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Effect of Agriculture on Poverty Reduction in Nigeria: A Multifaceted Approach Using Principal Component Analysis

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Abstract: This study examined the effect of agriculture on poverty reduction in Nigeria. These were with the view to examining the relative effectiveness of crop production, livestock farming, forestry and fishery on poverty reduction in Nigeria. Annual data over the period of 1981 to 2014, sourced from the World Bank Development Indicators and the Central Bank of Nigeria (CBN) Statistical Bulletin was used for the study. Time series econometrics (Principal Component Analysis and Vector Error Correction Model) was applied to generate poverty index, and the interaction among the variables respectively. The result of the variance decomposition established that a shock on Crop production, Livestock rearing, Forestry and Fishery respectively have significant and lasting impact on poverty reduction long into the future. The paper recommends that strengthening the agriculture sector especially crop production with fertilizer, improved seedling, training of farmers and dredging of dams to aid dry season farming are viable policy decisions that could inject a sustained drive for poverty reduction.

Keywords: Poverty Reduction, Agriculture, Principal Component Analysis

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I. INTRODUCTION

One of the challenges facing mankind is how to provide an equitable standard of living, adequate food, clean water, safe shelter and energy, a healthy and secured environment, an educated public, and satisfying job for the present and future generations. Inability to meet this needs have been refered to as the presence of poverty (Bwamwojo, 2013). Ranger Nurkse in "Problems of Capital Formation in Underdeveloped Countries" describes poverty as the basic cause of under-development of poor countries. According to him, a country is poor because it is poor. Being poor, a country has little ability or incentive to save. The low of saving leads to low level of investment and to deficiency of capital. The low of investment leads to low level of productivity. When the productivity per worker is low, the real income will obviously be low and so there poverty and vicious circle is complete (Nurkse, n.d).

The Incidence of poverty in Sub-Saharan African is increasing faster than population (World Bank 2015) which has led to largely dependence on relations and friends for a bit of sustenance (Noko, 2016) and lost in the necessities of life in Africa which include basic food, shelter, health, and safety. Empowering rural people especially through agriculture is an essential first step to eradicating poverty (Warr, 2001). Agriculture is the foundation and bedrock upon which the development of stable human community has depended on throughout the whole universe such as rural and urban communities. It is concerned with the husbandry of crops and animals for food and other purpose (Tochuwu, 2012).

Nigeria as a nation is characterized with alarming poverty rate considering its high level of natural and human endowments. The World Bank (2007) records show that Nigeria has a substantial percentage of its population living below the national poverty line. An appraisal report by the Africa Development Fund (2005) reported that Nigeria ranks number 151 in the 2004 Human Development Index. Nigeria's basic indicators place the country among the 26 poorest countries in the world. The proportion of Nigerians living below the poverty line of one dollar a day has increased dramatically during the last two decades. In the year 2000, more than 70% of Nigerians were estimated to be living below the internationally defined poverty line of one dollar a day. In the same year, both per capita income and per capita private consumption which are two major indicators of poverty index were lower than the early 1970s. Per capita income fell from $1,600 in 1980 to $290 in 2002. This is due to, among others, neglect of the agriculture sector, depreciation of the naira and economic mismanagement by the both the military and civilian governments at all level. Average GDP per capita has oscillated between US $ 355 and 387.5t

In addressing poverty issue in Nigeria, Udofia and Essang (2015) noted that poverty in Nigeria is mostly a rural phenomenon and agriculture has been highlighted as the sector that could best touch the poor as it is at the heart of the livelihoods of the rural people. Agriculture was noted to be a key driver of growth in recent years with high potential of reducing poverty among Nigerians. Notwithstanding the enviable position of the oil sector in the Nigerian economy over the past three decades, the agricultural sector is arguably the most important sector of the economy. Agriculture's contribution to the Gross Domestic product (GDP) has remained stable at between 30 and 42 percent, and employs 65 percent, of the labour force in Nigeria (Emeka 2007). It is estimated to be the largest contributor to non- oil foreign exchange earnings. This means that agriculture holds abundant potential for reducing poverty. The Nigeria economy could reasonably be described as an agricultural economy, because agriculture served as the engine of growth of the overall economy (Ogen 2003).

