SOLVING THE POVERTY CRISIS IN NIGERIA: AN APPLIED GENERAL EQUILIBRIUM APPROACH

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ABSTRACT

POVERTY AMID PLENTY IS THE WORLD'S GREATEST CHALLENGE. THIS STUDY PROPOSES AN APPLIED (COMPUTABLE) GENERAL EQUILIBRIUM APPROACH THAT IS A RE-NEW ATTENTION TO THE PROBLEM OF POVERTY, EMPLOYMENT AND INEQUALITY THAT EARLIER STRATEGIES FOCUSING ON RAPID GROWTH WERE UNABLE TO RESOLVE. USING NIGERIA AS A CASE STUDY, WE PERFORM THE SPECIFICATION, ESTIMATION AND CALIBRATION OF A POVERTY-BASED MODEL WITHIN A DATA FRAMEWORK OF SOCIAL ACCOUNTING MATRIX (SAM). THE RESEARCH OUTPUT IS EXPECTED TO BE THE POLICY RESPONSE TO THE ENVISAGED COMPLEX HUMANITARIAN EMERGENCIES (CHES) FACING POOR COUNTRIES SUCH AS NIGERIA.

1.0 PROBLEM STATEMENT

"Human Poverty is more than income poverty – it is the denial of choices and opportunities for living a tolerable life" (United Nations, 1997).

Poverty amid plenty is the world's greatest challenge. Poor people live without fundamental freedoms of action and choice that the better off take for granted (Sen., 1999). They often lack adequate ford and shelter, education and health, deprivations that keep then from leading the kind of life that every one values. They also face extreme vulnerability to ill health, economic dislocation, and natural disasters. And they are often exposed to ill treatment by institutions of the state and society and are powerless to influence key decisions affecting their lives. These are all dimensions of poverty (World bank, 2001). Indeed, of the world's 6 billion people, 2.8 billion live on less than $2 a day, and 1.2 billion live on less than $1 a day. In rich countries less than 1 child in 100 does not reach its fifth birthday, while in the poorest countries as many as a fifth of children do not. And while in rich countries fewer than 5 percent of all children under fire are malnourished, in poor countries as many as 50 percent are.

One route for investigating the causes of poverty is to examine the dimensions highlighted by poor people. These include the lack of income and assets to attain basic necessities (food, shelter, clothing and acceptable levels of health and education); sense of voiceless ness and powerlessness in the institutions of state and society; and vulnerability to adverse shocks linked to on inability to cope with them. To understand the determinants of poverty in all its dimensions, it helps to think in terms of people's assets, the returns to (or productivity of) these assets, and the volatility of returns. These assets are of several kinds: human assets (such as the capacity for basic labor, skills, and good health); Natural assets (such as land); physical assets (such as access to infrastructure); Financial assets (such as savings and access to credit) and social assets (such as networks of contacts and reciprocal obligations that can be called on in time of need, and political influence over resources. The returns to these assets depend on access to markets and all the global, national and local influences on returns in these markets. But returns depend not just on behavior of markets, but also on the performance of institutions of state and society. Underlying asset ownership and returns to assets are not only economic but also fundamental political and social forces. Access to

assets depends on a legal structure that defines and enforces private property rights or on customary norms that define common property resources.

Access may also be affected by implicit or explicit dissemination on the basis of gender, ethnicity, race, or social status. And both access to assets and returns to assets are affected by public policy and state interventions, which are shaped by the political influence of different groups. Also important is the volatility of returns volatility results from market fluctuations, weather conditions, and, in some societies, turbulent political conditions. Volatility affects not only returns, but also the value of assets, as shocks undermine health, destroy natural and physical assets, or deplete savings (World Bank 2001). Faced with this picture of global poverty, the international community has set itself several goals for the opening years of the century, based on discussions at various United Nations Conference in the last decade. These international development goals (most for 2015) include the reduction by half the proportion of people living in extreme income poverty; ensure universal primary education; eliminate gender disparity in primary and secondary education; reduce infant and child mortality by two thirds, reduce maternal mortality by three quarters, ensure universal access to reproductive health services; and implement national strategies for sustainable development in every country by 2005, so as to reverse the loss of environmental resources by 2015.

However African economic performance has been markedly worse than that of other regions. The great majority of Africa lives on barely $0.65 a day and this number is growing relentlessly. Moreover, a severe lack of capabilities (education, health, nutrition) among Africa's poor threatens to make poverty "dynastic," with the descendants of the poor also remaining poor. The rural poor account for 80 percent of African poverty, but urban poverty is substantial and appears to be growing (World Bank, 2000, Nwaobi, 2000 and Collier and Gunning, 1999). Africa is not only poor, it also suffers from vast inequality in incomes, in assets, in control over public resources, and in access to essential to essential services, as well as pervasive insecurity. These dimensions of poverty and deprivation are worsening in many parts of the region while in some areas there are indications of deterioration in the general health of the population, particularly among the poor and children. Not surprisingly, the elimination of deep poverty has emerged as the overriding objective of development in Africa.

