found that the relationship between rural-urban migration and the total agricultural output of the Philippines has a negative relationship. Other results showed that the number of people employed in agriculture and average agricultural wage have a positive effect on the country's total agricultural output while inflation rate has a negative effect. Creating more opportunities for people living in rural areas and strengthening the institutional and governance in the agricultural sector can not only lessen the internal migration but also improve the country's economy.*

Keywords — *Total agricultural output, rural-urban migration, average agricultural wage, number of employed people in agriculture, and inflation rate*

I. INTRODUCTION

Agriculture has long been the economic foundation of the Philippines. Cosrojas and Eguia cited PDP (2017), according to the findings of a 2016 study, agriculture has provided a living to 65% of poor working adults. Agriculture, Fisheries, and Forestry (AFF) is the fundamental sector in the Philippines in producing employment for the majority of people in the Philippines. It employs nearly half of the total labor force and is a major source of revenue and employment. As a result, it is regarded as a major industry in the Philippines (Biazon, 2016). The agricultural sector, which comprises farming, fisheries, livestock and forestry employed 39.8% of the labor force and contributed 20% of the Gross Domestic Product, with crop cultivation as its main agricultural enterprise (Qamar, 2012). In an article by the World Bank, it says that agriculture is much needed to ensure strong food value chains, affordable and nutritious food, and a vibrant rural economy. Omodero (2021) cited Kilima et al. (2014), a country can gain so much from agriculture. Agriculture decreases the cost of food consumption and reduces the number of people migrating from rural to urban areas. It also boosts non-farm economic growth, allows local residents to participate in financial decision-making processes, and makes nutritional products available for consumption.

Under agricultural output, the study's data consists of the total volume metric of crop, livestock, and poultry. The data were gathered from the Philippine Statistics Authority. From the year 1988 to 2018, the total agricultural output increased, however there are years when output declined. According to a study conducted by Habito and Briones (2005), in 1980 - 2003, the country's agricultural output growth was weak, averaging only 1.7 per year compared to the 2.6 average overall GDP growth those years. The following years were said to be stagnant as compared to the growth of industry and services.

The primary goal of this study is to determine the relationship between rural-urban migration to the total agricultural output in the Philippines since there are many individuals and families who are migrating from rural to urban areas, specifically to Metropolitan Manila and close cities (Quisimbing & McNiven, 2005). According to Qiu et al. (2011), oftentimes, migrants who travel from rural to urban areas find greater work opportunities with high salary as compared to their hometown. The researchers determined the relationship of rural-urban migration to the total agricultural output in the Philippines and found out how internal migration impacts agricultural output in rural areas, specifically in the Philippines.

One of the study's independent variables is the Number of Employed People in Agriculture and is defined as the statistical numeration of agricultural workers in the Philippines from 1988 to 2018. Second, the Average Agricultural Wage in this study is the rate of agricultural workers daily. Third, Rural-Urban Migrants refer to the number of people who move from rural to urban cities, especially to have better opportunities for work and enhance life conditions. Fourth, inflation, which happens when there is an increase in the general prices level which results in a decrease in the value of the currency. Lastly, the dependent variable for this study is the agricultural output in the Philippines. To determine the relationship of these variables, all will be inserted to the econometric model stated above.

One of this study's objectives was to gather data for rural-urban migration, average agricultural wages, number of farmers, total agricultural output in the Philippines from the Philippine Statistics Authority and Philippine Statistics Yearbook. Furthermore, identifying and evaluating how rural-urban migration, average agricultural wages, inflation, and labor impact the production of the total agricultural output in the Philippines was also one of our objectives. With that, this study formulated recommendations to improve the production of agricultural outputs in the Philippines based on its findings.

As mentioned earlier, agriculture plays a significant role in the Philippines' economy. Aside from that, the agriculture industry is critical to increasing food availability and ensuring food security (Pawlak & Kolodziejczak, 2020). Without this sector, many Filipinos would suffer as it not only provides food for the majority of the people, but it also provides income and employment to many families. According to Ivanov and Sokolova (2018), it is highly accepted that the agricultural industry plays a major role for providing jobs, business opportunities, incomes and safety net for both professional farmers and rural population.

Learning the consequences of rural to urban migration to the total agricultural output to the whole country, the researchers came up with recommendations that would significantly improve the agricultural sector in the whole country, and for the betterment of the economy. With that being said, the study assessed the relationship of the Philippines' agricultural output and rural-urban migration. By knowing its effects or repercussions to the economy itself, the researchers were able to understand the nation's agricultural sector, and was able to formulate recommendations that will be useful to future researchers, economists, agricultural land owners, and even agencies such as Department of Agriculture, Department of La   bor and Employment, and Department of Interior and Local Government.

