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Relationship between Food Security, Macroeconomic Variables and Environment: Evidences from Developing Countries

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Abstract

Lack of food is a problem of present day at national and international level, but this problem become severe in the developing countries. The aim of this study is to check the impact of Macroeconomic variables and Environment on food security in developing countries. Panel data is taken from 1993 to 2016 for Pakistan, India, Indonesia, Bangladesh, Vietnam, Cambodia, Ethiopia, Mozambique, Kenya, Nigeria, Haiti, Guatemala, Honduras, Nicaragua and El Salvador. Then LLC and IPS are used to check stationary, then the Pool Mean Group model (PMG) is applied. PMG model and panel causality tests are used for analysis. The Food Production index is used as a proxy variable of food security. Gross Domestic Product and Population have a positive impact on food production index while CO2 and Combustible renewable wastes (CRW) have also the negative relation with food production index. To increase the goal of food security, there is a dire need of national and international efforts for the better quality of infrastructure in developing countries.

JEL Classification: O5; O11; O13; Q16; Q54

Keywords**:** Food Security; environmental degradation; macroeconomic variables; lower income countries; combustible renewable wastes

1. Introduction

At the beginning of the new century, in a Millennium Summit (2000) of all member countries of the United Nations met. The Millennium Development Goals were established to achieve in year 2015. The purpose of these goals was to overcome the most problematic challenged issues of present day (Millennium Project, 2002-2006). The Millennium Development Goals (MDGs)

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enumerated targets in many dimensions with selected time bound. One of the most alarming issues is to end hunger and to achieve food security. For achieving food security, it is necessary to improve nutrition and stimulate sustainable agriculture (Sustainable Development goal, 2016).

Food security and its determinants are explained in different studies in several ways. It is diversified and advanced after the mid-1970s (Giraldo et al., 2008). There are more than two hundred definitions (Maxwell and Smith, 1992). According to FAO 2000, food security is a situation when safe, nutritious, healthy and dietary needs of food are fulfilled. Food is accessible at all times for all people. So this definition of food security illustrates the four pillars as first is availability, second is stability, third is accessibility, fourth is utilization of food (MDGIF MGD achievement fund UNO Albania).

Literature on integration of food security and agricultural sciences (crops production and animal production) is facing the inadequacy. The population of the world is increasing rapidly, so it will be more than 9 billion in 2050 (FAO, 2014). So it is the need of time to think about the agricultural growth, share and consumption of food. The key solution of this issue is provided by agriculture sector. The 12.9 per cent of the population are undernourished in world. Betterment of agriculture sector can contribute a lot and make easy to achieve food security by producing more food (Sustainable Development goal, 2016).

It will be a great task of people to meet their food, diet, protein, nutrients and energy. The appeal of time is to overcome this challenge which is complicated and difficult at a time. There is hardly indeed of a sustainable farming system which increase food availability and food access for poor people (Modi, 2015). Integrated approach may be helpful for attaining sustainability of agriculture and achieving the goal of food security, especially in lower income countries (FAO, 2014).

Food security is a challenge in these days. But in developing countries the basic reason for the shortage of food is lack of investment and funds in infrastructure of food production system. (Report Global food security index 2015). Similarly, above mentioned countries are also facing the problem of food security. Food security attached with popular consideration and challenge to produce enough food. Food shortage and malnutrition could not alleviate from decades without agricultural policies (Richard et al., 2016).

It revealed the effectiveness of the merge of agricultural science with home knowledge to estimate vegetable production and agro-production and small range economic development. The results showed that the farmers, mostly utilize the crops for domestic use up to (76%) as matched to home market (24%). This is helpful for explaining the combination of crop utilization in forecasting off of farming especially small scale for food security (Modi, 2015). GDP India has been experiencing in the last decade high rate of growth economically. The growth was not only smooth in agriculture, but also slow. It showed by the statistical data that GDP growth rate of India was high, but the growth of across sector was uneven. GDP was rising approximately at a 7-9% rate yearly, at the same time annum agricultural growth rate was only 1.5% (Sasmal et al., 2015). The South Asia as the most exposed area in the World is much affected by the climate change. The climate change persuaded yield losses in production. Climate change has a negative impact in reference of food productivity and safety. Nearly half of the world's poorest people reside in this

