www.cenresinpub.org
ISSN 2277-0062

EFFECT OF AGRICULTURAL TECHNOLOGY ON INCOME OF CASSAVA AND MAIZE FARMERS IN EGBA DIVISION OF OGUN STATE, NIGERIA

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ABSTRACT

Agricultural technology/innovation has been viewed to face challenges from both the policy makers and the farmers. This study examined the effect of agricultural technology on the income of cassava and maize farmers in Egba Division of Ogun State, Nigeria. Multistage sampling technique was used to collect primary data from 160 farmers used for the study. The data collected were analyzed using descriptive statistics, budgetary technique, multiple regression and probit model. The study revealed that the improved technology adopters are more educated and cultivated more land than the traditional technology users. The traditional technology adopters are older and more experienced in farming than the improved technology adopters. The budgetary analysis revealed that improved technology adopters earned more income than the traditional technology adopters. The multiple regression result showed that increase in farm size and labour inputs will lead to increase in net farm income while additional unit cost of planting material will decrease the net farm income. The probit model identifies the determinants of improved technology adoption to include age, household size, education, farm size, farming experience, extension contact and farm income. Policy option requires the traditional technology adopters to adopt the improved agricultural technologies in order to increase the income per unit of land cultivated. Also, there is need for improvement in the education of the traditional technology adopters as a panacea for adopting improved technology.

Keywords: *agricultural technology, Farmers, Income, Nigeria*

INTRODUCTION

Technology may be defined as a systematic knowledge and action usually of industrial processes but applicable to any recurrent activity. It is a way of doing things in order to achieve defined ends for the benefit of the society. It is also refer to the study and mastery of industrial, manufacturing and productive methods in order to generate wealth from natural resources for the nation. Agricultural technology is the systematic application of collective human rationality to the solution of problems through the exertion of control over nature and all kind of human resources. Agricultural technology was also defined as the application of innovations to control the growth and harvesting of animal and crop with the motive of promoting agriculture [10]. Agricultural technology allows for mechanization which boosts production in many parts of the world. It involves the use of farm machinery to facilitate rapid expansion while dry season farming is made possible through irrigation. The application of fertilizer has not only increase food production quantitatively and qualitatively but also

made the long term intensive use of agricultural land possible [2]. The use of pesticides has proved an effective way of checking the menace of pests which attack crops like cassava and maize. Herbicides have also been used to control weeds in different ways. Through the biological knowledge of genetics, it is possible to select disease and drought resistant crops. Technology has also made dissemination of agricultural information to farmers easy through the print and electronic media The agricultural sector remains the most important sector of the economy of most developing countries. The sector remains significant in the Nigerian economy despite the strategic importance of the oil sector. The agricultural sector provides employment for about seventy percent of the population and accounts for more than one-third of the Gross Domestic Product [5] [14]. The share of the agriculture to the GDP stood at 90 percent before independence in 1960, about 56 percent between 1960 and 1969 and more than 40 percent between 1986 and 2002 [3]. Persistent increase in population experienced by the country and decades of neglect of the agricultural sector resulted in decline in food production [8]. It was ascertained that food production increased in an arithmetic progression while the population increased in a geometric progression. This was the period of oil boom in the seventies when most rural dwellers left the land to seek for employment in the expanding petroleum sector. Since seventies the country's agricultural production has declined greatly to the extent that it is unable to provide the population with cheap and adequate food and necessary raw materials for the agro-based industries.The aftermath of the neglect in the agricultural sector is that Nigeria engaged in massive food importation to bridge the gap between food supply and food demand. Food importation stood at 143 percent between 1970 and 1975 while the ratio of export to import declined to about 38 percent between 1976 and 1982, and Nigeria's food import bill rose from N88.3 million in 1971 to N8.5 billion in 1991[4]. The rise in the import bills had been attributed to the increase in the quantities of food imported. Food importation grow slowly and steadily partly because of the economic stabilization measure of 1981 and a partial ban since 1986 which later partly led to heavy border trading in food and raw materials into the country.