Evidences abound that almost 90% of Nigeria's poor are engaged in agriculture (**African** Development Bank, 2005). Agricultural sector of a less-developed country plays a paramount role in the physiology of the economy. This show the reason why increase in agriculture output will go a long way in reducing poverty, but more importantly, the sector is required to play a critical role in the development pace and pattern of the country. As food security is a strategic development objective for long-term survival of the nation, then the agricultural sector has to play the critical role of supplying relatively cheap food to both the poor villagers and the urban industrial sector to check inflationary tendencies of workers' wages where inadequate food availability leads to rising food prices and consequent poverty and industrial unrest as workers intermittently demand for upward review of minimum wage to meet basic needs (Kolawole and Omobitan, 2014).

Empirically, studies have examined the relationship between agriculture and poverty reduction in both cross country and country specific analysis. The discussion on the relationship between agricultural output and poverty remains contentious as controversies exist on the effect it has on poverty reduction. Some emphasize that the relationship is positive i.e increase in agriculture output reduces poverty. This include among others the work of Ravallion and Datt (1996 and 2002); Gustavo and Kostas (2007) etc. Although some studies like Suryahadi and Hadiwidjaja (2011); Kolawole and Omobitan (2014) and Udofia and Essang (2015) stressed that the agriculture output has no effect on poverty reduction, while Besley, et al (2005) conclude that the relationship that exist between them is neutral. It is important to note that most of these previous studies focus on cross-country analysis.

Most studies that focus on Nigeria made use of country specific with the studies looking at the agriculture sector in the aggregate form without considering each of the sub-sector within the agricultural sector and the effect each of the sub-sector has on poverty reduction. Also, in measuring poverty index, many studies have used real per-capita without considering other poverty indicators like rural development measured by per worker agricultural value added and consumption per capita which represents access to resources needed for a decent standard of living, (Olofin, Adejumo and Sanusi, 2015). Therefore, this study examined the multifaceted nature of poverty which Index will be compiled on two pillars and the effect of each of the agriculture sub-sector on poverty reduction in Nigeria.

II. LITERATURE REVIEW

Studies abound in economic literatures that investigate the interaction between agriculture and poverty reduction. Majority of these studies suggest that agriculture have strong significant effect on poverty reduction. For example, Timmer (1994) noted from his study that there existed a direct link between agricultural development, food availability, caloric intake by the poor and reduction in poverty. According to him, the essential first step in breaking the cycle of poverty is to increase agricultural productivity.

In line with the importance of agriculture, Ogunfiditimi (1996) stress that up till the late 1950, agriculture contributed over 60 percent of total GDP. He also argued that even though its percentage contribution has fallen drastically in recent years due to oil boom and the growth of the industrial sector, the agricultural sector still provides employment for over 70 percent of Nigerians through farming and agro-allied industries within the country.

Confirming with the above claim, Abayomi (1997) observed that in most developing countries, agriculture is both the main traditional pursuit and the key to sustained growth of the modern economy. He further states that economic growth has gone hand in hand with agricultural progress, as rising agricultural productivity has aided industrialization.

In a counter and recent analysis on this subject matter, Kolawole and Omobitan (2014) empirically investigate the impact of agricultural sector on poverty reduction in Nigeria over the period 1986 to 2012. Among econometric techniques employed for the research, the error correction mechanism (ECM) model reveals that food production index and government spending had negative impact on poverty headcount ratio in the country.

Using a Time series data from 1980 – 2012, Udofia and Essang (2015) investigate the relationship between expenditure on agriculture and poverty alleviation in Nigeria. The adopting the Ordinary Least Square

(OLS) as the tool of analysis, findings show a clear but insignificant response of poverty reduction to agricultural growth. It was also found that the dismal performance of the sector is largely responsible for its insignificant positive impact on poverty.