II.   LITERATURE REVIEW

2.1 Relationship of Rural-Urban Migration to the Agricultural Output

There are many factors affecting the total agricultural output which affects the production of agricultural output in the Philippines. One of which is rural-urban migration. Michaelsen and Haisken-DeNew (2015) cited Young (2013) that in all emerging countries, large salary disparities occur between rural and urban employees. Imran et al. (2015) mentioned that the decision of migration of any individual involves many 'push factors' which force migrants out of rural areas and 'pull factors' which attract migrants to urban centers, and that the main reason why people move from rural areas to urban areas is because of the expected wage differential.

Many economic publications have long linked economic growth and development to rural-urban migration. From the historical point of view, the current developed world in the 19th and early 20th century has undergone different patterns of migration, predominantly rural-urban migration attributed to the process of industrialization and economic development. In addition, the percent of population living in the urban areas has grown rapidly and urbanization has been fuelled by rural-urban migration (Wondimagegnhu, 2014). In the years 1978-1999, China considered rural-urban migration as a major contributor to urban growth (Zhang & Song,

2003). A type of migration that will be one of the focus of this study is internal migration, specifically, rural to urban migration. Rural-urban migration is a form of internal migration wherein people from rural areas move to urban cities within the borders of the country. Marta et al. (2020) defined rural–urban migration as a common demographic phenomenon in developing countries. Rural-urban migration is the dominant pattern of internal migration (Ofuoku, 2014 and Chukwuji, 2007). National Geographic Expeditions (NGE) (2006) defined rural-urban migration as the movement of people from rural areas (villages) to the urban centres (cities).

Goldsmith et al. (2004) and Rains and Fei (1961) that current literature has presented significant differences in the effects of RUM on agricultural production, including many positive, negative, or uncertain research results. In one study by De Brauw (2014) stated that when rural residents find employment in urban areas, agricultural productivity is not affected or there is no lost-labor effect. In addition to that, Brennan et al., (2012) said in their study that migration appears to have had a little influence on agricultural output, with slight increases in meat production and slight decreases in feed output.

Mbah et al. (2016) cited Olayide (2009), Lewis (2004), Osondu and Ibezim (2001) that rural youth migration has been associated with decline in food production, farming activities, fishing, urban congestion, inadequate infrastructural facilities in urban areas and so on. The decline in food production in developing countries such as Nigeria can be linked to the impact of rural-urban youth migration as well as other variable factors such as economic, soil quality, ecology, climatic conditions, socio-cultural setting, and poor farm management are all factors to consider. Mgbakor et al. (2000) stated that many factors have been contributing to this poor performance of agricultural sector but one of the major factors is the rural-urban migration (especially by youths) which involves the movement of labor from rural areas to urban centers in search of employment, a better standard of living, religious freedom, and a variety of other factors too numerous to mention; one factor influencing rural-urban migration patterns is agricultural scarcity.

Imran et al. (2015) mentioned that the decision of migration of any individual involves many 'push factors' which force migrants out of rural areas and 'pull factors' which attract migrants to urban centers, and that the main reason why people move from rural areas to urban areas is because of the expected wage differential. Internal migrants make up a significant population in the Philippines. According to Anaglo et al. (2014), out-migration may result in drastic decrease in the labour which in turn reduces total cropped area and quality of work giving rise to reduced food production and reduced household wealth leads to increased vulnerability in many rural areas, potentially resulting in food insecurity.

The economic literature on migration has assumed that a rational individual or household considering migration considers many locations and chooses one that maximizes the expected profit from migration. This expected benefit is determined by a variety of factors, including personal characteristics and experience, social networks, wealth, or reduced vulnerability to poverty. Due to this, Lawal and Okeowo (2014) stated that it is certain that agricultural production will not take place in the absence of labour input. There is a mass rush of labour from rural areas to urban areas and the outflow of the young labour force and the best-educated individuals from rural areas poses challenges to rural agricultural productivity. Moreover, de Brauw (2017) explained that the major concern is that rural-urban migration can threaten food security, through reductions in agricultural production. Moses et al. (2017) cited Mini (2001), in most rural areas, the impact of rural-urban migration was a rapid deterioration of the rural economy leading to chronic poverty and food insecurity.