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region of South Asia and most countries are agricultural (Bandara and Cai, 2014). The output of the agriculture sector has always been a cause of the increase in CO2. The effect of energy intensity is negative on CO2 emission. CO2 emissions also affect the food production, which is one of the indicators of food security (Lin and Xie, 2016). The CO2 emission's effect on the biofuel of wood after increasing production of crops and land cultivated arable. Due to the increase in demand for food, there was a need for increasing the supply of food. South America can take part in a vital influence on future supply-demand and the balance of crops in the future (Maeda et al., 2015). Not only Biomass production, but also the quality of crops will be affected by climate change. Biomass production and photosynthesis are affected by increasing CO2. A sequence of "free air CO2 enrichment" (FACE) research on barley, wheat and maize's quality were investigated which was effected by biomass production (Erbs, 2015). Studies have shown the co-integration relationship between economic variables and CO2 emission (Zakarya et al., 2015).

Population shocks gave an increasing tendency. Biodiesel has a negative impact due to use of land for fuel rather food (Applanaidu et al., 2013). The global challenges in the reference of decrease in food security is increase in population from 7 million to 9.2 from 2011 to 2050. The changes in climate, by erosion, soil degradation, water shortage, increase demand of land due to urbanization biofuel and bricks making are also effects the food security. An efficient supremacy is needed for implementation of the policies (Lal, 2013).

Macro studies discover the food aid's negative impact on food production, but micro studies fail to do so. For example wheat output decreases because of the increase in food aid in Ethiopia (Farrier et al., 2015). According to Economic decision-makers, food security is a big challenge in developing countries and effect of FDI in agriculture is positive (Slimane et al., 2015). Many different studies showed positive and negative impact of FDI on food security (Keef, 2013).

According to FAO projects, demand for cereals could increase in coming years by 70% especially in 2050. Actions for adoption should be in two areas (1) adoption of accelerated in reference of climate change (2) management for risk aversion. So investment in agriculture is required for innovation in technology (Vermeulen et al., 2012). Availability of food in Pakistan was more insecure. For accessibility of food, the electrification and literacy rate contribute positively (Khan et al., 2012).

The aim of this study is to investigate the effect of macroeconomic variables (population, GDP, Foreign Direct Investment, food production index, receipt of food aid) and environmental variables (CO2 emission, combustible renewable and waste energy) on food production index of the selected Developing countries of world (Pakistan, India, Indonesia, Bangladesh, Vietnam, Cambodia, Ethiopia, Mozambique, Kenya, Nigeria, Haiti, Guatemala, Honduras, Nicaragua, El Salvador). Food availability, the first aspect of food security is focused on this study. There is a dire need for discussion about growing concerns and factors effecting of food security in developing countries and lower income countries. The important thing is the identification of the determinants for the assistance of policy makers. It will be also helpful for researchers to make decisions and policies for achieving the food security. Next section consists of methodology followed by empirical results, discussion and conclusion.

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2. Methodology

In this study, penal data is used from 1993 to 2016 years and 15 countries of selected developing countries of the world.

2.1 The data

Table 1. List of Particular Variables

Variables	*Variable's abbreviations*	*Sources*
FPI	Food Production Index, The Food production index consists of edible crops which have contained nutrients and nonnutritive goods are not in this index	World bank
GDP	Gross Domestic Production per capita	World bank
CO2	Carbon dioxide emissions (CO2) in metric tons	World bank
CRW	Combustible renewable and waste contains biogas, solid biomass, industrial waste, liquid biomass, which are measured in percentage form of total energy used.	World bank
POP	Total Population regardless legal status or citizenship, all residents are counted. Refugees who are not permanently settled or are generally considered the part of their origin country and they are counted in the population of their own country.	World bank
FA	Receipt of Food Aid receipts of the volume of cereals selected, which is transferred to deserving countries from donors	Food Security Portal
FDI	Foreign Direct Investment Net inflow (BOP Current US$)	world bank

Source: Author's Calculation.

2.2 Model Specification

Following model is constructed to check the impact of Macroeconomics and Environmental indicators on the food production index:

FPI=f (LGDP, LPOP, LFDI, LFA, LCO2, CRW)

The general form equation is given below:

$$FPI=\beta 0+\beta 1t(LGDP)+\beta_{2t}(LPOP_{2t})+\beta_{3t}(LFDI_{3t})+\beta_{4t}(LFA_{4t}) + \beta_{5t}(LCO2_{5t})+ \beta_{6t}(CRW_{6t})+\varepsilon it \quad (1)$$

FPI= Food Production Index.