Indeed, Nigeria presents a paradox. The country is rich but the people are poor. Per capital income today is around the same level as in 1970. Poverty in Nigeria encompasses a very complex society: regional climatic and ethnic differences are reinforced by different historical and socio-economic legacies. Also, The country has had a complex political history. Frequent changes in governments have led to sharp changes in economic and social policies, which have impacted adversely on the population and have worsened income distribution. The challenge for Nigeria is not one of improving one sector or region at the expense of another or of introducing policy distortions and inefficiencies in resource allocation to benefit one group which in the past has led to increased poverty for others, but to adopt growth and social service oriented policies that will enable all its inhabitants to improve their welfare.

The thrust of out project therefore is to give a new impetus to the integral approach to poverty. It combines attention to income distribution and satisfaction of basic human needs it the micro level with analysis of macro constraints, intersectoral relationships and the dynamics of productivity and population. The essential advantage of general equilibrium analysis is that it includes prices and their effects on resource allocation, income formation and demand, thereby providing a full picture of interrelationships in the economy, not necessarily limited to those characterized by perfect competition and smoothness. Specific parameter choice and specification of relationships will allow the model to capture a number of particular rigidities or occurrences of non-perfect markets such as imperfect commodity markets, credit rationing, segmentation of the labour market, product differentiation in international trade and the particular role of the domestic trade sector.

Basic needs satisfaction will be described by the model as the "output" of income formation and distribution processes, and is dynamically linked to longer-term processes, that is, basic needs indicators affect labour productivity, population growth and labour supply. In other words, our models will emphasis the process of income distribution and basic needs satisfaction (both conceived in dynamic terms) incorporating many details of the socio-economic structure of developing countries into a general equilibrium type model constitutes the uniqueness of the proposed study (using the social accounting matrix framework of the Nigerian Economy).

2.0 OBJECTIVES OF STUDY

The fundamental aim of this project is to construct an applied general equilibrium model that will enable us to identify and analyze the implications of basic needs policies on various socio economic groups in Nigeria.

This objective requires us to carry out the following steps,

(1) To describe the relatively short-term processes of income formation and expenditure, as well as the longer-term processes of household and socio-economic group formation, labour force and wealth formation in Nigeria.

(2) To provide a comprehensive accounting framework characterized by a complete picture of the main socio-economic processes; a high level of disaggregation and an emphasis on income distribution and the role of the various socio-economic groups in Nigeria.

(3) To perform the specification estimation and calibration of a big Nigeria model that may be rewarding in the sense of quantifying, and hence improving our understanding of complex and unexpected interrelationships between variables.

(4) And to provide operational models (for economists and planners) as a tool of policy making and a conceptual device for comprehending socio-economic processes in a market economy such as Nigeria.

3.0 THE NIGERIAN ECONOMY AND POVERTY CRISIS

3.1 ECONOMIC STRUCTURES

The Nigerian name was derived by the British colonial administration from "Niger area" which initially was a term used to describe the territories around the river Niger.

In 1886, the British acquired the territories through the Royal Niger Company, which were administering then. In 1906, the Lagos Colony and southern province was amalgamated to form the Lagos and southern protectorate while the protectorate of Northern Nigeria was joined in 1914 to form the colony and protectorate of Nigeria. In 1939, Nigeria was structured into three regional governments, namely, the Western, Eastern and Northern regions. However, the 1951 McPherson constitution that favored regional governments within a federal system at the apex faced the problem of regional representation at the federal level. Under the federal constitution of 1959, Nigeria gained independence from the British colonial administration on October 1, 1960.

Nigeria is the single largest geographical unit in West Africa. It occupies a land area of 923, 768 square kilometers situated between longitude 3^0 and 15^0 East, and latitude 4^0 and 14^0 North (CBN, 2000). She lies entirely within the tropics with two main vegetation zones the rain forest and savanna zones; reflecting the amount of rainfall and its spatial distribution. The wet and dry seasons are climatically the two major seasons in the country. Nigeria is conglomeration of several ethnic groups, with three major dominant tribes. Hausa, Ibo and Yoruba domiciled mainly in the North, Southeast and Southwest of the country respectively. About 250 ethnic groups could be recognized within the country (with considerable differences in the norms and values of each major tribe).