In order to boost food production, concerted efforts (short and long run) had been made by successive governments. This is evidenced by the establishment of many institutions and agencies. Some of whom include the establishment of the Federal Department of Rural Development(FDRD) in 1976 to coordinate and integrate rural and agricultural development and to initiate and develop appropriate strategies and projects which will help to increase agricultural productivity and employment opportunity in the country. The Directorate of Food, Rural and Road Infrastructure (DFRRI) was established in 1978 to create easy access to rural areas to facilitate increased food production and ease the transportation of farm produce. Government also made various attempts at reforming the agricultural sector to its enviable position in the Nigerian economy by embarking on various programmes including the National Accelerated Food Production Project (NAFPP) in 1973, Operation Feed the Nation (OFN) in 1976, River Basin and Rural Development Authorities (RBRDA) in 1976, Green Revolution Programme (GRP) in 1980, Agricultural Development Programme (ADP) in 1975 among others.

Although government at various levels and donor agencies had made concerted efforts to bring about agricultural development, but these deliberate efforts were ineffective as there is no much to show for them. Much of the failure can be attributed to adapted transformation approach to agriculture which is characterized by the introduction of a wide variety of large scale farming and processing technologies. There has however, been a progressive shift in emphasis from the large scale transformation approach to the small scale improvement strategy which is attuned to African age long practices. Majority of the Nigerian farmers are still operating at subsistence level. According to [11], Nigerian farms are classified into small scale, medium scale and large scale. By international standard, all farms less than 10 hectares are classified as small, then when judged by this standard, 94.37 percent of all farm holdings must be classified as small scale farms while the remaining 5.63 percent (1.7million hectares) are medium scale holdings [11]. Empirical evidences have shown that small scale farmers depend on their efficiency in the utilization of basic production technology available to them [9] [13]. The small holder farmers are the main producers of 98 percent of the food consumed in Nigeria with the exception of wheat. [11] also reported that even though small scale farmers' accessibility to agricultural innovation/technology is often limited. They have achieved some level of efficiency through deployment of their indigenous knowledge. These small holder farmers have the capability to transform the traditional agriculture.The general view is that technology/innovation will have effects on the income of farmers in general and small scale cassava and maize farmers in particular. It is against this background that this study seeks to identify and categorize cassava and maize farmers based on technology use, estimate and compare the net farm income of the two categories of farmers and examine the effect of technology on the income of the farmers.

METHODOLOGY

The Study Area

The study was carried out in Egba division of Ogun State, the western region of Nigeria. The Ogun State Agricultural Development Project (OGADEP) divides the State into four zones. These zones include Abeokuta, Ikenne, Ilaro and Ijebu-Ode. The Abeokuta zone consists of six blocks namely, Abeokuta North, Abeokuta South, Obafemi Owode, Odeda, Ifo, Ewekoro and Ado Odo Ota. The blocks are further divided into cells while the cells consist of farming communities. The study area lies approximately within latitude 7^0 and 8^0N and longitude $3^0$2 and $3^0$27'E. It falls within the humid tropical lowland region with 2 distinct seasons. The shorter dry season lasts for 4 months from November to February. Average annual rainfall ranges from 1,200mm in the Northern part of the study area to 1,472 in the southern part. The mean monthly daily sunshine hours ranges between 3.8 and 6.8. The relative humidity ranges between 76% and 95% coinciding with dry and wet season respectively. The study is endowed with fertile soils which is good for arable and cash crops.

Sampling Technique

Multistage sampling method was used to select the respondents used for the study. The first stage involved the purposive selection of two blocks from the existing six blocks of the ADP

under Abeokuta zone because of the high involvement of people of these blocks in farming. The selected blocks are Odeda and Obafemi Owode. The second stage involved the selection of two cells from each of the blocks selected in stage one. The third stage involved the selection of three farming communities from each of the selected cells in stage two. This gives a total of 12 farming communities. In the last stage, 14 cassava and maize farmers were randomly selected from each of the farming communities giving a total of 168 cassava and maize farmers. However, due to incomplete information, only 160 questionnaires were returned and used for the study.

Method of Data Analysis

The data collected for the study were subjected to descriptive and quantitative analyses. Descriptive statistics was used to describe the socio-economic characteristics of the farmers as well as the types of technology used by the farmers.