A couple of studies show the link between rural-urban migration and the total output in the agricultural sector. According to Qin (2010), a widely held belief about the effects of migration on agriculture is that rural labor out-migration reduces agricultural cultivation and production. This means that the farmers, or their families, tend to migrate to urban areas which in turn lowers the total output in agriculture. The pressure for people to move from urban regions derives from the low productivity in the rural sector (Brennan et al., 2012). The increased rural-urban migration has resulted in a decrease in agricultural labor force. The labour force which continuously loses a bulk of able-bodied men who are engaged in non-agricultural pursuits or are attracted away from the farms, because they received a better life in the cities and higher income (Adepoju, 2003). Afolabi (2007) also mentioned in his study that as more people leave rural areas, there would be fewer able-bodied people on the farm resulting in lower agricultural output and productivity.

The researchers opted to use rural-urban migration as one of the independent variables in this study since the objective of this study was to find out if rural-urban migration has a relationship with the dependent variable, which is the total agricultural output in the Philippines.

2.2 Relationship of Average Agricultural Wages to the Agricultural Output

Another factor that affects the total agricultural productivity is the average agricultural wages of Filipinos belonging to the poorest and they receive the lowest daily wage in comparison to the workers in industry and service sectors. Despite its contribution to the economy, Filipino farmers don't get enough from doing this job, they are even called "a poor man's sector". Regardless of its 11% contribution to the Gross Domestic Product, only 4% is allocated from the national budget to the agricultural sector (Lubang, 2019). Moreover, a study by Gollin et al. (2013) explained that according to national accounts data, there is a much higher value added per worker in the non-agricultural sector compared to agriculture in countries, and especially in developing countries. In a study by Briones (2017), wages continue at institutionally fixed levels as output rises, until surplus labor is depleted. The Lewis turning point is the point at which economic expansion is accompanied with increases in rural and agricultural earnings. The "agricultural productivity gap" suggests that there is great misallocation across sectors if taken at face value. As stated by Ezelea-Harrison (2016), in forming their wage and employment policies, agricultural employers tend to use efficiency wage rules: factors such as technology and productivity tend to shape the wage rate in a primary sector of the labor market where market supply and demand forces do not seem to to play a significant role in wage determination.

According to Mbah et al. (2016), agriculture is the main source of income in rural areas. According to evidence, the majority of the population in most rural areas is made up of small-scale farmers who produce food for human consumption as well as raw materials for export and manufacturing industries. The higher the income of the farmers, the more motivated they are to do their work well. As a result, agricultural output arises. A study by Emran and Shilpi (2014), the effects of agricultural productivity on daily labor wages imply that a one percent increase in agricultural productivity (crop yield per acre) raises the wage for unskilled agricultural labor by approximately 0.93 percent, a significant impact. Rising productivity provides the potential for substantial growth in the pay for the vast majority (Economic Policy Institute, 2019). With this concept, increased wages will increase productivity to the workers since they are being paid with their desired salary and the farmers are inspired to work extraordinarily well. According to Barton (2016), the increase in farm labor productivity has affected the incomes of farm workers and the physical efficiency of agricultural production. In addition, a study of Katovich and Maia (2018) stated that agricultural productivity is a vital long-run determinant of real wages. However, wage and productivity dynamics frequently diverge due to a variety of economic and institutional factors. According to Mechri et al. (2017), in addition to global initiatives such as the 2030 Agenda for Sustainable Development, several countries have implemented policies to boost agricultural productivity, particularly in countries where agriculture is a major economic sector and the productivity gap between agriculture and other industries and services is the greatest. Agriculture productivity improvement is significant because it contributes to poverty reduction by improving food security and increasing farm income.

2.3 Relationship of Number of Employed People in Agriculture to the Agricultural Output

Agriculture work is known as labor-intensive, therefore, the decrease of workforce in agriculture leads to lesser productivity and output and will have a negative impact on the economic and situation of a region (Schwarcz et al., 2012). Changes in agricultural productivity affect employment and pay in a conventional model of the rural labor market by affecting the demand for labor (Emran and Shilpi, 2016). Irz et al. (2001) stated that increased employment and revenues in the rural economy allow for greater nutrition, health, and education investment among the rural people. Result in increased welfare and, indirectly, enhanced labor productivity.