At the start of the 1960s, the basis of the Nigerian economy was a well-diversified agricultural sector that supported 75 percent of the population, provided 68 percent of GDP and 78 percent of exports and supplied the people with 94 percent of their food. Again, per capita income was estimated at US $90 per capita and GDP growth was rapid at an annual rate nearly 5 percent (see World Bank, 1996). However, a new development pattern gradually emerged (over the years) as agriculture began to stagnate due to the growing

burden of taxation. Later rapidly growing industries began to exert considerable influence on the economy, including demands for special protection from imports. This led to a shift in the pattern of industrialization, from the processing of agricultural products for export, towards simple import substitution; as well as the emergence of petroleum extraction as a leading growth sector. However, in the mid-1960s growing regional tensions and the identification of the political parties with rent seeking, ethnic interests and patronage created a climate of arrest and political uncertainty that was compounded by the stagnating GDP growth. The ensuing civil war caused major losses of production. Again, there was a sharp decline in foreign exchange earnings and government revenues attributable to the loss of all on-shore production of oil while foreign exchange was rationed during the war years with a series of increasingly stringent direct and indirect controls.

In the early 1970s, the budget buoyed by the growing oil revenues, quickly returned to a surplus position. The speed of the recovery was entirely due to the oil expansion and rapid growth of government spending. Again, extensive state controls and interventions in economic activities were intensified (rather than relaxed) with the introduction of programs for price controls (Price Control Decree of 1970/71) and for indigenization Nigerian Enterprise Promotion Decree (NEPD) decree of 1972, which limited the sectors open to, and equity stakes of, foreign investors. Stringent import and credit controls were put into place with the hope of boosting manufacturing. And yet, the most significant event affecting the economy during these periods was the management of the oil boom and bust. Essentially, the positive oil shocks of 1973 and 1979 increased the terms of trade more than four times between 1972 – 80.

Latter, the collapse of world oil prices and the sharp decline in petroleum output brought to the forefront the precarious nature of the country's economic and financial position. The overall fiscal deficit rose from ½ percent of GDP in 1980 to 9½ percent in 1981, and the external current account balance shifted from a surplus of 4½ percent to a deficit of 7½ percent in the same period. The severe weakening of the external position was reflected in a reduction of international reserves. Stepped up foreign borrowing by federal and state governments and public enterprises increased external debt, while the growing scarcity of foreign exchange affected output in the import intensive manufacturing sector with capacity utilization falling. The steady appreciation of the real effective exchange rate also depressed agricultural output, which remained at levels below those achieved in the 1970s. As a result,

annual GDP growth decelerated sharply and turned negative in 1981. Thus, the sharp worsening of economic conditions prompted the Shagari government to introduce significant budget cuts and measures to improve the external position (that is the 1982 Austerity measures). These measures resulted in some easing of inflationary pressures, but real GDP contracted in 1982-83, owing to the sharp decline in oil production, the scarcity of imported inputs, and a worsening drought. Although the external current account position improved in 1983 reflecting the severe compression of imports, the government's financial position deteriorated as fiscal oil revenue dropped further and transfers to state and local governments and loans to parastatals expanded. The monetization of the government's fiscal deficit resulted in a strong growth of broad money and accelerated inflation.

The observed worsening economic and financial conditions and alleged widespread corruption led to a military coup at the end of 1983. The new regime (under General Buhari) reinforced the austerity measures while additional exchange and trade restrictions were announced in 1984. The fiscal and monetary measures announced were aimed drastically reducing domestic demand pressures. The government also implemented expenditure cuts and substantial tax increases. The expenditure cuts were particularly successful in the short run and they reduce the overall federal government fiscal deficit to a significant percentage in 1985. As a consequence, the government's recourse to bank credit was virtually eliminated and inflationary pressures were significantly reduced.

However, the government's austerity measures did meat with some setback. The emphasis on short run stabilization measures reflected the government's belief that Nigeria's economic and financial problems were transient and would eventually disappear with a recovery in oil export prices. In the event, oil prices did not recover, and it became clear that the stabilization policies had failed to address the underlying economic problems. Thus, crippling import shortages and growing social and political discontent set the stage for another military coup (under General Babangida) who assumed power in October, 198. After considerable popular debate, the Babangida Government adopted in June 1986 a comprehensive structural adjustment program (SAP) that signaled a radical departure from previous adjustment efforts. It emphasized reliance on market forces and deregulation. The objectives of the SAP were to restructure and diversify the productive base of the economy so as to reduce dependency on the oil sector and imports; achieve fiscal and balance of payments viability over the medium term; and promote non-inflationary economic growth.

The key policies designed to achieve these objectives were the tightening of financial policies; the adoption of a market determined exchange rate; the Liberalization of the external trade and payments system; the elimination of price controls and commodity boards; the decontrol of interest rates; the rationalization and restructuring of public expenditure; the rationalization of the tariff structure and the overall lowering of tariffs; and the privatization; or commercialization of most federal public enterprises.