Budgetary Technique

Budgetary technique was used to estimate the cost and return of cassava and maize farmers.

$$GM = \sum_{i=1}^{n} P_i Q_i - \sum_{j=1}^{m} c_j x_j \quad (1)$$

Where:

GM = Gross Margin (Naira)

P_i = Unit price of output for crop i (Naira)

Q_i = Quantity of output for crop i (Kg)

C_j = Unit price of the variable input j (naira)

X_j = Quantity of the variable input j

i = Crop and n is the total number of cultivated crops.

j = Variable input and m is the total number of the variable inputs used in the farm enterprise.

Straight line method of depreciation was used to calculate the depreciation cost of farm tools and equipment.

$$\text{Annual Depreciation} = \frac{P - S}{n} \quad (2)$$

n = economic life of the equipment/tool

P = purchase price

S = salvage value

$$\prod = GM - TFC \quad (3)$$

Where:

$\prod$ = Net Farm Profit

GM = Gross Margin

TFC = Total Fixed Cost

Test of difference of mean was used to test for significant difference in the net farm income of the two categories of farmers. The formula goes thus:

$$t = \frac{\overline{X}_A - \overline{X}_B}{\sqrt{\frac{\delta_1^2}{n_1} + \frac{\delta_2^2}{n_2}}} \quad (4)$$

$\overline{X}_A$ = Mean net farm income of the improved technology adopters
$\overline{X}_B$ = Mean net farm income of the traditional technology adopters
δ_1^2 = Variance of the net farm income of the improved technology adopters
δ_2^2 = Variance of the net farm income of the traditional technology adopters
n_1 = Number of improved technology adopters
n_2 = Number of traditional technology adopters

Multiple Regression Model

Multiple regression model was used to examine the effect of technology on the income of the farmers. The Cobb-Douglas functional form of the model is specified as:

$$\ln Y_i = \beta o + \beta_1 \ln X_{1i} + \beta_2 \ln X_{2i} + \beta_3 \ln X_{3i} + \beta_4 \ln X_{4i} + \beta_5 \ln X_{5i} + \beta_6 \ln X_{6i} + \mu_i \quad (5)$$

Where:
Y_i = Net Farm Income (Naira)
X_{1i} = Farm Size (Hectare)
X_{2i} = Labour input (Man days)
X_{3i} = Fertilizer (Kg)
X_{4i} = Herbicide (Litre)
X_{5i} = Cost of Planting Materials (Naira)
X_{6i} = Technology use (1= improved technology, 0 = traditional technology)

Probit Regression Model

This was used to identify the determinants of improved technology adoption among the cassava and maize farmers. The general model following [12] and [7] is given as:

$$\{ K_i^* = \alpha X_i + e_i , K_i = 1 (K_i^* > 0)\} \quad (6)$$

Where K_i^* is a non-observed continuous latent variable and K_i is an observed binary variable, equal to 1 if the farmer use improved agricultural technology, all the farmers that used improved planting materials are categorized as improved technology adopters; X_i is a vector of the independent socio-economic variables affecting the use of technology, α are the parameters to be estimated; and e_i is unobserved term following a normal distribution. The set of independent variables include:

X_1 = Age of farmer (year)
X_2 = Sex of the farmer (Male =1, Female =0)
X_3 = Marital status of the household head (Married =1, otherwise =0)
X_4 = Household size (number)
X_5 = Educational level (year)

X_6 = Farm size (hectare)
X_7 = Farming experience (year)
X_8 = Number of contact with extension personnel in the last production season
X_9 = Farming income (naira)

RESULTS AND DISCUSSION

Categories of Farmers based on Technology Adopted

The distribution of the different agricultural technologies adopted by the farmers is presented in Table 1. The farmers are categorized into improved technology and traditional technology based on whether the farmers planted improved seeds/cuttings, used fertilizer, herbicide and tractor or not. All the farmers under improved technology (56.25% of the total respondents) planted improved maize seeds and cassava cuttings while 43.75% percent of the farmers categorized under traditional technology planted improved maize seeds and cassava cuttings, respectively. This implies that some farmers stick to the traditional farm practice. These categories of farmers are often the last to adopt any improved technology introduce to farmers. Under the improved technology, 44.38 % of the farmers used fertilizer, 40.63% used herbicide while 38.13% used tractor for farm operation. On the other hand, 55.63%, 59.38%, 61.88% of the farmers did not use fertilizer, herbicide and tractor services, respectively and thus classified as traditional technology adopters.