The researchers used employment as the study's variable, and number of employed people in agriculture as its measurement due to the fact that agricultural employment has major consequences to agriculture's contribution to the whole economy. With rural-urban migration comes the loss or the decline of employment in agriculture in the rural areas, which leads to a decrease in agricultural productivity. This simply meant that the number of people employed in agriculture had a positive relationship with the dependent variable, production of root crops, as concluded by different scholarly authors. Zhang et al. (2020) mentioned in his study that farmers tend to abandon their farmland which leads to lower and weakened agricultural cultivation brought about by labor outmigration, this resulted in reduced staple food crops in rural areas. Rural-urban migration resulted in a loss of human resources for rural areas. With lower human resources in the rural areas due to internal migration, the lower the total output in agriculture will be. Onegina et al. (2020) stated that increasing agricultural labor productivity and reducing the time required for food production lay the groundwork for economic growth and the advancement of society to a higher level of socioeconomic progress. Also, According to Eze (2017), the shifting of the labor force from rural to urban brought about by the rural-urban

migration is one of the major reasons why there is a shortage in agricultural production and agricultural output. As the labor force in agriculture continuously loses a number of able-bodied men, agricultural production will also continuously decline. In a study in China where farmers do not have property rights to sell their land, migration leads to labor shortages as farmers abandon their farmland which then leads to decrease in outputs (Qin, 2010). This proves Kan Liu's study in 2011 that labor migration has a negative impact on agricultural yield as it decreases the number of agricultural workers.

Another arising problem nowadays in relation to the number of employed people in agriculture and its link to agricultural output is that the rural-urban migration which according to Martin et al. (2017), decreases the number of youth men that are supposed to take over the older farmers in the agricultural industry, resulting in the decline in agricultural output. Rural-urban youth mobility, according to Mbah et al. (2016), is linked to decreased food production, farming activities, fishing, urban congestion, and poor infrastructural amenities in urban regions, among other things. This is also what Mgbakor et al. (2014) and Martin et al. (2017) stated in their study, the shifting of labor force caused by rural-urban migration, especially youth, is a major factor that has been contributing to the poor performance of the agricultural sector. Especially because males migrate more often than the females. With the rural youth migrating to urban areas, this will leave the elderly and female population of rural areas to take over in the agriculture industry. The problem is, based on the research of Li and Zhao, people are worried about the aging population of their agricultural labor force as they are less productive compared to young workers and they have a negative direct impact on productivity growth in Canada (Guo et al., 2015).

In accordance with Nolte & Ostermeier (2017) citing World Bank (2016), in contrast with the argument above, it is said that less labor is required to create the same amount of product. This is said to be caused by the decreasing importance of the agricultural sectors which can be explained by comparing the proportion of persons employed in agriculture with the sector's contribution to GDP in low- and middle-income nations. Agriculture's contribution to the workforce has fallen from 45% to 24% between 2000 and 2010. During the same time period, the agricultural sector's contribution to GDP fell by only 23%. (From 13% to 10%).

2.4 Relationship of Inflation Rate to the Agricultural Output

In a study by Ruzima and Veerachamy (2015), it is concluded that agriculture output is one of the major contributors of inflation in Rwanda. According to their tests, the two variables have a positive relationship, which is caused by the high production of inputs. In accordance with what Ruzima and Veerachamy stated, Narayan et al. (2011) also came to the conclusion that agricultural output as a percentage of GDP has a positive and significant effect on the inflation rate. Moreover, Oltaunji et al. (2006) stated that the results revealed variations in the trend of both the inflation rate and agricultural output. In addition to that, the change in agricultural output (inventory change) caused inflation during the 1970-2006 period and not vice-versa. The findings revealed that there is a direct relationship between changes in agricultural output and the rate of inflation. Recent Nigerian inflation has been attributed to high food prices. Increased population growth has also rendered agricultural sector growth insignificant, resulting in a small increase in output level. (Olantuji et. al., 2012). According to Tangermann and Heidhues (1973) an increase in the rate of inflation has a much greater impact on the need for agricultural adjustment than an increase in the rate of economic growth. However, with appropriate domestic policy actions, the inflationary effects of agricultural supply shocks could be mitigated. Fiscal policy that focuses on increased agricultural productivity and efficiency, such as irrigation and storage, has the potential to reduce the effects of agricultural supply variability on inflation (Mawejje & Lwanga, 2015).

However, a study by Chaudhry et al. (2013) negates the assumption that inflation and agriculture have a significant positive relationship. The study pointed out that there is in fact an inverse relationship between CPI inflation and the growth of the agriculture sector.

2.5 Synthesis

Overall, this review vaguely satisfies the study's third objective. It might be said that the relationship between the dependent variable, agricultural output, and the explanatory variables, rural-urban migration, employed in agriculture, inflation rate, and minimum wages of the farmers, has a positive relationship. As one explanatory variable decreases (increases), the dependent variable also decreases (increases). The variables chosen were interconnected with each other. For instance, if people from rural areas saw that there were more job opportunities with higher wages in urban areas, they would migrate and try to search for better opportunities in the urban areas, resulting in the reduction of the labor force in rural areas, therefore, less agricultural

production. However, to be able to have an accurate conclusion, the researchers used the econometric method by utilizing the data gathered from the Philippine Statistics Authority website and Philippine Statistical Yearbook.