During this period, some of Nigeria's earlier anti-export bias in manufacturing disappeared with policy reforms, and producers switched from imported to local inputs. Particularly in agro-processing and textile manufacturing, there was greater use of locally produced materials. The assembly-based manufacturing, which had depended on imported inputs and been shielded from competition and market signals, contracted. But the industry as a whole grew by 3.5 percent per year (1986-1990); similarly, production of traditional food crops and cash crops increased and agricultural output grew at 4.7 percent per year on average. However, the gradual loss of macroeconomic control after 1990 eroded many of the positive changes that took place in the preceding years and have begun impacting negatively real economic indicators. Although significant progress was made in the liberalization of the economy, specifically through reform of the exchange and the trade system and the freeing of prices, macroeconomic policy implementation remained erratic and failed to bring inflation under control.

The spark was set off once again by the short-lived oil price increase of 1990-91, but the deterioration in macroeconomic management can be mostly attributed to the rapid expansion of extra budgetary spending. This problem was compounded by inappropriate priorities. These large outlays were financed primarily by diversion of oil receipts into off-budget accounts and by borrowing from the CBN external debt service obligation were not fully met. Substantial new external arrears accumulated despite the successful debt reduction operation negotiated with the London club in 1992. In 1993/94 the pressure on the external balance was exacerbated by the downturn in world oil prices. Instead of tackling the cause of the mounting economic crisis by sharply reducing spending, the government attempted to suppress its symptoms in 1994 by centralizing all foreign exchange transactions, outlawing the autonomous foreign exchange market, fixing the official exchange rate at an increasingly overvalued level, setting up committees to ratio foreign exchange to the private sector, and capping interest rates significantly below prevailing inflation levels. As a result, non-oil

export volumes fell sharply. However, a 12 percent drop in imports that reflected foreign exchange shortages largely offset the impact of the decline in export revenue on the current account deficit. The 1994 financing gap net of the preceding stock of arrears was covered entirely by a large accumulation of external payment arrears.

The rapidly worsening economic conditions in 1994 led to significant policy corrections in the 1995 budget of "guided deregulation". Included among these were a tight fiscal and monetary stance; a free market for foreign exchange for all except some government transactions and new legislation to liberalize the environment for foreign direct and portfolio investors. As a result of these corrections, inflation slowed down but the strongest evidence was the stability experienced by the market exchange rate throughout 1995 and the first half of 1996. Notably, aggregate domestic output grew by 3.3 percent and inflation rate declined to 29.3% in 1996. For the third consecutive year, macroeconomic stability was sustained in Nigeria in 1997; resulting in further improvement in overall economic performance specifically, aggregate domestic output growth recorded a modest improvement over the previous year, while the inflation rate decelerated persistently throughout the year, reacting a single digit level in December. Although the current account surplus was lower, the overall balance of payments position showed a modest surplus compared with a deficit in the previous year significant success was achieved in stemming the growth of domestic liquidity that impacted favorably on the exchange rate and price stability while satisfactory progress was made towards distress resolution in the financial sector (CBN, 1997).

The economic policy measures adopted in 1998 were designed primarily to consolidate and build on the gains of maintaining macroeconomic stability in the previous years. The dominant strategy for achieving these objectives remained the use of market-based instruments of monetary policy and addressing the problems of unemployment and poverty from the supply side. Macroeconomic stability was threatened, as the collapse of crude oil prices in the international market weakened commitment to fiscal prudence, resulting in substantial increase in the budget deficit. Moreover output growth showed further and the pressures on the external sector intensified. Specifically, the balance of payment position resulted in an overall deficit of ₦220,667.6 million (US $2,873.0 million). This development was due to the decline in oil export earnings and increased demand for imports. Consequently, the current account position swung to a deficit of ₦330,109.0 million (US$4,297.8million). The intense pressures on the external sector also resulted in depletion

of external reserves to the level of US$7,100.0 million or 9.2 months of imports (CBN, 1998).

The performance of the Nigerian Economy in 1999 was mixed. Inflationary pressures cased, especially during the second half of the year, while growth in real output was sluggish. Here, the government fiscal operations resulted in a substantial deficit amounting to ₦285,104.7 million or 8.4 percent of GDP and the pressure on the external sector intensified with deterioration in the overall balance of payments position. However, the exchange rate of the Naira depreciated in all segments of the foreign exchange market. Prior to the introduction of Inter-Bank Foreign Exchange Market (IFEM), the average exchange rate at the AFEM (Autonomous Foreign Exchange Market) was ₦91.8 = US$1.00 for the period of January to October 1999. However, at the IFEM which commenced operations on October, the exchange rate depreciated to ₦97.42 = US $1.00 in December 1999, averaging ₦96.12 = US$1.00 during the period. The performance of the economy improved generally in 2000. At 3.8 percent, real GDP growth was higher than target and inflation was kept at a single digit of 6.9 percent while the pressure on the balance of payments abated. Here, the fiscal operations of the Federal Government resulted in as overall fiscal deficit of ₦103,777.3 million, representing 2.9 percent of GDP. This lower deficit was attributed to the increased revenue particularly from the oil sector and the restraint on expenditure. The fiscal deficit was financed entirely from domestic sources (such as the banking system).