Table1: Distribution of Farmers based on Technology Adopted

Technology	Improved Technology Adopters		Traditional Technology Adopters	
	Frequency(Yes)	Percentage	Frequency(No)	Percentage
Improved Maize Seeds	90	56.25	70	43.75
Improved Cassava Cuttings	90	56.25	70	43.75
Fertilizer	71	44.38	89	55.63
Herbicide	65	40.63	95	59.38
Tractor Services	61	38.13	99	61.88

Source: Computed from survey data, 2011

Socio-economic Characteristics of Cassava and Maize Farmers

The summary statistics of the socio-economic characteristics of the cassava and maize farmers is presented in Table 2. Forty two percent of the farmers under improved technology have their age between 41 and 50years and the mean age of this category of farmer is 47.2years. On the other hand, thirty seven percent of the farmers under traditional technology have their age in this group. The mean age of farmers under this category is 49.4 years. This implies that the two categories of farmers are still in their active ages but the traditional technology adopters are older than their improved technology adopter counterparts. Majority (91.1 percent) of the improved technology adopters are males. Also, majority (91.4 percent) of the traditional technology adopters are males. This is an indication that farming activity in the study areas is dominated by men. The study also revealed that

majority of the farmers have marital responsibility in addition to farming and because wives are part of family labour in most developing countries. In addition, majority (46.7 percent) of the improved technology adopters had secondary education as against majority (45.7 percent) of traditional technology adopters who had primary education. This indicates that the improved technology adopters are more educated than their traditional technology counterparts. Education increases the level of awareness of the farmers on the importance of innovation. Majority (42.2 percent) of the improved technology adopters have between 11 and 20 years of experience in farming as against 40 percent of the traditional technology adopters who have over 30 years of experience in farming. The mean values of farming experience of the two categories of farmers are 15.8 years and 16.5 years respectively implying that the traditional technology adopters are more experienced in farming. In terms of farm size, majority (74.4 percent and 78.6 percent) of the improved technology adopters and traditional technology adopters respectively have less than one hectare of farm land. This shows the subsistence level of agriculture in the study area.

Table2: Socio-economic Characteristics of Cassava and Maize Farmers

Variables	**Improved Technology**			**Traditional Technology**		
	Frequency	**Percentage**	**Mean**	**Frequency**	**Percentage**	**Mean**
Age						
≤ 30	4	4.4		2	2.9	
31-40	22	24.4		10	14.3	
41-50	38	42.2	47.2	26	37.1	49.4
51-60	16	17.8		4	5.7	
> 60	10	11.1		28	40	
Sex						
Male	82	91.1		64	91.4	
Female	8	8.9		6	8.6	
Marital Status						
Married	71	78.9		64	91.4	
Single	14	15.6		2	2.9	
Widow	5	5.6		4	5.7	
Educational Level						
No Formal Education	13	14.4		12	17.1	
Primary Education	17	18.9		32	45.7	
Secondary Education	42	46.7		24	34.3	
Tertiary Education	18	20.0		2	2.9	
Years of Farming Experience						
≤ 10	24	26.7		19	27.1	
11-20	38	42.2	15.8	8	11.4	16.5
21-30	26	28.9		15	21.4	
>30	2	2.2		28	40.0	

Farm Size (Hectare)						
≤ 1.0	67	74.4		55	78.6	
1.0-2.0	17	18.9	0.93	15	21.4	0.89
>2.0	6	6.7		-	-	
Total	**90**	**100**		**70**	**100**	

Source: Computed from survey data, 2011

Budgetary Analysis of Cassava and Maize Farmers

The cost-return structure of the cassava and maize farmers is presented in Table 3. The variable cost constituted the largest percentage of the total production cost. The total revenue, gross margin and net farm income for the improved technology adopters are N353,085, N224,069.13 and N195,239.75 respectively. On the other hand, the total revenue, gross margin and net farm income for the traditional technology adopters are N260,795, N190,127.75 and 163,083.75 respectively. These figures suggest that the improved technology adopters perform better in terms of margin between total revenue and total cost. The t-test of difference of mean attests to this and showed that a significant difference exists between the net farm income of the two categories of farmers at 1 percent.