Oni (2014) examines the role of agriculture in poverty reduction in Nigeria between 1980 and 2011. The results from the Augmented Dickey-Fuller (ADF) unit root test and Error Correction Mechanism showed that per capita agricultural GDP, physical infrastructure per capita and social infrastructure per capita were positively and significantly related to poverty reduction while per capita non-agricultural gross domestic product (GDP) and inflation rate were negatively and insignificantly related to poverty reduction in Nigeria. The study therefore recommends among others that government should provide the needed assistance to Nigerian farmers to transform and adopt the use of modern technology so as to stimulate higher productivity in agriculture and reduce the level of poverty in the country.

In Observing the role of agriculture in reducing poverty vis-à-vis accelerating economic development for the period 1976-2004, Azuh (n.d.) employed the Ordinary Least Square (OLS) regression method and co-integration test. The results show that, all the agricultural development opportunities identified captured with different variables are all equally significant in enhancing the level of agricultural output and in reducing poverty.

In a recent study that corroborates the study of Azuh (n.d.), Nwankpa (2017) examined the agricultural transformation via-a-vis hunger and poverty eradication as a means of sustaining economic growth and development in Nigeria. The study reported that about 80 percent of Nigerians live in rural areas and agricultural sector remains the main provider of livelihood for most rural dwellers and a major contributor to Nigeria growth rate besides oil and gas sector.

III. METHODOLOGY

The theoretical framework underpinning the study has its basis on Lewis (1955) model. Lewis viewed economic development as a process of relocating factors of production from an agricultural sector characterized by low productivity and the use of traditional technology to a modern industrial sector with higher productivity. Lewis‟s theory was interpreted as advocating industrialization and used to justify government policies that favoured protection for domestic industries and, explicitly or implicitly, taxed the agricultural sector (Kirkpatrick and Barrientos, 2004). That theory and it implications for policy have been largely debunked by later work and the degree to which economic policies of developing countries discriminate against agriculture has lessened dramatically in recent decades (Anderson and Valenzuela, 2008).

A paper produced by DFID (2004) emphasizes the historically close correlation between different rates of poverty reduction over the past 40 years and differences in agricultural performance – particularly the rate of growth of agricultural productivity. The authors see links between agriculture and poverty reduction as being forged through four, "transmission mechanisms": (i) direct impact of improved agricultural performance on rural incomes; (ii) impact of cheaper food for both urban and rural poor; (iii) agriculture's contribution to growth and the generation of economic opportunity in the non-farm sector; and (iv) agriculture's fundamental role in stimulating and sustaining economic transition, as countries (and poor people‟s livelihoods) shift away from being primarily agricultural towards a broader base of manufacturing and services. They go on to note that the potential for future poverty reduction through these transmission mechanisms depends on the extent to which agricultural productivity can be increased where it is most needed.

Following the theoretical foundation above, this study adopt the second transmission principle as outlined by DFID (2004) cheaper food (as a result of much agriculture output) will reduces poverty. Hence, the specification of the model adopted for this investigation is implicitly stated as follows:

$$POVR = f(AGRIC) \text{ -- -- -- -- -- -- -- -- } (3.1)$$

Where: POVR is poverty reduction and AGRIC is the agricultural output. Since agriculture in Nigeria is divided into various sub-sectors, the agricultural output will therefore be decomposed to include all the sub-sector, hence equation 3.1.

$$AGRIC = f(Crop, Livestock, Forest, Fish) \text{ ---- -- -- -- } (3.2)$$

By integrating equation (3.2) into equation (3.1), while also showing the intercept and stochastic term and finding the logarithm function of the agriculture component, the new equation which will show the effect of each sub-sector of the agricultural output on poverty reduction in Nigeria now becomes:

$$POVR = \beta_0 + \beta_1 \ln Crop + \beta_2 \ln Livestock + \beta_3 \ln Forest + \beta_4 \ln Fish + \varepsilon \quad (3.3)$$

Where: POVR is poverty reduction Index, Crop is the general crop production in Nigeria, Livestock is the total livestock production in Nigeria, Forestry and Fish are both forestry conservation and fishing production respectively in Nigeria. ε is the stochastic term which represents other factors that may determine poverty reduction which are not captured in the model. While β_0, β_1, $\beta 2$, $\beta 3$, and β_4 are the parameters. On apriori expectation, β_1, β_2, β_3, and β_4 are expected to be < 0.