The performance of the real sector improved in 2001, with the real gross domestic product growing by 3.9 percent. The major sources of growth were agriculture, manufacturing merchandise, transportation, finance and insurance and government services. However, inflationary pressures accelerated as a result of the liquidity surfeit fuelled by expansionary fiscal operations and the lingering structural bottlenecks that increased costs of doing business in the economy while the unemployment level remained high. During this period, Nigeria's external sector experienced renewed pressure resulting in a lower overall balance of payments surplus of ₦29.2 billion. The deficit in the capital and financial account narrowed during the year. The lingering problems included the excessive dependence on imports, a huge external debt profile, the debt service burden as well as the low level of foreign direct investment. As from 2002, the feud between the national Assembly and the presidency over budget issues left deep scars on the economy. Government accounts for well over 65 percent of total spending in the economy and therefore sets the pace of business

activities as well. With the poor implementation of budget in the last four years, planning and business projections by the various economic units in country were better left to the vagaries of guesswork. And at the macro-economic level, government projections did not fare better either.

After months of brainstorming, an economic document entitled "Framework for Nigeria's Economic Growth and Development (2003-2007) was rolled out. It was aimed basically at enhancing the frontiers of economic growth as well as poverty reduction in the medium term. The agricultural sector was targeted to grow at an annual growth rate of eight percent while total economic activity was expected to grow at seven percent. To realize these objectives, some factors were identified as possible causes of the nation's poor economic goals. They include lack of due process for the award of government jobs, corruption, lack of proper monitoring of budget implementation, conflict within civil society and lack of accountability. And agencies are created to handle and address these factors. Indeed, Nigeria is going through a difficult political and economic transition after several years of military rule. The newly elected Federal government faces an away of complicated issues that must be overcome for Nigeria to be successful in its transition to a democratic political system and a vibrant market economy. These include pervasive poverty and widespread unemployment; deterioration of government institutions and inadequate capacity at all levels of government to deliver critical services effectively; sporadic violence between ethnic groups; a legacy of widespread corruption; little growth in the non-oil private economy and limited self-empowerment among local communities. Yet, Nigeria remains a society rich in cultural linguistic, religious, ethnic and political diversity. These constituent parts of Nigerian society each feel aggrieved, in one way or another. The average Nigerian today struggles hard to make ends meet, sees himself/herself as being poorer than he/she was a decade ago, and finds it hard to be hopeful that things will get better soon.

3.2 POVERTY CRISIS

In Nigeria, the problem of poverty has for a fairly longtime been a cause for concern to the government. Initial attention was focused on rural development and town and country planning as practical means of dealing with the problem. Thus, the 2nd to the 4th National

development plan documents contain both direct and indirect allusions to, as well as objectives of policies and programmes aimed at minimizing the causes of poverty. In order to stave off the causes of urban poverty and other ills, the development plans called for the provision of master plans for future expansion and better physical layouts with facilities utilities including adequate water supply, housing, sewage, electricity and efficient transport and communications network including the establishment of the necessary institutions to ensure their maintenance. Failure to adequately implement these programmes can be seen as the precursor to most of the present causes of poverty in Nigeria.

Information from the Federal Office of statistics (table 3.2.1) showed that the incidence of poverty increased sharply both between 1980 and between 1992 and 1996. However, there was a decrease in poverty level between 1985 and 1992. The figures were 27.2 percent, 46.3 percent, 42.7 percent and 65.6 percent for 1980, 1985, 1992 and 1996 respectively. The 27.2 percent for 1980 translated to 17.7 million persons in 1985. Despite the drop in poverty level in 1992, the proportion in poverty was about five million higher than the 1985 figure. And by 1996, the population in poverty had increased sharply to 67.1 million.

TABLE 3.2.1 TRENDS IN POVERTY LEVEL (1980-1996) (%)

YEAR	POVERTY LEVEL	ESTIMATED TOTAL POPULATION	POPULATION IN POVERTY
1980	27.2	65M	17.7M
1985	46.3	75M	34.7M
1992	42.7	91.5M	39.3M
1996	65.6	102.3M	67.1M

SOURCE: FOS POVERTY PROFILE FOR NIGERIA: 1980 – 1996 IN DRAFT NATIONAL POLICY ON POVERTY ERADICATION (2000)

Again the 1992 household survey indicates that the number of people who fell below the poverty line declined from 43 percent in 1985 to 34 percent in 1992. However, this translates into a small decline in the number of poor people from 36.1 million in 1985 to 34.7 million in