Table3: Cost-Return Structure of the Cassava and Maize Farmers

Adopter	**Improved Technology**	**Adopters**	**Traditional**	**Technology**
Cost		**% of Total Cost**		**% of Total**
Revenue from Maize	112,313.00		93,115.00	
Revenue from Cassava	240,772.00		167,680.00	
Total Revenue	353,085.00		260,795.00	
Variable Cost Items				
Labour	53,517.50	33.91	52,466.25	53.70
Fertilizer	39,105.00	24.77	-	-
Planting Materials	21,415.00	13.57	18,201.00	18.63
Herbicides	4,765.87	3.02	-	-
Tractor Services	10,212.50	6.49	-	-
Total Variable Cost	129,015.87	81.74	70,667.25	72.32
Fixed Cost Items				
Land	22,875.00	14.49	21,825	22.34
Depreciation	5,954.38	3.77	5,219	5.34
Total Fixed Cost	28,829.38	18.26	27,044	27.68
Total Cost	157,845.25	100.00	97,711.25	100.00
Gross Margin	224,069.13		190,127.75	
Net Farm Income	*195,239.75*		*163,083.75*	

Source: Computed from survey data, 2011

Effect of Technology on the Income of Cassava and Maize Farmers

The multiple regression result on the effect of technology on the income of farmers is presented in Table 4. The adjusted R-square value showed that 86 percent of the variation in the net farm income of the farmers is jointly explained by the set of the independent variables. The F-value is significant at 1 percent which indicates that the model is of good fit. The result showed that all the variables examined conform with a prior expectation. The farm size (X_1), labour (X_2), cost of planting materials (X_5) and technology use (X_6) have significant effect on the income of the farmers. These variables were significant at 1 percent, 5 percent, 1 percent and 5 percent respectively. This implies that one percent increase in farm size, and labour input will lead to increase in net farm income of the farmers by 0.69 and 0.334. On the other hand, one percent increase in cost of planting materials will decrease the farm income by 0.02. This implies that the farmers over-utilized the planting materials. The finding revealed that farmers under improved technology adopters will have income of 0.0366 more than the traditional technology adopters for every unit of input used in production. Thus technology has a significant positive effect on the net farm income of the farmers.

Table4: Multiple Regression Results

Variables	Coefficient	Standard Error	T-ratio
Constant	9.63***	0.72	13.36
Farm Size (X1)	0.69***	0.12	5.85
Labour (X2)	0.334**	0.16	2.14
Fertilizer (X3)	0.005	0.029	0.19
Herbicide (X4)	0.013	0.036	0.36
Cost of Planting Materials (X5)	-0.02***	0.0042	4.66
Technology Use (X6)	0.0366**	0.015	2.4
R-square	0.89		
Adjusted R-square	0.86		
F-value	106***		

Source: Computed from survey data, 2011

Determinants of Improved Technology Adoption among Cassava and Maize Farmers

The result of the probit regression model on the effects of socio-economic characteristics on the technology adoption is presented in Table 5. The Chi-Square value is significant at 5 percent and therefore attests to good fit of the model. The Age, household size, education, farm size, farming experience, extension contact and income are the determinants of technology adoption. They are significant at 10 percent, 1 percent, 10 percent, 1 percent, 5 percent, 5 percent and 5 percent respectively. The marginal effect revealed that the likelihood of adopting improved technology decreases by 0.0055 as the farmers grow older. This implies that younger farmers adopt improved technology than the older ones. Also the

likelihood of adopting modern technology decreases by 0.161 as the household size increases. This implies that the more the household members the lesser it is to adopt improved technology as discussed by [2] and this contradicted [6] who stated that household size was not a significant factor in the adoption of technology. Farm size indicates that increase in farm size will increase the use of modern technology and this could result to more output and there will be low man days which might reveal the efficiency level of cassava farmers. The likelihood of adopting improved technology increases with increase in educational level, farm size, farming experience, extension contact and income by 0.0137, 0.31, 0.005, 0.15 and 0.029 respectively.