One of the problems the researchers encountered is that most countries do not gather data on rural-urban migration (Goldsmith et al., 2003). This is true in the case of the Philippines. With this being said, the researchers used a formula from the United Nations to estimate the internal migration data since there is no statistics available on the web for the number of Filipinos migrating from the rural to urban areas in the Philippines. Another limitation the study has is that the available agriculture output data in 1977-1999 is only agriculture crops. The data for livestock and poultry only became available in the year 2000.

For the data of total agricultural output, the researchers used the sum of crops, livestock, and poultry and eggs.

2.6 Statement of Hypothesis

● H0: Rural-Urban Migration Rates have no significant relationship on the country's agricultural output.
● H0: Average Agricultural Wages have no significant relationship on the country's agricultural output.
● H0: Number of Employed People in Agriculture has no significant relationship to the country's agricultural output.
● H0: Inflation Rates have no significant relationship on the country's agricultural output.

2.7 Research Simulacrum
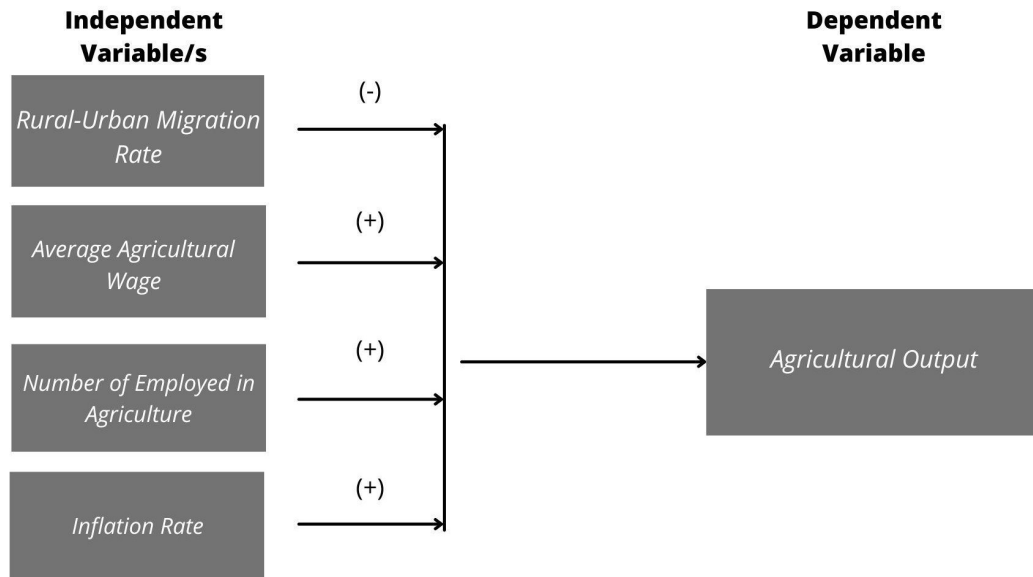
III. METHOD (Size 10 & Bold)

A. *Study Design*

This is a quantitative study aiming to understand and analyze the relationship between the total agricultural output and rural-urban migration in terms of the number of employed people in agriculture, average agricultural wage, and inflation rate. It is a descriptive research and a time-series study that digs deeper into the relationship of the said variables to be able to aid those people who will benefit from the results of this paper.

B. Study Site

This paper estimated the relationship of rural-urban migration, average agricultural wage, number of employed people in agriculture, and inflation rate and possibly tested if the stated variables affects the agricultural output.

The locality of the study is the Philippines. The researchers used data from the World Bank to compute which contains the aggregate rural and urban population to get the rural-urban migration.

C. Data Collection Procedure

In determining the relationship between Rural to Urban Migration and the Total Agricultural Output, the researchers utilized the data of Rural to Urban Migration in the Philippines, and the Total Agricultural Output per metric ton, also in the Philippines. However, in attaining RUM data, the researchers opted to use the formula from the United Nations' Method of Measuring Internal Migration since there is no available data to use.

$$RUM_t = UP_t / TP_t$$

Where UP_t is the urban population divided by the Total Population or TP_t, and then convert the numerical value into nominal value. Afterwards, use the formula:

$$RUM_t = \frac{CP_t - OP_t}{OP} * 100$$

Get the percentage change of the Current Population (CP_t) and the Old Population (OP_t).