Data Sources, Description and Estimation Technique

In measuring poverty, this study considers the multifaceted nature of poverty by measuring it with index generated from combination of rural development measured by per worker agricultural value added and real per capita income which represents access to resources needed for a decent standard of living (Olofin, Adejumo and Sanusi 2015). This was done using Principal Component Analysis (PCA). The PCA is a multivariate statistical method used to reduce the number of variables without losing too much information. It is efficient in generating fewer numbers of variables that explain most of the variation in the original variables. While the new variables generated are linear combinations of the original variables, the first new variables will account for as much as possible of the variation in the original data (see Messiah, 2015). The secondary and time series data was use for this study. The data for Crop production, Livestock production, Forestry output and Fishing Output will be sourced from the Central Bank of Nigeria (CBN) Statistical bulletin (2013). Data on agricultural value added, real per capita income, were obtained from the World Development Indicators (2013)

To estimate the model, the statistic properties of poverty reduction, crop production, livestock, forestry and fishery were considered as well as the lag selection test to determine the lag length of the model. Unit root tests on both variables were carried out using the Augmented Dickey-Fuller (ADF). Also, the long-run association of the variables was tested using the Johansen co-integration test. In estimating the model, VEC model was considered. The VEC model is a natural progression from a VAR representation especially when the variables of interest are not stationary at their levels and are cointegrated. The model also provides a simple framework to systematically examine the rich dynamics in multiple time series. It provides a coherent and credible approach to data description, forecasting, structural inference, policy analysis and error free method of estimating economic relations (Sim, 1980). A. VECM also combines the long-run relationship with a short-run adjustment process and gives a suitable tool for policy analysis when the series are non-stationary. The VECM representation as below:

$$\Delta y_t = \theta + \sum_{i=1}^{n} \beta_i y_{t-1} + \lambda ECM_{t-1} + \varepsilon_t \quad \text{-- -- -- -- --} \quad (3.4)$$

Where Δ is the differencing operator, such that $\Delta y_t = y_t - y_{t-1}$

Where y_t is an (n x 1) column vector of the endogenous variables, θ is an (n x 1) vector of constant terms, β represent coefficient matrices. y_t is the 5 x 1 vector of the variables included in the model (POVR, Crop, Livestock, Forestry, Fish), θ is the 5 x 1 vector of constant terms and β is the 5 x 5 matrices which include the interactive coefficients of the variables involved in equation 3.3, and lastly λ is the 5 x 1 vector of coefficients for each of the error correction terms and ε_t is the vector of disturbance term. The vector error correction model pertaining to the five (5) variables incorporated into the model for the study is expressed below:

$$\begin{bmatrix} \Delta POVR_t \\ \Delta Crop_t \\ \Delta Livestock_t \\ \Delta Forestry_t \\ \Delta Fish_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \end{bmatrix} + \sum_{i=0}^{k} \begin{bmatrix} \beta_{1i}\theta_{1i}\pi_{1i} \\ \beta_{2i}\theta_{2i}\pi_{2i} \\ \beta_{3i}\theta_{3i}\pi_{3i} \\ \beta_{4i}\theta_{4i}\pi_{4i} \\ \beta_{5i}\theta_{5i}\pi_{5i} \end{bmatrix} \begin{bmatrix} \Delta POVR_{jt-i} \\ \Delta Crop_{jt-i} \\ \Delta Livestock_{jt-i} \\ \Delta Forestry_{jt-i} \\ \Delta Fish_{jt-i} \end{bmatrix} + \begin{bmatrix} \lambda_1 \\ \lambda_2 \\ \lambda_3 \\ \lambda_4 \\ \lambda_5 \end{bmatrix} [ECM_{t-1}] + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \end{bmatrix} \quad \text{--(3.5)}$$