LGDP=Log of Gross Domestic Production.

LPOP= Log of Population.

LCO2= Log of Carbon dioxide.

LFDI= Log of Foreign Direct Investment.

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LFA= Log of Food Aid Receipts

CRW= Combustible renewable and waste energy.

β0=Intercept, =slope coefficient, εit =Error term, t=1,2,3,4,5……24 (time periods)

I = 1, 2 …...15 (for countries)

2.3 Econometrics Methods

2.3.1 Panel Unit Root Test

A unit root means that series is not stationary. It is a formal method for checking stationary. It is also applied to time series as well as panel data (Zakarya et al., 2015).

2.3.1.1 The Levin and Lin test (L.L.C)

Levin and Lin test was an extension of previous test 'DF' test (Asteriou and Hall, 2007). Stationary is measured by homogeneity. General equation is as follows

$$y_{it} = \beta o_i + \rho y_{i,t-1} + \Delta y_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

Here βoi varies from cross sectional units and is called intercept. ρyi,t-1 shows a a coefficient of a variable(lagged independent) which is homogenous restricted among all panel individuals members. yi, t-1 shows the series of countries (i=1……N) w.r.t time (t=1….T). εi,t is error term and throughout the unit of sample is independent (Asteriou and Hall, 2007).

2.3.1.2 Im, Pesaran and shin (IPS) Test

Im, Pesaran and shin in 1997 extended LLC test to allow heterogeneity yi, t-1 coefficient.(Asteriou and Hall, 2007). Each i section estimation is provided by IPS test. Different specifications allow for different parametric values not only residual variance, but also lag lengths. The model is given as

$$Yit = \alpha i + \rho yi,t\text{-}1 + \Delta yi,t\text{-}1 + \delta it + \mu i,t \quad (3)$$

Here α represents intercept, ρyi,t-1 is a coefficient of a lagged variable. i shows series for countries and t for time period, μi,t is error term. The basic assumption of Panel data, at least some of the parameters in same across panel are same; this assumption refers to as a pooling assumption. When this pooling assumption is not true, then some problems related to bias arise under certain circumstances and in dynamic or static models. Then suggested the model which is called dynamic autoregressive distributed lag (ARDL) model (Asteriou and Hall, 2007).

2.3.2 The Pooled Mean Group Estimators (PMG)

For average technique this is a weak test to apply, and is designed to estimate just long-run parameters not even short-run dynamics. According to Pesaran and Smith (1995) in all countries the dynamic specification remains common while the implausibility also exists, it is convincible the parameters in long-run on any common model. So the estimation by averaging the countries individually or long-run parameter's pooling, but there is a condition of allow about data and a system to estimate the model. Pasaran, Shin and Smith (1999) bring up to this towards pooled

mean group estimator (PMG). PMG estimation shows that long-run coefficients of the same across countries are constrained but in short, run coefficients can be varied. In conclusion, large number of unit roots exist in literature, yet no clear direction is present for the use of these tests. So the selection of appropriate method for estimation will be decided on the bases of the results of stationary in the next this underlying research (Asteriou and Hall, 2007).

3. Results and discussion

Results of IPS and LLC panel unit root test are displayed in Table 2. These results are based on panel unit root test at level and 1st difference with constant and trend. The stationary is checked through both intercept and trend. However, the results are shown that there are some variables which are stationary at level and some are stationary at 1st difference. So it is confirmed by results that series consists of heterogeneous data and heterogeneous integrated order like some variables are stationary at 1st difference and some at level (see table 2). For long-run coefficients estimation, PMG estimation technique is considered as appropriate technique. Therefore, Pooled Mean Group (PMG)/ Auto Regressive Distributed Lag Model (ARDL) are used to estimation of the model.