To further understand how the Total Agricultural Output and Rural-Urban Migration affect each other, the study will also need the data for Employment measured by Agricultural Employment and Average Agricultural Wages in the Philippines. All of the data are collected from the Philippine Statistical Yearbook, except for the Agricultural Output, which the researchers got from the Philippine Statistics Authority (Openstat).

D. Data Analysis

Regression Model

The study used multiple regression analysis to identify the relationship between the dependent variable (Agricultural Output) and independent variables (rural-urban migration, average agricultural wages, employment, and inflation). The multiple regression equation was formulated to describe the relationship between the dependent variable and independent variable. In doing so, the researchers determined the significance of each independent variable to the dependent variable.

Agricultural Output = β0 + β1Rural-Urban Migration + β2Agricultural Wages + β3Employment + β4Inflation + e

Where Y is the agriculture output, X_1 is the rural-urban migration, X_2 is the agriculture wages, X_3 is the number of employed people in agriculture, X_4 is the inflation, and e represents the error term to determine what the model does not fully represent on the actual correlation between the dependent variable and independent variables.

IV. RESULTS AND DISCUSSION

The study aimed to understand and analyze the relationship between the total agricultural output and rural-urban migration in terms of the number of people employed in agriculture, average agricultural wage, and inflation rate in the Philippines starting 1988 - 2018. The agricultural output has shown an uptrend while the rural-urban migration showed a downtrend with negative values. Several tests were carried out to verify the

accuracy of the trends and their association with one another. Some of these tests are the Ordinary Least Squares Regression, Multicollinearity, and Normality Test. The study also used the Heteroskedasticity test, Ramsey Reset test, and ARCH test (Refer to Appendix G).

Table 1. Ordinary Least Squares

Variable	Coefficient	Standard of Error	t-Statistics	Probability
Constant	50483.51	29479.06	1.712521	0.0987
Employed in Agriculture	0.000134	0.002484	0.054004	0.9573
Inflation Rate	16.77605	417.025	0.040228	0.9682
Rural-Urban Migration	-3202.037	1985.524	-1.612691	0.1189
Average Wage in Agriculture	154.0135	25.99626	5.924451	0

R- Squared	0.819821	Mean dependent variable	75366.35
Adjusted R-squared	0.792101	S.D. dependent variable	12849.27
S.E. of regression	5858.748	Akaike info criterion	20.33595
Sum squared resid	8.92E+08	Schwarz criterion	20.56724
Log likelihood	-310.2072	Hannan-Quinn criterion	20.41134
F-statistic	29.57518	Durbin-Watson statistic	1.355736
Prob(F-statistic)	0		

For the purpose of this study, multiple regression analysis was used to explain the relationship between the dependent variable (agricultural output) and the four independent variables (average agricultural wage, inflation rate, rural-urban migration rate, and number of employed people in agriculture). Table 1 shows a summary of the model, which provides information about the ability of regression lines to explain the total variation in the dependent variables.

The results of the Multiple Regression Analysis using the Ordinary Least Squares can be seen in Table 1. The agricultural output in the Philippines was used as the dependent variable, while employed people in agriculture, inflation rate, rural-urban migration rate, and average agricultural wage served as the independent variables. The p-value of the number of employed people in agriculture, inflation rate, and rural-urban migration are significant to the agricultural output since their p-values are greater than alpha which is 0.05. On the other hand, average agricultural wage is insignificant, with a p-value less than 0.05. The coefficient of determination (R^2) is 0.8198. This shows that 81.98 percent change of the dependent variable is caused by the independent variables, while the remaining 18.02 percent of the dependent variable is unexplained. The adjusted R^2 of the model is 0.7921, which showed that 79.21 percent of the changes in agricultural output could be forecasted from the combination of the four independent variables. The Durbin Watson has a value of 1.36 which implies that there is a positive autocorrelation of the model. Furthermore, the prob(f-statistic) tells us that there is an overall significance of the regression.

With the coefficients of the number of employed people in agriculture, inflation rate, and average agricultural wage being all positive, their relationship with the dependent variable are all direct. Agriculture work is known as labor-intensive, therefore, the decrease of workforce in agriculture leads to lesser productivity and output and will have a negative impact on the economic and situation of a region (Schwarcz et al., 2012). Meanwhile, Ruzima and Veerachamy (2015) explained that inflation rate and agricultural output have a positive relationship and they concluded that agricultural output is one of the major contributors of inflation in Rwanda. Oltaunji et al. (2006) also mentioned in their study that the result revealed there were variations in the trend of both inflation rate and agricultural output. Furthermore, according to Mbah et al. (2016), agriculture is the main source of income in rural areas. Evidence has shown that the majority of the population in most rural areas are small-scale farmers providing food for human consumption and raw materials for export and manufacturing industries. The higher the income of the farmers, the more motivated they are to do their work well. As a result, agricultural output arises.