Where: $\alpha_i = \theta$; a (3 x 1) matrix of the constants; $0 \leq i \leq k$, and k is the lag length selected based on the Akaike Information criterion (AIC) and the Final Prediction Error (FPE) and $t > 0$. The AIC and FPE are considered most appropriate for the study because they minimize the chance of under estimation while maximizing the chance of recovering the true lag in a small sample of 60 observations or less (Liew, 2004; Orisadare and Agu, 2016). $\Upsilon > 0$; and Υ is a vector of the estimated parameters in the VECM equation. The proportionate impact of one standard deviation shock of each of the agriculture sub-sector on poverty reduction was examined using the variance decomposition tool found in the VECM.

IV. EMPIRICAL RESULTS

Unit Root and Cointegration Test

The decision rule adopted is, if the absolute value of the ADF test is greater than the MacKinnon (1991, 1996) 1%, 5% or 10% critical value, then the null hypothesis is rejected, but if the absolute value of the ADF and PP test is less than MacKinnon (1991, 1996) critical value, it is concluded the tested variables are non-stationary. An observation of table 4.1 shows that our entire variable which include Poverty reduction index, crop production output, livestock output, forestry output and fishery output are not stationary at level but at their first difference.

Table 4.1: Result of the Augmented Dickey Fuller (ADF) Unit Roots Test on Variables

VARIABLES	AUGMENTED DICKEY FULLER			
	t- statistic			Remark
	Level	1st Difference	2nd Difference	
Poverty_Index	0.327545	-5.771860*	-	I(1)
lnCP	-0.136353	-5.714304*		I(1)
lnLST	-0.226796	-5.707917*	-	I(1)
lnFORT	-0.009402	-5.635491*	-	I(1)
lnFISH	-0.014634	-5.617434*	-	I(1)

Source: Author's Computation, 2017

NOTE**:** One, two and three asterisk denotes rejection of the null hypothesis at 1%, 5% and 10% respectively based on critical value. For the augmented Dickey –Fuller (ADF) test, the automatic maximum lag length based on Schwarz information criterion is applied.

Since all data for this study are all I(1) variables, we therefore test for the existence of co-integration among the variables in order to capture know the long run relationship among the variables. This study followed the multivariate co-integration methodology proposed by Johansen and Juselius (1990). The trace test and the Max-Eigen test from this technique were utilized to establish the number of co-integrating vectors and the results are as reported in Table 4.2. The Trace test indicate two co-integration equation while the Max Eigen test also indicate two co-integrating equation at 5% significant level. This implies that there is long-run association between poverty reduction and the different subsector of agriculture at the 5% significant level, hence, the linear combination of two or more of these variables exhibit a long-run relationship.

Table 4.2: Co-Integrating results (with a linear deterministic trend) where r is the number of co-integrating vectors Lag interval (1 to 3)

Trace Test				**Max-Eigen Test**			
Null	Alternative	Statistic	Critical Value (5%)	Null	Alternative	Statistic	Critical Value (5%)
r = 0*	r = 1	130.38392	69.81889	r =0*	r = 1	74.04241	33.87687
r ≤ 1*	r = 2	56.34683	47.85613	r ≤1*	r = 2	29.96074	27.58434
r ≤ 2*	r = 3	26.38609	29.79707	r≤ 2	r = 3	16.61052	21.13162
r ≤ 3	r = 4	9.775572	15.49471	r ≤ 3	r = 4	9.601944	14.26460
r ≤ 4*	r = 5	0.173628	3.841466	r≤ 4*	r = 5	0.173628	3.841466
Trace test indicates 2 co-integrating equations at the 0.05 level.				Max-Eigen test indicates 2 co-integrating equations at the 0.05 level.			

