Trop. J. Anim. Sci. 5 (1): 131 - 141 (2002)
ISSN: 1119 - 4308

ESTIMATING GROWTH, INSTABILITY INDICES AND LEVELS OF ASSOCIATIONS IN NUMBER AND VALUE OF LOANS GUARANTEED UNDER AGRICULTURAL CREDIT GUARANTEED SCHEME FUND IN LIVESTOCK AND CROP SECTORS

UDOH, E. J[1]. OMONONA, B. T[2]. AND AKINTOLA, J.O[2].

[1] Department of Agricultural Economics / Extension University of Uyo, Uyo. Akwa Ibom State.

[2] Department of Agricultural Economics, University of Ibadan, Ibadan.

Target Audience: Agricultural, policy makers

ABSTRACT

This study made independent analysis of the rate of growth and instability that exist in the number and value of loans guaranteed to crop and livestock sub-sector under Agricultural Credit Guaranteed Scheme Fund for the period of 1978 to 1999. in addition, the level of association that exist between the total number and value of the loans guaranteed is also assessed. By means of negative growth exponential function, the study revealed fairly low to moderate compound growth rates for all the purposes in both crop and livestock industries, though with different and peculiar indices. Negative rates of growth were revealed for mixed farming in crop sub-sector and poultry in livestock industry. The measures of instability (C.V, I.I and I.C) revealed high levels of instability in number and value of loans guaranteed for both crop and livestock sub-sectors. The study further revealed different levels of association between number and values of loans guaranteed under ACGSF for both crop and livestock sub-sectors. However, the calculated r for the crop sub-sector was statistically significant while the one for livestock was not significant.

Keywords: Growth, association levels, livestock and crop sectors

DESCRIPTION OF PROBLEM

There is a prevalence of vicious cycle of smallholdings, low output, low income and consequently low capital investment in Nigeria agriculture. Incidentally, Nigeria agriculture is dominated by small-scale farmers who are highly unorganized, sparely distributed and poor in resource endowment and managerial skill. To greater extent, agriculture production has remained at rudimentary and traditional level, as the use of modernized and improved input is limited. The situation requires injection of capital and credit into agricultural sector that cannot be provided by the resource-poor farmers.

The recognition of the inherent problems of traditional agriculture resulted in formulating policies and programmes overtime with some credit components attached to them by successive Nigerian administrations. The cardinal objective is that of large infusion of finance use of inputs such as fertilizer, improved seeds, insecticides, additional labour etc (1, 2). Notably among these programmes are the Nigerian Agricultural Co-operative Bank (NACB), Agricultural Credit Guarantee Scheme Fund (ACGSF), peoples Bank of Nigeria (PBN), Community Bank (CB) and Rural Banking Schemes etc. It is pertinent to note that the operation of these programmes/schemes is bequeathed with multiple problems in such a way that agricultural credits are both insufficient and inefficiently administered to small scale farmers. These problems militate against the development of agriculture. Spefically, (3) identified one of such problems to be high degree of structural complexity in agricultural credit administration to the extent that the illiterate farmers are discouraged and disenchanted. A rather high and excessive operational cost of administration and recovery of these loans and credit constitute another problem. (4) contended that the smallholdings of Nigerian farmers make it exceedingly difficult and uneconomical to extend credit to them in efficient manner. This situation therefore results into high incidence of default (5). These problems, in a holistic view have always make lender of agricultural credits to be skeptical in extending credits to these farmers and if they do. The credit is always accompanied with high interest rates and collateral.

To circumvent the aforementioned problems, Agricultural Credit Guaranteed Scheme Fund (ACGSF) was established and began operation in April 1978. The policy framework of ACGSF is to induce Commercial/Merchant Banks to increase lending to agriculture and to ensure that loans granted to farmers are guaranteed up to 75 percent against default in repayment. In case of loan default, repayment is made from a fund set up by federal government and Central Bank of Nigeria with an authorized share capital of ₦100m. The maximum loans, which can be guaranteed under the scheme, are ₦100,000 for individual farmers and ₦1m for cooperative society/ corporate agencies.