1992. This was mainly because a sharp increase in population growth has not enabled Nigeria to realize large reductions in the number of poor people as shown in table 3.2.2)

TABLE 3.2.2 INCIDENCE OF POVERTY IN NIGERIA 1985-92 (%)

	NATIONAL		URBAN		RURAL	
	1985	1992	1985	1992	1985	1992
Extreme Poor (₦998)						
Number of poor (million)	10.1	13.9	1.5	4.3	8.6	9.6
Poverty incidence	12.0	13.6	4.9	10.9	16.1	15.4
Poverty depth	4.2	8.5	0.9	6.1	4.2	8.0
All Poor (₦395)						
Number of poor (millions)	36.1	34.7	9.7	11.9	26.4	22.8
Poverty incidence	43.0	34.1	31.7	30.4	49.5	36.4
Poverty depth	15.7	14.7	9.1	12.0	18.9	16.1

SOURCE: Evolution of poverty and welfare in Nigeria (1985-92) in Canagarajah, S. et. al (1997)

Some government programs initiated over the past decade have aimed at improving basic services, infrastructure and housing facilities for the rural and urban population, extending access to credit and farm inputs, and creating employment. The Federal government has administered most of these programs with some cofinancing, in cash or kind by the states. While none of these programs is specifically targeted towards the poor, the government has a concern for reducing poverty. In May 1994, the National Planning Commission (NPC) after considering preliminary outputs from the collaborative work on the poverty assessment took the initiative to set up poverty alleviation program development committee (PAPDC). This consists of representatives from government agencies, non-governmental organizations, community development associations, and academic and business communities. PAPDCs main task was to advice the government on the design, coordination programs. To help inform the design of poverty alleviation programs, the PAPDC commissioned research terms to conduct consultative surveys of 36 rural and urban communities in six zones across Nigeria in March 1995. The surveys assessed current poverty alleviation activities being implemented by government, non-governmental organizations and community-based

organizations; evaluated the capacity and performance of local implementing institutions and the level of popular participation in their programs; and sought the views of communities as to the most appropriate institutional arrangements of community development and poverty alleviation. PAPDC's report recommends that to be effective, any national poverty alleviation program would need to be flexible enough to address the diversity of the needs of poor individuals and communities /World Bank, 1996).

As an interim measure, government also started a Poverty Alleviation Programme (PAP) in 1999. Here, it was supposed to pay ₦10,000 each to an agreed number of unemployed persons for up to a year to enable then begin business. The programme was stopped because of criticisms that the ruling party hijacked it and the money rarely got to those who actually needed it. Also, instead of the ₦10,000 which government allocated, the recipients got only ₦7,000 each. However, there were beneficiaries of the scheme. When PAP failed government revisited the matter of poverty alleviation and came up with the National Poverty Eradication Programme (NAPEP). With this perggo tricycles were given to beneficiaries to enable then become players in the informal transportation sector. Also, a poverty-reduction strategy process was started by government in order to enable it deal with the matter of poverty and unemployment once and for all. Indeed, the Human Development Report (2000) ranked Nigeria number 151 out of 1974 countries and amongst the poorest twenty (20) countries in the world. All these point to the fact that poverty is a serious problem in Nigeria (see Nwaobi 2000). In fact, Nigeria faces mass poverty and this has serious social, political, economic, and security consequences that cannot be ignored. The Nigerian situation has however been made worse by the rapid population growth rate of about 2.83 percent since the 1990s giving rise to a high dependency ratio and pressure on resources in several areas. The qualitative aspects of poverty derived from the voice of the poor, a consultative World Development Report (2000/2001) carried out by the Department for international Development (DFID) and World Bank in collaboration with the National Planning Commission also manifested poverty in terms of lack of access to resources by individuals which leads a state of powerlessness, helplessness and despair, in ability to subsist and protect oneself against economic shocks, social economic, cultural and political discrimination and marginalisation among others.

4.0 MODEL CONSTRUCTION

General equilibrium models go back to Walras (1875) who formulated the economic system as set of excess demand equations in as many unknown prices, to be solved via successive price revisions. Walras did not prove the existence of an equilibrium price vector (until 1950) when mathematical economists such as Arrow, Debreu, Gale and others derived rigorous conditions for the existence, uniqueness and stability of general equilibrium. Applied general equilibrium modeling had to wait further development of computational techniques (such as fixed point algorithms of scarf and kuhn) and cheap computers before equilibrium prices could be computed in practice.