Source: Author's Computation by E-views7

Variance Decomposition

Shock in Crop Production, Livestock Rearing, Forestry and Fishery

The result shows the extent to which a standard deviation shock in crop production in Nigeria affects poverty reduction, livestock production, forestry and fishery over time. A one-time shock on crop production affects poverty reduction from the first period by 4.7% and rise to about 12.98% in the 10th lag period. However, the effect on livestock, forestry and fishery increase from the second period by less than 1%. The shock effect of crop production on poverty reduction in Nigeria does not die out but last far into the future. Increasing or reducing crop production in Nigeria has the potential to correspondingly drive and reduce poverty over a long time. The gains of crop production are hinged on its capacity to provide food domestically and improve export base of the country. The finding is consistent with Ihimodu (2007) who noted that agriculture can curtail poverty in Nigeria

Similarly, a standard deviation shock on livestock rearing affect poverty by 5.2% in the 1st lag period. However, the magnitude of the impact extends up to the 10th lag period by 13%. Similarly, a standard deviation shock in livestock rearing also affects crop production, forestry and fishery. The effect on crop production is very high at 94.6% but decline steadily to 81.7% in the 10 period. The strong effect of livestock rearing on crop production might not be unconnected evidences that animals provide manures which are needed by farmers to improve plant yield.

Empirical evidence also shows that a standard deviation shock on forestry reduces poverty by 4.3% from the 1st lag period and extends up to the 10th lag period by 16%. Also, standard deviation shock on forestry also affects crop production more than livestock and fishery. The effect on crop production is very high at 95.6% in the 1st lag period but decline steadily to 81.7% in the 10th period. The strong effect of livestock rearing on crop production might not be unconnected to evidences that as forestry increase, available land left for crop

production deplete. Just like previous evidence, a standard deviation shock on fish farming affect poverty by 5.2% in the 1st lag. The magnitude of the impact extends up to the 10th lag period by 8.96%. In a nutshell, the result from the sub-sector of agriculture in Nigeria supported the evidences by Onyebueke and Eze (2017), which are of the opinion that strengthening agriculture in Nigeria will help sustained the life of citizen and economic recovery.

V. CONCLUSION AND RECOMMENDATIONS

The study examined the effect of the disaggregate agricultural output on poverty reduction in Nigeria over the period of 1981 to 2014. Cointegration test was conducted to show the long-run association among the variables while the Variance Decomposition on a Vector Error Correction model was employed to examine the interactions between poverty reduction and the diverse component of the agricultural sector.

The results established a long-run relationship between the variables which include poverty reduction, crop production, livestock farming, forestry and fishery. The variance decomposition showed that a shock on crop production, livestock farming, forestry and fishery have significant and lasting impact on the Nigerian poverty reduction in Nigeria. Therefore, the agricultural sector is instrumental variables that could catalyze the economy towards poverty reduction if manipulated appropriately through viable growth-driven policies. Therefore, to foster Nigerian economic recovery while reducing poverty, relevant government agency should adopt favorable policies such as providing fertilizers, improve seedling, training of farmers and dredge dams to aid dry season farming and agriculture productivity.

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APPENDIX

Poverty Reduction

:

Period	S.E.	POVERTY_REDUCTION_INDEX	LOG_CROP_PRODUCTION_	LOG__LIVESTOCKS_	LOG__FORESTRY_	LOG__FISHERY_
1	0.196690	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.315402	92.65957	0.008546	0.763152	6.508497	0.060240
3	0.411694	93.63325	0.033995	0.519792	5.660119	0.152840
4	0.519791	90.14512	0.033598	2.614421	7.081107	0.125755
5	0.590442	90.99622	0.043203	2.477896	6.359179	0.123500
6	0.664245	90.80531	0.244359	2.626152	6.202724	0.121450
7	0.729489	91.34155	0.235215	2.912354	5.403946	0.106936
8	0.790730	91.22830	0.309860	3.325799	5.044425	0.091616
9	0.846667	91.49140	0.312600	3.611429	4.501293	0.083277
10	0.902232	91.64689	0.353170	3.625211	4.301344	0.073385