Over the years, the number of loans guaranteed and their values have been fluctuating and of late have been on a decline. In 1997, 17840 loans valued at ₦242 million were guaranteed and by 1998 the number declined to 14637 with a value of ₦215.7 million (1999). In addition, the distribution of loans by size and to which purpose has changed. As at 1998, food crop sub-sector with the loan size ₦20000 to ₦ 25001 category carried the highest fund and in term of purpose, the same sub-sector carried the highest of 13119(89.6%) as against livestock sub-sector share of 458 loans representing 3.1 percent of the total guaranteed fund. Considering the mandate of ACGSF and the multiplicity of purposes the fund is meant to cover, it is natural that there exist high level of

competition among the various subsectors and existence of strong likelihood for one purpose to dominate others. This study therefore seeks to statistically determine the degree of instability and growth rate of loans guaranteed under ACGSF in both crop sub-sector and livestock sub-sector. The study also seeks to determine the level of association existing between the number of loans guaranteed and their respective values for each purpose. This is necessary loan guaranteed as it affects credit delivery and development in the subsectors.

MATERIALS AND METHODS

Scope and Data Source

The scope of this study covers the activity of ACGSF in terms of number of loans guaranteed and their values to both crop subsectors and livestock sub-sectors between the period, 1999. As such, for crop sub-sector, both food crops and cash would be considered and these include grains, roots, oil palm, rubber, cocoa, cotton, groundnut and mixed farming. For the livestocks would be considered.

The study relied on secondary sources for the data used in the analysis. Therefore, the publication of CBN statistical bulletin and Annual Reports provided the secondary data used in the study.

Analytical Technique:

The time series data collected were analyse with a combination of analytical techniques needed to fulfil the stated objectives of the study. These include:

i. The exponential growth function defined as

$$LG_i = AB^t \qquad i = 1,2,3\ldots\ldots\ldots\ldots 13 \qquad \text{——————(1)}$$

Where LG_i = number or valve of loans guaranteed to $_i^{th}$ purpose under crop and livestock subsectors; t = time trend in years; A and B are the parameters to be estimated.

To estimate growth rate, equation (1) is linearised into

$$\ln LG_i = \ln A + t\ln B \quad \ldots\ldots\ldots\ldots\ldots(2)$$

If $\ln LGi = y$, $\ln A = a$ and $\ln B = b$, then equation (2) becomes

$$Y = a + bt \quad \ldots\ldots\ldots\ldots\ldots (3)$$

Therefore, growth rate r = Antilog b-1, i.e. $e^{b-1.}$

ii Coefficient of Variation (cv): This is expressed as

$$cv = [\Sigma (LG_i - \overline{LG^2}) /(n-1)]/\overline{LG} \quad \ldots\ldots\ldots\ldots\ldots\ldots(4)$$

where LG_i is as defined in equation (1), $\overline{LG}$ is the mean number or value of loan guaranteed .

iii Index of instability (I.I): This is given as

$$I.I = [1/n \sum_{i=1}^{n} / LG_i - \hat{LG} /]/\overline{LG} \quad \ldots\ldots\ldots\ldots\ldots(5)$$

Where LG is the actual number or value of loan guaranteed for $_i$th purpose: $\hat{LG}$= predicted number or value of loan guaranteed; and LG is the mean number or value of loan guaranteed.

iv Instability Coefficient (I.C): $\sqrt{[1/n\Sigma(LG-\hat{LG})^2]} / \overline{LG}$.....(6)

Where LG, $\hat{LG}$ and $\overline{LG}$ are as previously defined. Equations in (ii), (iii) and (iv) are necessary to estimate the degree of instability that may be present in every purpose for the loan guaranteed.

v) Correlation analysis: This is necessary to determine the level of association existing between the numbers of loan guaranteed for i^{th} purpose and it respective value. It is defined as

$$\frac{n\Sigma XY - \Sigma X\Sigma Y}{\sqrt{n\Sigma X^2-(\Sigma X)^2}\ \sqrt{n\Sigma Y^2-(\Sigma Y)^2}} \quad \text{.....(7)}$$

where X is the value of the loans guaranteed and Y is the number of the loan guaranteed.