3.1 Unit Root Test Results

The test of Im, Pesaran and Shin Shin W-stat (IPS)'s results are shown in table 2. The t-statistic values are also calculated. Calculation is based on firstly intercept and secondly trend and intercept. The t-statistic values of FPI Intercept and with Trend and Intercept are respectively -6.35157 and -3.75010 and significant at first difference is at 10% and 5%. Log of POP is significant at level with the values of t-statistics with intercept -8.10840 and with intercept and trend is -11.6124 at 10%, 5% and 1% level. Log of GDP, FDI and FA are also significant at first difference at level of 10%, 5% and 1% level given the t-statistic values with Intercept and with Trend and Intercept of GDP -6.04968, -4.45661 FDI -11.2050, -9.50422 AID -9.65021, -7.92865 at level of 10%, 5% and 1% level. While, the log of CO2 is significant at first difference at 10% and 5% level, given the t-statistic values -9.74979 and -8.49633 respectively with Intercept and with Trend and Intercept. CRW is also significant at first difference with t-statistic with intercept -6.80642 and -5.46449 with intercept and trend.

Table 2: IPS Test result

Variables	*At Level*				*At First Difference*			
	η_c	P-value	$\eta_{c,t}$	P-value	η_c	P-value	$\eta_{c,t}$	P-value
FPI	3.48635	0.9998	0.70351	0.7591	-6.35157	0.0000***	-3.75010	0.0001**
LGDP	4.12619	1.0000	1.04502	0.8520	-6.04968	0.0000***	-4.45661	0.0000***
LPOP	-8.10840	0.0000***	-11.6124	0.0000***	-6.14680	0.0000***	-13.2342	0.0000***
LFDI	-0.75230	0.7741	-0.44219	0.3292	-11.2050	0.0000***	-9.50422	0.0000***
LFA	-1.22060	0.8889	0.99305	0.8397	-9.65021	0.0000***	-7.92865	0.0000***
LCO2	1.73998	0.9591	0.43396	0.6678	-9.74979	0.0000***	-8.49633	0.0000***
CRW	1.49319	0.9323	2.19345	0.9859	-6.80642	0.0000***	-5.46449	0.0000***

Source: Author's Calculation. Significant level 10%, 5% and 1% are shown by *, **, *** respectively. SIC is used for based of lag length.

Table 3 shows the LLC panel test results at level and 1st difference while the results also show the values with trend and without trend. These findings show that some variables of selected

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series are stationary, and some variables are non-stationary at level. So FPI, LCO2 and LGDP are stationary at first difference with the t-statistic values without intercept and with trend and intercept respectively as FPI -3.88427 and -2.25294, LCO2 -6.53702, -4.28620, LGDP -4.22021 and -3.58669. CRW is also stationary at first difference and its t-statistics values are -4.10405 and -2.22744 at level of 10% and 5% level. So it is concluded that integrated order of all series is different like LFA is stationary at 1st difference with values of t-statistics without trend and with trend LFA -5.78881 and -3.88275. LPOP is stationary at I (0) with values of the t-statistic values, respectively as without trend and with trend LPOP -9.21047 and -10.2073 at level of 10%, 5% and 1% level. LFDI is also stationary at 1st difference with t-statistics values without and with trend respectively -11.6559 and -10.1211 at level of 10%, 5% and 1%.

Table 3: LLC Panel unit root test results

Variables	*At Level*				*At First Difference*			
	η_c	P-value	$\eta_{c,t}$	P-value	η_c	P-value	$\eta_{c,t}$	P-value
FPI	0.87736	0.1901	2.37029	0.9911	-3.88427	0.0001**	-2.25294	0.0121**
LGDP	0.49568	0.6899	2.67190	0.9962	-4.22021	0.0000***	-3.58669	0.0002**
LPOP	-9.21047	0.0000***	-10.2073	0.0000***	-6.41853	0.0000***	-9.88214	0.0000***
LFDI	-0.27346	0.3922	14.1871	1.0000	-11.6559,	0.0000***	-10.1211	0.0000***
LFA	-1.53308	0.0626	2.51114	0.9940	-5.78881	0.0000***	-3.88275	0.0001**
LCO2	1.42116	0.9224	-0.70795	0.7605	-6.5370	0.0000***	-4.28620	0.0000***
CRW	-1.39772	0.0811	1.62643	0.9481	-4.10405	0.0000***	-2.22744	0.0130**

Source: Author's Calculation. Significant level 10%, 5% and 1% are shown by *, **, *** respectively. SIC is used for based of lag length.