Here, the basic objective of our model is to simulate policies oriented toward basic needs satisfaction. For this, it is necessary to capture as many intentions as possible between the various "zones" of the society that are relevant to the issue and can be quantified in some way. They main focus is on the medium and long-term. The various agents of the economic and social processes (productive units, households and institutions) are interdependent, as is particularly clear with the role of prices in the decision making processes Relative prices affect the outcome of the economic and social processes in terms of basic needs satisfaction. A general equilibrium type of model captures these interdependencies among agents and does justice to the allocative role of prices. The most important basic needs characteristic is the classification of the various agents in the socio-economic processes, accomplished through the division of relatively homogenous as to income and consumption behavior and can be identified as target groups for government policies. Similarly, commodities, consumption categories and sectors are distinguished so as to identify those units relevant for basic needs satisfaction [see Nwaobi 1997; Kouwenuur, 1988]

The model structure has two major parts: the main iteration that determines on equilibrium for the current year and the updating part, in which the exogenous variables of the main-iteration part are updated [for iteration of the following year] as functions of the equilibrium solution of the previous period. In this sense, the model can be called recursive, i.e. it computes a sequence of temporary equilibria. The main iteration part basically centers on deriving a set of excess demand equations for commodities in as many price variables.

Behind excess demands lie the state of resource ownership and the processes of production, income formation and expenditure. The equations of this part can be grouped into six blocks:

(I) **PRODUCTION SECTORS**- supply of commodities by productive units.

(II) **EMPLOYMENT AND VALUE ADDED**- distribution of employment opportunities and factor income among the various agents owing factors.

(III) **INCOME DISTRIBUTION**- transforming factor income into secondary or disposable household income, i.e., the mapping of factorial income distribution into size income distribution

(IV) **CONSUMPTION**- the formation of consumption demand: private consumption of the various socio-economic groups, public and intermediate consumption and this includes the determination of domestic and foreign components of consumption demand.

(V) **SAVINGS AND INVESTMENT**- formation of investment demand i.e., how household savings as well as savings and credit flows of institutions are channeled (flow of funds) to households and institutions to lead to investment, by investing agent by sector of destination and by commodity of origin; domestic and foreign components of investment demand are determined.

(VI) **EXPORTS AND EXCESS DEMAND**- After export demand has been added to domestic demand for domestic commodities, total demand is confronted with domestic supply, foreign exchange is considered as are of the commodities for which an excess demand equation is defined and in equilibrium, all markets clear and the equilibrium price vector equates all excess demands to zero.

The updating part consists of the following:

(VII) **POPULATION AND LABOUR SUPPLY**- changes in population and labour supply by socio-economic group and the distribution of persons among households.

(VIII) **DISTRIBUTION OF WEALTH-** changes in capital stocks by sector and owning agent and in distribution parameters for capital ownership (share capital, debt-claims, self-employed shares in operating surplus) and this also includes the derivation of desired capital-output ratios.

(IX) **BASIC NEEDS INDICATORS-** basic needs satisfaction indicators by socio-economic group nutrition, education, life expectancy, infant mortality, housing, drinking water and sewerage as well as indices describing income inequality and its sources.

Equations 4.1 to 4.17A shows the simplified mathematical structure of the model; that is, the systems of equations (K = 1, k sectors and commodities). It also shows the simultaneous equation system with endogenous domestic commodity prices PD_1, PD_k and the exchange rate ER. The system contains 11k + 4 equations in 11k + 4 unknowns. Substitution reduces the system to K + 1 excess demand equations in K + 1 prices (including the exchange rate). Walras law implies that one excess demand equation is dependent and one price can be chosen as numeraire. It depends on the homogeneity property (of degree zero) whether the choice of the numerous affects the outcome.