RESULTS AND DISCUSSION

The result of the analysis of growth rate and instability in loan guaranteed for both livestock and crop sectors are summarized and discussed in this section.

Crop subsector

Growth Rate and Instability Index in Number of Loans Guaranteed Under ACGSF For Crop Sub-sector

Growth rates and instability indices in number of loans guaranteed under ACGSF to crop sub-sector are presented in Table 1.

Table 1: Indices of Growth Rate and Instability in Numbers of Loans Guaranteed for Crop Sub-sectors

Purpose	Growth Rate	CV	I.I	I.C
Grains	0.262	0.97	0.99	1.38
Roots	0.257	1.17	0.99	1.52
Oil Palm	0.108	0.85	0.84	1.13
Rubber	0.014	2.11	0.97	2.21
Cocoa	0.242	1.77	0.98	1.98
Cotton	0.264	1.27	0.98	1.58
Groundnut	0.347	1.04	0.98	1.41
Mixed Farming	-0.181	2.91	0.95	2.99
Total	0.259	0.91	0.99	1.39

Source: Computed from CBN database (6, 7).

The table shows that the growth rates range from –0.181 for mixed farming to

0.347 for groundnut while it is 0.259 for the whole sub-sector. As such, for the period under review (1978-1999), number of loans guaranteed for mixed farming and groundnut recorded a decline of 18.1 percent per year and increase of 34.7 percent per year respectively while the whole sub-sector had a compound growth rate of 25.9 percent per year. Rubber with growth index of 0,014 shows a moderate rate of growth over the period.

In term of instability (variability), the three measures, coefficient of variation, instability index and instability coefficient show that the highest variation in the number of loans guaranteed is for the mixed farming purpose, while the least variation is recorded for oil palm purpose. However, on the bases of instability indices, apart from oil palm purpose, all other purposes are seemingly the same in magnitudes. Therefore, the numbers of loans guaranteed for mixed farming appear to be most unstable while oil palm purpose has the least. On a general note, the observed high variability indices calculated is an indication that the number of loans guaranteed for various purposes in crop sub-sector was highly unstable throughout the period. This situation could have translated into acute shortage of working capitals for farmers whose interests were establishment of mixed farms. This may also likely explains why mixed farming is quite unpopular among Nigerian farmers.

Growth Rate and Instability Index in Values of Loans Guaranteed Under ACGSF for Crop Sub-sector

Table 2: Presents the growth rates and instability indices in the values of loans guaranteed under the ACGFS in crop sub-sector.

Table 2: Indices of growth rate and instability in numbers of loans guaranteed for crop sub-sectors.

Purpose	Growth Rate	CV	I.I	I.C
Grains	0.187	1.01	0.99	1.39
Roots	0.324	0.95	1.04	1.43
Oil Palm	0.271	1.46	0.68	1.19
Rubber	0.309	2.42	0.41	1.06
Cocoa	0.353	0.39	0.71	1.21
Cotton	0.368	1.22	0.76	1.23
Groundnut	0.441	1.08	0.92	1.34
Mixed Farming	-0.301	0.86	1.05	1.44
Total	0.177	0.91	1.09	1.46

Source: Computed from CBN database (6,7).

The table reveals that the compound growth rates ranges from –0.301 for mixed farming to 0.441 for groundnut while it is 0.177 for the whole sub-sector. This implies that, the value of loans guaranteed for mixed farming and

groundnut recorded a decline of 30.1 percent and increase of 44.1 percent yearly respectively while the whole crop sub-sector had a compound rate of growth of 17.7 percent per year. Comparing rates of growth recorded for the purposes in both table 1 and table 2 will reveal apparent similarity in the pattern of loan guaranteed. In both cases mixed farming showed negative growth rates while groundnut had the highest rate of growth recorded. The same follows in other purposes.