On the other hand, rural-urban migration has a negative coefficient, meaning that there is an indirect relationship between rural-urban migration and agricultural output. This satisfies the study of Xinjie Shi (2018) which concluded that migration and agricultural productivity has a direct negative relationship. In one study by Mgbakor et al. (2000) stated that many factors have been contributing to this poor performance of agricultural sector but one of the major factors is the rural-urban migration (especially by youths) which involves the shifting of labour force from rural areas to urban centers, in search of employment, better living standard, freedom of religion and others too numerous to mention, one of the factor affecting rural urban pattern of migration is the shortage of agriculture. This is also true vice-versa. When rural residents don't migrate to urban areas, agricultural productivity will rise. Xinjie Shie (2018)

In Table 1 it is shown as well that the probability for rural-urban migration is 0.1189 which is greater than the alpha 0.05, therefore, the null hypothesis is rejected. It also shows that the null hypothesis for employed in agriculture is rejected because 0.9573 is greater than or equal to 5%. Same with the inflation rate which has a probability of 0.9682, also greater than 5%, therefore, rejecting the null hypothesis. However, the average wage in agriculture can be seen as insignificant with 0.000 as its probability which is less than 0.05, which results to the acceptance of the null hypothesis.

Table 2. Multicollinearity

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
Constant	8.69E+08	784.8367	NA
Employed in Agriculture	6.17E-06	611.3334	1.976287
Inflation Rate	173909.9	9107727	2.641925
Rural-Urban Migration	3942306	1.72449	1.58977
Average Wage in Agriculture	675.8053	17.99449	3.179253

When two or more predictors in a model are correlated, they provide redundant information about the response, which is known as multicollinearity. In Table 2, it can be seen that the Centered VIF shows that the results are less than the threshold which is 10. This implies that the dependent and independent variables are correlated with each other, with Average Wage in Agriculture being the highest (3.17).

Table 3. Normality Test
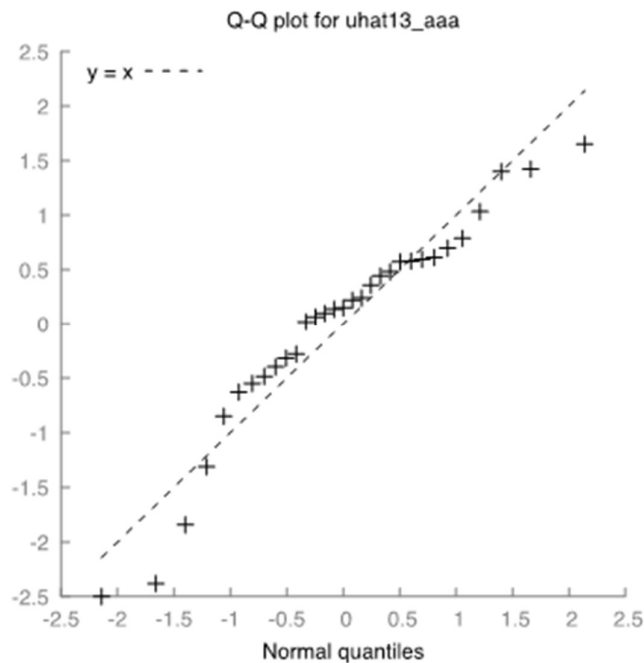
Q-Q plot for uhat13_aaa
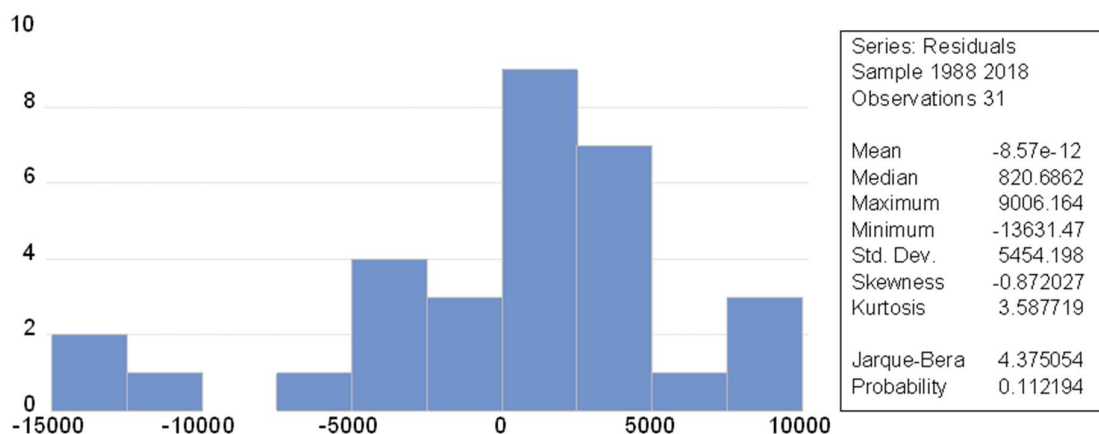
Table 3 shows the Normality Test. Based on the results, table 3 shows a probability of 0.112, which is greater than 0.05 level. This means that the independent variables are normally distributed in relation to the dependent variable. In addition, the Q-Q plot can be used to determine whether the data is normally distributed or if there are any outliers. As shown above, there can be little to no outliers but overall, this shows that there is a normal distribution among the dependent and independent variables.