3.2 Pooled Mean Group/ ARDL Estimation

To find the integrated order, Im, Pesaran and Shin (IPS) test and Levin, Lin and Chu (LLC) Test tests have used for variables like Food production index (FPI), Log of GDP, Log of Population (LPOP), Log of Foreign direct investment (LFDI), Log of Food aid(FA), Log of CO2 (LCO2) and Combustible renewable wastes (CRW). From the results, it is clear that some variables are stationary at level I (0) and some are stationary at first difference I (1) (Asteriou 2009). In PMG approach, the first step is to estimate coefficients and to check their long-run relationship. The Short-run relationship is examined by Error correction model which examines the divergence and convergence towards equilibrium. This model also shows the time of divergence or convergence towards long-run equilibrium.

Model: FPI=f (lgdp, lpop, lfdi, crw, lco2, lfa)

It is shown by the results (see table 4) that CRW and CO2 have insignificant effect on FPI in short-run at present and time of lag. The coefficient values of CRW and CO2 shows that their positive impact on food production index (proxy for food security) in present time and negative in previous year. It means when Combustible renewable and wastes and carbon dioxide increase, the food production also increases in the short-run, but decrease in the last year (Parry,1994). Combustible renewable and wastes also have a negative relation with production of food because the use of agricultural products as a fuel is an alternative of food so it is justified that Combustible renewable wastes have a negative relation to food security. Mostly biofuel and biomass are produced from corn sugar beets and wheat so increase in biofuels decrease the food items related to agriculture (Demirbas,2009). Same in case of carbon dioxide because it also has a negative impact on food security because of a permanent increase in temperature and Green House Effect

GHE decrease the productivity of food after a specific point, especially in developing countries where natural calamities are not cured by different policies (Dhillon et al.,2013). GDP is insignificant at present and significant with lag value. GDP has negative relation with FPI because, when GDP increase then there is much chance to increase investment in industrial sector rather than agriculture sector (Sasmal et al.,2015). Food aid is significant at present and have positive a impact on production of food (Nino et al.,2007). Food aid positively related to food security and agricultural product food crops (Galen at al., 2007) as is shown here, but with the lag it shows the negative impact because empirical evidence showed that recipients of production of food have significant disincentive results from food aid (Abdulai et al., 2005). Foreign Direct Investment shows two different results of significant with lag and without lag. In short-run Foreign Direct Investment can increase availability of food by increasing food supply (Slimane et al., 2005). Population growth is significant at present and not in the last year (Applanaidu et al., 2013). Population causes an increase in food demand so food production has to increase to meet increasing demand (Schneider et al., 2010).

Table 4: PMG/ARDL in Short-Run, Macroeconomic and Environmental Impact on FPI

Regressors	*Coefficients*	*T-Statistics*	*Probability*
ECM term	-0.454438	-4.341199	0.0000***
$D(LGDP)_{it}$	-6.163191	-0.689779	0.4914
$D(LGDP)_{it-1}$	-8.541108	-1.745611	0.0830*
$D(LPOP)_{it}$	6364.345	1.680543	0.0950*
$D(LPOP)_{it-1}$	-6688.234	-1.854729	0.0657 *
$D(LFDI)_{it}$	-0.825238	2.479116	0.0146**
$D(LFDI)_{it-1}$	0.909296	1.233331	0.2195
$D(CRW)_{it}$	0.148029	0.345099	0.7305
$D(CRW)_{it-1}$	-0.548759	-1.288678	0.1996
$D(lCO_2)_{it}$	3.962096	0.713062	0.4770
$D(lCO_2)_{it-1}$	-5.781039	-1.004236	0.3169
$D(lFA)_{it}$	7.898640	2.050232	0.0422**
$D(lFA)_{it-1}$	-0.050983	-0.022459	0.9821
Constant	-1127.918	-4.413935	0.0000***

Source: Author's Calculation, *, **, *** shows level of significant at 10%, 5% and 1% respectively. PMG/ARDL, Lag structure is (1,2,2,2,2,2,2)

Error Correction Term

Error Correction Term is -0.454438 which is ECM<1 (less than 1) and negative (see table 4). Negative sign shows the tendency stabilities of short run towards long-run equilibrium. Value of probability shows significant at 1%, 5% and 10%. So there is a long run relationship exists. ECM coefficient is -0.45 implying convergence from short run equilibrium towards long run that in each year equilibrium has corrected by 45% in every year.