Further, the table reveals the rate of instability in value of loans guaranteed for each purpose for the period under review. The instability indices measured indicate rather high level of instability for all the purposes. Using instability index (I.I) as a reference point the highest instability occurred in root crops and mixed farming with respective index of 1.04 and 1.05. The least of 0.41 is recorded for rubber purpose. Therefore, the amount of loans guaranteed for all the purposes were highly unstable. This is an indication that extension of agricultural credits to these purposes fluctuated significantly.

Livestock sub-sector

Growth Rate and Instability Index in Numbers of Loans Guaranteed Under ACGSF For Livestock Sub-sector.

Table 3 presents the growth rates and instability indices of loans guaranteed under ACGSF for livestock sub-sectors.

Table 3: Indices of growth rates and instability in number of loans guaranteed for livestock sub-sector.

Purpose	Growth Rate	C.V	I.I	I.C
Poultry	-0.053	0.61	0.97	1.14
Cattle	0.148	0.76	0.97	1.22
Sheep/Goat	0.318	1.43	0.38	1.04
Other livestock	0.0281	1.08	0.85	1.29
Total	0.043	0.48	2.04	2.26

Source: Computed from CBN database. (6, 7).

The table shows that growth rates ranges from –0.053 for poultry to 0.318 for sheep/goat while it is 0.043 for the whole livestock sub-sector. This reveals that during the period under review (1978-1999), number of loans guaranteed for poultry and sheep/goat production recorded a decline of 0.53 percent per year and increase of 31.8 percent per year respectively while the whole sub-sector had a compound growth rate of 4.3 percent per year. Apart from poultry, number of loans guaranteed for other purposes were on increased and this reveals that production of other forms of livestock was encouraged. However, the negative rate of growth recorded for poultry over the period may not be unconnected to the persistent high cost of management cost, especially cost

associated with feeding and medication. Further, the scourge of high mortality associated with poultry production may also explain the resultant growth in the industry. It should be stressed at this point that haze consequent of structural adjustment programme (SAP) was much felt in the poultry industry. Creditors were becoming reluctant and skeptical in granting loans to poultry farmers and the farmers were very apprehensive in investing in poultry production. The resultant effect was closing up of many poultry farms.

The instability indices on table 3 show the existence of high level of variability in number of loans guaranteed for all the purposes over the years. Though there is no regular (uniform) pattern for each of the three measures, Instability index (I.I) however reveals a highest variability for both poultry and cattle, while the least variability is observed for sheep/goat production. This further confirms that poultry industry was marked with uncertainty while sheep/goat production was positively encouraged with more funds injecting in their husbandry. On the whole, the high variability indices for the livestock sub-sector show how unstable the number of loans guaranteed for the identified purposes have been since ACGSF become operational. This result confirms that the stream of guaranteed funds to livestock sub-sector is highly unpredictable.

Growth Rate and Instability Index in Values of Loans Guaranteed Under ACGSF For Livestock Sub-sector.

Table 4 presents the constant growth rate and the level of instability in the amount of loans guaranteed under the ACGSF in livestock sub-sector.

Table 4: Indices of growth rate and instability in value of loans.

Purposes	Growth Rate	C.V	I.I	I.C
Poultry	-0.071	0.64	1.57	1.84
Cattle	0.133	0.87	1.12	1.49
Sheep/Goat	0.568	2.37	0.42	1.06
Other livestock	0.0025	1.00	0.99	1.39
Total	-0.0319	0.54	1.84	2.08

Source: Computed from CBN database. (6,7).

The table shows that the compound growth rates ranges from –0.071 for poultry to 0.568 for sheep/goat while it is –0.0319 for the whole sub-sector. This reveals that for the period, 1978-1999 there was decline of 7.7 percent in volume of loans guaranteed for poultry and increase of 56.8 percent in volume of loans guaranteed for sheep/goat purpose. These results re-enforced the earlier results presented in tables 3 that poultry industry experienced low investments. However, for the whole sub-sector, the growth rate recorded a decline of 3.19 percent per year. Therefore, apart from sheep/goat production, little or no encouragement was given to the livestock sub-sector. As such over the years,

proportion of loans that was guaranteed against default became reduced. The result for this dismal performance could not be unconnected to high rate of default among the livestock farmers and perceived high rate of risk associated with livestock husbandry. It is likely that commercial/merchant banks became disenchanted in granting more loans to livestock purposes when it became increasingly difficult to collect back the previously disbursed loans.