Table 5: Probit results on the determinants of improved technology adoption

Variables	Maximum Likelihood Estimate (MLE)	Marginal Effect
Constant	-0.331 (-2.66) ***	-0.328 (-2.67)***
Age	-0.0055(1.80)*	-0.00548(1.83)*
Sex	0.0281 (1.17)	0.0205 (1.16)
Marital Status	0.188 (0.82)	0.101 (0.82)
Household size	-0.157 (-2.63)***	-0.161 (-2.63)***
Educational	0.0190 (1.84)*	0.0137 (1.87)*
Farm size	0.314 (2.67)***	0.310 (2.68)***
Farming experience	0.00572 (2.16)**	0.00501 (2.16)**
Extension contact	0.142 (2.21) **	0.150 (2.33) **
Farming income	0.0283 (2.03)**	0.0291 (2.04)**
Chi-square	38.9 (2.3)**	
Log Likelihood Function	-136.08	

Figures in Parentheses are the T-Value**.** *** implies significant at 1%, ** implies significant at 5%, *implies significant at 10%
Source: Computed from survey data, 2011

CONCLUSION AND RECOMMENDATION

This study revealed that the improved technology adopters are more educated and cultivated more land than the traditional technology adopters. Education may increase the level of awareness of the farmers on the importance of agricultural technology. On average, the traditional technology adopters are older than the improved technology adopters. Also, the improved technology adopters earned more income than the traditional technology adopters. The multiple regression result showed that increase in farm size and labour input will lead to increase in net farm income while additional unit cost of planting material will decrease the net farm income. The improved technology adopters will however earn additional income of ₦0.03666 than the traditional technology adopters. The determinants of improved technology adoption include age, household size, education, farm size, farming experience, extension

contact and farm income. Policy option requires the traditional technology users to embrace the improved agricultural technologies in order to increase their earning per unit of land cultivated. Lastly, there is need for improvement in the education of the traditional technology adopters as a panacea for adopting improved technology.

REFERENCES

1. Agbamu, J.U. and I.A. Idowu, 2000. An Evaluation of the Contact Farmer Approach in Transfer of Improved Maize and Cassava Technologies in Ogun State. Paper presented at the 6th Annual Conference of the Agricultural Society of Nigeria held at University of Nigeria, Nsuka, 9-14.
2. Amao J. O. and T.T. Awoyemi, 2007. Adoption of Improved Cassava Varieties and Its Welfare Effect on Producing Households in Osogbo ADP Zone of Osun State. *Journal of Social Sciences,* 5 (3), 87-94.
3. CBN, 2003. Central Bank of Nigeria Annual Report and Statement of Account
4. CBN, 1995. Central Bank of Nigeria Annual Report and Financial Statement
5. FAO, 2003. Food and Agriculture Organization Production Year Book.
6. Kavia, F.Y., C.C. Mushongi, G.B. Sonda, 2007. Factors Affecting Adoption of Cassava Varieties: A Case of Cassava Mosaic Disease tolerant varieties in Lake Zone Regions – Tanzania. African Crop Science Conference Proceedings, 8, 1875-1878.
7. Matshe, I. and T. Young, 2004. Off-farm Labour Allocation Decision in Small-Scale Rural Households in Zimbabwe. *Agricultural Economics,* 30, 175-186.
8. Nweka, F.I., 1989. Economics of Root Crop Production and Utilization in Africa: a Challenge for Research in Tropical Root Crops Promotion of Root-Based Industries. *International Society for Tropical Root Crops*. African Branch Kinshasha, Zaire 1-8 December, 1989.
9. Nweka F.I., D.S.C., Spender, J. Lynam, 2002. The Cassava Transformation: Africa's Best Kept Secret, Michigan State University Press, East Lansing Michigan, United State of America.
10. Oyede, O.A., 1994. Analysis of Technological Change in Small-scale Maize and Cassava Production System in Ado-Odo/Ota and Ifo Local Government Areas of Ogun State". A Dissertation Submitted to the Department of Agricultural Economics and Farm Management, University of Agriculture Abeokuta, Nigeria, 1-67.
11. Ozowa, V.N., 2005. Information Needs of Small Scale Farmers in Africa, *The Nigerian Example*, 1-6.
12. Paul, M., 2008. Constraints in Access to and Demand for Rural Credit: Evidence from Uganda. A Paper Presented during the African Economic Conference held at Tunis, Tunisia between 12th and 14th November, 2008. 1-29.
13. Tsegai, D., and P.C., Kormawa, 2002. Determinants of Urban Household Demand for Cassava Production in Kaduna, Northern Nigeria. A Paper presented at Conference of International Research for Development held at Witzen House between 9th and 10th October, 2002.
14. World Bank, 2003. World Bank Annual Report. www.worldbank.com