Table 5 illustrates the long-run impact of macroeconomic and environmental variables on food security (food production index as a proxy). As compared to short-run, the results of long-run presents better outcomes of all variables. It is basically a linear log model as say that independent variable with log and dependent without log. It can be interpreted as 1 % increase in independent variable brings 1/100-unit change in dependent variable.

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Gross domestic product per capita has a positive effect on food security (Applanaidu et al., 2013). According to table 5, 1% increases in GDP will lead to 0.054 units increase in food production. GDP is positive and significant in long run at level of 10%.

Log of population is significant at 10% 5% and 1 %. It is positively related with food security (Schneider et al.,2011). 1% increase in population lead to 1.45% units increase in food production (Applanaidu et al., 2013).

Log of foreign direct investment is significant at level 10%, 5% and 1 %. And the coefficient value is 3.2365 the sign of the coefficient is positive, which indicate the positive relation between FDI and food production (Slimane et al., 2015). The value of the coefficient indicates that 1% increase will be a cause of 0.032 % increase in production of food.

Combustible renewable wastes also show a positive relation to food production index because its coefficient value is 0.782 which shows the positive relation because of its positive sign. CRW is significant at 10%, 5% and 1% level. The results show that 1% increase in Combustible renewable wastes will lead 0.78 % increase in food production (Dhillon et al..,2013).

The table point out that lco2 is negatively related to the production of food as is shown by its coefficient which is -10.2171 lco2 is significant at all levels like 5% and 10%. The value of coefficient shows that 1% increase in co2 affects the food production 0.10%. The impact will be negative on food production (Parry,1994).

The last variable is a log of food aid which is insignificant at just 10%, 5% and 1 % level of significant. The value of is coefficient 0.457 which shows positive relation with food production. It means 1% increase in food aid will bring 0.004% change in dependent variable food production. Positive sign shows increase in food production with an increase in food aid (Ninno et al.,2007).

Table 5: PMG/ARDL in Long Run

Regressors	*Coefficients*	*T-Statistics*	*Probability*
Lgdp	5.434061	1.700490	0.0912*
Lpop	145.5165	18.76290	0.0000***
Lfdi	3.236526	6.311301	0.0000***
Crw	0.782099	8.735877	0.0000***
lco2	-10.21711	-3.222429	0.0016**
Lfa	0.457015	0.634113	0.5270

Source: Author's Calculation PMG/ARDL lag structure is (1, 2, 2, 2, 2, 2, 2).*, **, *** show significant level at 10%, 5% and 1% respectively, Fpi=5.43$lgdp$+145.52$lpop$+3.24$lfdi$+0.78crw-10.22$lco2$-+0.46lfa (4)

4. Conclusion And Recommendations

This study is done by consuming the penal data of fifteen developing countries from 1993 to 2016. Unit root tests like IPS and LLC are used for checking stationary of selected developing countries of the world. PMG/ARDL techniques are applied to analyze the impact of macroeconomic and environmental effect on food security in selected developing countries. The main objective is to find out the solution of food insecurity with utilizing the macroeconomic and environmental factors.

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The model describes the Macroeconomic factor (Gross Domestic Product, Population, Foreign Direct Investment, Food Aid) and Environmental factors (CO2 and Combustible Renewable Wastes) and their impact on food security. The results of the model show that POP, GDP, FA, FDI, CO2 Combustible Renewable and Wastes significantly affected the food production of developing countries. There is 45% convergence from short-run to long-run in every year. It is concluded that, due to the increase of population, food production also increases but not enough. Similarly, the GDP effects the food production. FDI, FA, CO2 and CRW are also effecting the food production index (used as a proxy variable for Food Security).

To achieve of "goal" of food security, it is necessary to control the rapid increase of population. To equalize the demand and supply of food. The findings of studies confirm that with the increased use of combustible renewable wastes for producing more biomass and biodiesel fuels can decline the use of land for food production. The biomass and biodiesel industry should be under control. Government of developing countries should fix the funds for the betterment of the agriculture by utilizing the funds in research and technology, which will be helpful to increase the food production by improving field yield and irrigation system. From the results, it is clear that FDI affects food security. So it is recommended that developing countries should use FDI to improve infrastructure of agriculture and facilitates the food producers because of these improvements more foreign direct investment will be captured in rural areas of developing countries. Food aid can affect positively if the government plays its vital role effectively to integrate the programs for the development of economy with food aid. The most important suggestion is that, the policy maker institutions and persons should be deeply connected with new research.

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