In the case of instability indices, the table reveals no regular pattern for the three measures. However, using instability coefficient (I.C), the table reveals that poultry purpose was that most unstable while sheep/goat purpose had the least. The whole livestock sub-sector shows high level of instability in the value of loans guaranteed under ACGSF in livestock sub-sector.

Relationship Between Number And Value Of Loans Guaranteed Under Acgsf For Both Crop And Livestock Sub-sectors.

Having discussed growth rates and instability indices for both crop and livestock purposes, we want to establish the level of association between the number and value of loans guaranteed under ACGSF. This is necessary so as to evaluate whether the value of loans guaranteed increase or decrease with the number of beneficiaries of such loans. The vector of correlation coefficients, r, presented in table 5 shows the extent of associations that exist between the number and value of loans guaranteed under the ACGSF

Table 5: Correlation coefficients, r, for value and number of loans guaranteed under ACGSF.

Purpose	Correlation Coefficient, r
Crop Sub-sector	
Grains	0.707**
Root crops	0.961**
Oil palm	0.579**
Rubber	-0.004
Cocoa	0.789**
Cotton	0.788**
Groundnut	0.706**
Mixed farming	0.416
Total for Crop sub-sector	0.809**
Livestock Sub-sector	
Poultry	0.773**
Cattle	0.559*
Sheep/Goat	0.948**
Other Livestock	0.752**
Total for Livestock sub-sector	0.417

** Shows significant at 10%

* Shows significant at 5%

Source: Computed from CBN database. (6,7).

The table reveals different levels of association between number and value of loans guaranteed for the various purposes. The association ranges from strong to weak and exception of rubber purpose that has negative association; the number and value of loans guaranteed for other purposes (both crop and livestock) are positively associated. Therefore, as the number of loans guaranteed under ACGSF increased, the value of the loans increased at different proportionate levels.

For crop sub-sector, the estimated correlation coefficients for all the purposes are statistically significant at a = 0.01 except for rubber and mixed farming. For instance, the level of association existing between number and value of loans guaranteed for root crops is 0.961 showing a very strong degree of association. But in the case of oil palm, the statistically significant r of 0.579 is fairly strong. Both rubber and mixed farming have insignificant and weak level of association between number and value of loans guaranteed. However, for the whole crop sub-sector, the level of association between number and value of loans guaranteed under ACGSF is strong and statistically significant.

In the case of livestock sub-sector, all the purposes have significant, but different levels of association existing between number and value of loans guaranteed under ACGSF. Sheep/Goat purpose has the highest correlation coefficient of 0.948 while cattle purpose had the least coefficient of 0.557. However, foe the whole sub-sector, the estimated correlation coefficient, 0.417 is statistically insignificant and quite low showing rather weak level association between number and value of loans guaranteed under ACGSF. It therefore follows that for the period under review (1978-1999) the increase in the number of loans guaranteed for livestock sub-sector did not necessary result in increase of amount of the loans guaranteed; and if such corresponding increase occurred, it was less than proportionate and statistically insignificant. This is however contrary to the case in crop sub-sector that showed strong level of association between the number and value of loans guaranteed under ACGSF. Hence, in the case of crop sub-sector, it is statistically inferred and this confirmed that the value of loans guaranteed for the sub-sector increased as the number of such loans increased. But such inference and conclusion cannot be made for livestock sub-sector that weak and statistically insignificant coefficient of correlation.

Policy implication of the findings

Based on the findings, the following policy statements can be deduced;

1) The low growth rates and negative growth rate in loans guaranteed for all other livestock and poultry respectively are indications of declining supply of credit to the sub sector. The implication is that not enough funds will be available for farmers to meet their production needs. And since all farmers cannot meet their need for money from savings, they will rely

more on informal sources of credit that have been known to be less efficient especially with respect to the high rate of interest charged.