Crop Production

Period	S.E.	POVERTY_REDUCTION_INDEX	LOG_CROP_PRODUCTION_	LOG__LIVESTOCKS_	LOG__FORESTRY_	LOG__FISHERY_
1	0.993692	4.737104	95.26290	0.000000	0.000000	0.000000
2	1.360753	5.686294	93.91413	0.011883	0.376247	0.011449
3	1.626428	7.284872	92.13921	0.075999	0.491677	0.008240
4	1.835975	8.759816	90.40708	0.189855	0.636762	0.006484
5	2.014861	9.716601	89.37584	0.253866	0.648068	0.005628
6	2.189332	10.54680	88.48463	0.322838	0.639933	0.005795
7	2.351852	11.23114	87.65613	0.454977	0.651713	0.006032
8	2.510732	11.89510	86.76198	0.639533	0.696016	0.007378
9	2.659801	12.51078	85.89866	0.790720	0.788611	0.011227
10	2.806195	12.98403	85.24986	0.871503	0.879704	0.014904

_: Livestock

Period	S.E.	POVERTY_REDUCTION_INDEX	LOG_CROP_PRODUCTION_	LOG__LIVESTOCKS_	LOG__FORESTRY_	LOG__FISHERY_
1	1.040477	5.152161	94.57418	0.273655	0.000000	0.000000
2	1.431370	6.189613	92.62099	0.701285	0.470541	0.017571
3	1.702883	7.980558	90.31548	1.001913	0.684258	0.017787
4	1.923846	9.470600	88.09895	1.457695	0.947558	0.025201
5	2.123621	10.30915	86.78105	1.847621	1.039087	0.023098
6	2.321747	11.06593	85.59429	2.214327	1.098551	0.026906
7	2.504378	11.66716	84.46671	2.645207	1.187873	0.033052
8	2.685494	12.19822	83.43579	3.046617	1.280799	0.038565
9	2.856139	12.65889	82.45345	3.420634	1.419748	0.047272
10	3.022256	13.01063	81.68214	3.707706	1.545197	0.054329

Forestry

Period	S.E.	POVERTY_REDUCTION_INDEX	LOG_CROP_PRODUCTION_	LOG__LIVESTOCKS_	LOG__FORESTRY_	LOG__FISHERY_
1	0.941664	4.262258	95.42973	0.292872	0.015141	0.000000
2	1.300527	5.485183	93.55167	0.616754	0.340487	0.005908
3	1.558018	7.418220	90.91714	1.169902	0.485785	0.008950
4	1.769850	9.091903	88.37545	1.765344	0.752781	0.014526
5	1.960034	10.15669	86.80048	2.180479	0.847253	0.015097
6	2.148210	11.01943	85.39718	2.610609	0.949262	0.023523
7	2.326584	11.68494	84.15720	3.084782	1.044795	0.028280
8	2.501111	12.28766	82.99084	3.521662	1.165678	0.034158
9	2.663912	12.78604	81.94501	3.920682	1.305037	0.043229
10	2.823410	13.16984	81.16989	4.182352	1.428769	0.049140

Fishery

Period	S.E.	POVERTY_R	LOG_CROP_	LOG__LIVES	LOG__FORE	LOG__FISHE

		EDUCTION_INDEX	PRODUCTION_	TOCKS_	STRY_	RY_
1	0.849522	5.216584	92.53608	1.663859	0.379447	0.204031
2	1.182764	6.030511	90.42835	1.361376	1.980688	0.199077
3	1.418246	7.188211	88.70419	1.154326	2.739651	0.213623
4	1.606773	7.610131	87.57399	1.286663	3.316169	0.213046
5	1.784104	7.731898	87.65474	1.225798	3.214501	0.173059
6	1.935177	7.914258	87.51634	1.322199	3.088533	0.158674
7	2.070321	8.077082	87.29613	1.527467	2.951178	0.148142
8	2.204343	8.377553	86.86347	1.753488	2.863867	0.141626
9	2.326909	8.670391	86.07221	2.169200	2.932414	0.155786
10	2.454010	8.960863	85.39301	2.426692	3.055527	0.163905

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