V. CONCLUSION

This research paper investigated and estimated how rural-urban migration, average agricultural wage, number of agricultural workers, and inflation rate affect agricultural output. The study determined that the data for agricultural output, average agricultural wages, and employment in agriculture has an increasing trend while the trend for the rural-urban migration and inflation rate is decreasing. This paper further explained the relationship of agricultural output in the Philippines and other explanatory variables used in this study.

In conclusion, the researchers successfully completed the objectives by obtaining data on rural-urban migration, average agricultural wages, number of employed in agriculture, and total agricultural output in the Philippines from the Philippine Statistics Authority, World Bank, Banko Sentral ng Pilipinas, and Philippine Statistics Yearbook. The data that were annually utilized from the year 1988 to 2018 using time series analysis. Furthermore, the researchers were able to identify and evaluate how rural-urban migration, average agricultural wages, inflation, and labor affect total agricultural output in the Philippines. With that, this study formulated recommendations to improve the production of agricultural outputs in the Philippines based on its findings.

Based on the study's results and findings, the study recommends the following: 1) Since it is determined that rural-urban migration negatively affects the agriculture output of the Philippines, agencies must make a way to lessen the rates of people migrating from rural to urban places by giving more attention to the rural areas and creating more opportunities for the people within; 2) Wages have a positive relationship with the agricultural output which means that the higher the agriculture wage is, the more agricultural output would be, this should be enough reason to increase what the farmers can get from working in the agricultural sector however, there is an insignificant relationship between wages and agricultural output ; 3) There is only a little increase in the number of employed in agriculture with every 1,000 increase in agriculture output, this means that even if the sector is performing well, people tend to choose other jobs instead of agricultural work. Regional agriculture should focus on providing appropriate regulatory mechanisms and more efficient labor resource utilization in agricultural companies. Agencies should promote the agricultural sector well in order to attract more workers; 4) The finding showed that there is a positive relationship between inflation rate and agricultural output. With that

the study suggests stabilizing the food prices and inflation by creating policies that would be able to control the surplus of agricultural output.

The relationship between the dependent and independent variables that was determined in this study can be the guide of certain government agencies such as the Department of Agriculture (DA), National Wages Productivity Commission (NWPC), Department of Labor and Employment (DOLE), Department of Interior and Local Government (DILG), and the National Economic and Development Authority (NEDA) to further decrease the rates of internal migrants. The outcome of the paper can help in the analysis of socioeconomic issues such as the lack of government support on agriculture. One way to resolve this is to strengthen the sector through improving the machineries and technology in agricultural areas. The government may also organize sponsored training programs for everyone to explain how sustainable farming works. This way, farmers would be more efficient in catering to a larger land. In addition, if higher wages would be given to agricultural workers, more and more people would choose to work and stay in rural areas rather than migrating to urban areas to get a more high-paying job. Another socioeconomic issue would be poverty. Through sustainable farming, farmers would be able to sustain themselves by promoting economical, environmentally sound, and community-friendly farming practices and approaches. The next socioeconomic issue that this paper would like to address is brain drain. As more and more people migrate from rural to urban areas, the less human capital the origin area would have. In relation to this, the study also perceives urban overpopulation as one of the socioeconomic issues that can be addressed. People who relocate from rural to urban places in hopes of finding a better life end up either unemployed or homeless and eventually wind up living in slums, which leads to overpopulation. One way to diminish this issue is by producing opportunities like what urban areas offer. In doing so, people from rural areas will not be forced to migrate to urban cities.

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