2) The fact that the rate of growth in loans guaranteed under ACGSF to crop sub sector is higher than those to the livestock sub sector is an indication that there would be shortfall in meat, milk and egg supply to meet the ever increasing needs of the Nigerian populace. This will worsen the already low level of animal sourced-protein intake of average Nigerian.

3) The high levels of instability in the loans guaranteed to the livestock sub sector could make the planning for sustained production to be difficult. High instability means that there were years when the loans guaranteed were far below the average for the whole period. In such periods, needed funds for productive activities were not available.

CONCLUSION AND APPLICATIONS

This study attempted to estimate the magnitude of growth rate, instability and level of association in the loans guaranteed to both crop and livestock sub-sectors under the Agricultural Credit Guaranteed Scheme Fund (ACGSF) in term of total number and value for the period 1978 to 1999. The results of the study show;

* that there exist moderate growth rates in both number and value of the loans guaranteed for crop production;
* that there exist high levels of instability in both the number and value of the loans guaranteed for crop production;
* that in livestock sub-sector the growth rates for all the purposes were fairly low and on the increase except for poultry purpose that recorded negative rate of growth with regards to the number and value of loans guaranteed;
* that there exist high levels of instability in both the number and value of the loans guaranteed for livestock industry;
* that in livestock industry while number and amount of loans granted and guaranteed for poultry production was on a decline, that of the sheep/goat purpose was on an increase. This point to deliberate effort in promoting sheep/goat husbandry;
* that there exist different levels of association between number and value of loans guaranteed for the different purposes in both crop and livestock sub-sectors;
* that in the crop sub-sector, all the purposes showed strong and significant levels of association between number and value of loans guaranteed except in the case of rubber (with negative coefficient) and mixed farming; and
* that in the livestock sub-sector, all the purposes have positive and strong

association levels but for the whole sub-sector the association is weak and statistically insignificant.

Based on the findings of this study it is therefore imperative of the government to ensure regular flow of funds to farmers and to ensure that both commercial and merchant banks adheres to the mandatory amount of loans that should be granted for agricultural purposes. Government needs to embark on enlightenment campaign to educate farmers on economic importance of using credits. Further, poultry farming should be the focus of the scheme to ensure that the declining rates of both number and amount of loans guaranteed to the industry is halted and reversed. Agricultural Credit Guaranteed Scheme Fund (ACGSF) is practically assured avenue of regular source of investment capital for Nigerian farmers therefore government should as a matter of importance continue to induce commercial/merchant banks to increase lending to the farmers and also to ensure that the loans granted are guaranteed up to the fixed rate against default in repayment which is characteristic of Nigeria agricultural environment.

REFERENCES

1. **Uma, Lele (1972)** "Role of Credit and Marketing Functions in Agricultural Development" International Economic Association Conference on Agriculture in the Development of the low-income countries. Rad Godebery, Germany, August 20-September 4, 1972.
2. **Udoh, E.J. and B.T. Omonona (2000)** "Growth and Instability in Livestock Sub-sector Loan Guaranteed Under ACGSF in Nigeria". In Book of Proceedings, 27th Annual NSAP conference, 19-23 march, 2000: Pp 423-426.
3. **Osuntogun, C.A. and Akinbode, C. (1976)** "Financing Nigerian Agriculture: A case study of the effectiveness of the Nigerian Agricultural Bank" A paper presented at the symposium of productivity and efficiency on the public service, Faculty of Administration, University of Ife, Pp. 1-12.
4. **Ijose, A. and J.N. Abaelu (1973)** Institutional credit for smallholder farmers: a case study of the Western Nigerian Agricultural Credit Cooperation (WNACC), USAID, Spring Review of Small Farmer Credit, 6: 178-198.
5. **Ojo, M.O. (1988)** "Agricultural Credit policies in Nigeria: A review of achievements, problems and prospects" CBN Economic and Financial Review, 23(4): 40-47.
6. **CBN (Central Bank of Nigeria) (1997)** Statistical Bulletin, Vol.8 (2) December 1997.
7. **CBN (Central Bank of Nigeria) (1999)** Annual Report and Statement of Account, Lagos.