(4.1) PRODUCTION FUNCTION

$$X_K = f[L_K, \bar{K}_K, (V_{ßK})]$$

(4.2) INTERMEDIATE DEMAND

$$V_K = \sum_{ß} V_{Kß} = \sum A_{Kß} X_ß$$

(4.3) NET PRICE OR PER UNIT VALUE ADDED

$$PN_K = PD_K - \sum_{ß} A_{ßK} P_ß$$

(4.4) MARGINAL PRODUCTIVITY CONDITION

$$L_K = qk[X_K, PN_K, \bar{W}_K]$$

(4.5) LABOUR INCOME

$$YL = \sum_{K} L_K \bar{W}_K]$$

(4.6) GROSS CAPITAL INCOME

$$YK = \sum_{K} (X_K PN_K - L_K \bar{W}_K)$$

(4.7) CONSUMPTION

$$C_K = C_K (YL, YK, P_1 \ldots P_K)$$

(4.8) DOMESTIC SAVINGS

$$SD = S(YL, YK)$$

(4.9) INVESTMENT AND GOVERNMENT EXPENDITURE BY COMMODITY OF ORIGIN

$$I_K = b_k (P_1 \ldots P_K)$$

(4.10) IMPORT DEMAND

$$M_K = M_K [(C_K + I_K + V_K), PD_K, ER]$$

(4.11) DOMESTIC DEMAND

$$D_K = C_K + I_K + V_K - M_K$$

(4.12) EXPORT DEMAND

$$E_K = e_k [PD_K, ER]$$

(4.13) COMPOSITE PRICE OF DOMESTIC AND IMPORTED COMMODITIES

$$P_K = h_k [PD_K, ER]$$

(4.14) EQUILIBRIUM CONDITION: EXCESS DEMANDS COMMODITIES EQUAL ZERO

$$D_K + E_K - X_K = O$$

(4.15) BALANCE OF PAYMENTS IN FOREIGN CURRENCY

$$\text{Ó}_K [M_k \overline{PW}_k – E_K PD_K / ER] – \overline{SF} = O$$

(4.16) MACRO BUDGET CONSTRAINT OF WALRAS LAW

$$Y_L + Y_K + \overline{SF}\ ER = [X_K PD_K - V_K P_K] + \overline{SF}\ ER = [C_K + I_K] P_K$$

Income + borrowing = Value added + borrowing = expenditure which is the price – weighted sum of all equations (4.14) and (4.15) and equivalent to the usual formulation of the savings – investment identity:

(4.16A) $$I = SD + \overline{SF}\ ER$$

Excess supply of domestic commodities, that is:

(4.17) $$\text{Ó}_K [X_K – D_K – E_K] PD_K > O$$

Which implies excess demand for foreign exchange (measured in domestic currency at the exchange rate

$$\textbf{(4.17A)} \quad \sum_{K} [M_k \overline{PW}_k ER - \sum_{K} E_K PD_K - \overline{SF}\, ER > O$$

Walras Law means that the sum of all excess demands equal zero, that is, only K equilibrium conditions out of K + 1 [eq. (4.14) and (4.15)] are independent. Equilibrium on K markets implies equilibrium on the [K + 1) markets.

The Glossary of variables of the above model are as follows:

$\mathbf{A_{ßk}}$ = Input – output coefficient

$\mathbf{C_K}$ = Consumption

$\mathbf{D_K}$ = Domestic Demand

$\mathbf{E_K}$ = Export demand

ER = Exchange rate

$\mathbf{I_K}$ = Investment and government expenditure by commodity

$\overline{\mathbf{K}}_{\mathbf{K}}$ = Capital stock

$\mathbf{L_K}$ = Employment

$\mathbf{M_K}$ = Composite Price of domestic and imported commodities

$\mathbf{P_K}$ = Import Demand

$\mathbf{PD_K}$ = Domestic Price

$\mathbf{PN_K}$ = Per unit value-added

$\overline{\mathbf{PW}}_{\mathbf{K}}$ = World Price

SD = Domestic Savings

$\overline{\mathbf{SF}}$ = Foreign savings in foreign currency

$\mathbf{V_K}$ = Intermediate demand

$\overline{\mathbf{W}}_{\mathbf{K}}$ = Sectoral wage rate

$\mathbf{X_K}$ = Production

$\mathbf{Y_K}$ = Gross Capital income

$\mathbf{Y_L}$ = Gross Labour income

The above model is designed as a tool for policy making. Its interest lies in the ability to describe socio-economic mechanisms and the effects of exogenously introduced policies possible simulation (policy questions) include changes in government policy instruments (tax rates, current and capital expenditure, access of various socio-economic groups to government services) – how will basic needs satisfaction, income distribution employment and the production structure change when certain policy packages are introduced; changes in medium-run structural characteristics of the country – population growth, foreign savings, urban-rural composition and import function parameters; changes in various exogenous prices such as wage and interest rates; changes in "closure rules" – the expenditures of a variety of institutions or households can be specified as the residual item which brings about income expenditure equilibrium (government investment may be residual or household consumption or foreign savings); changes in the parameters describing the structural impact of basic needs satisfaction – which medium run effects can be expected when basic needs satisfaction has a larger (smaller) impact on certain structural variables?

5.0 THE SAM FRAMEWORK

The Social Accounting Matrix (SAM) is a comprehensive, disaggregated, consistent and complete data system that captures the interdependence that exists within a socioeconomic system. Thus, depending on the classification scheme used to record transactions and the extent of disaggregation, the SAM can provide useful information about such key issues as intersectoral linkages, socioeconomic groups given the structure and technology of production and the resource endowments of these groups; and the relationship between a given regional economy and other regional economies within a nation, and with the rest of the world Alternatively, the SAM can be used as a conceptual framework to explore the impact of exogenous changes in such variables as exports, certain categories of government expenditures, and investment on the whole interdependent socioeconomic system, that is, the resulting structure of production factorial and household income distributions. As such the SAM becomes the basis for simple multiplier analysis and the building and calibration of a variety of applied general equilibrium models (Thorbecke, 1985, Decaluwe et.al. 1999).

Basically, a SAM can be seen as a numerical representation of the economic cycle with emphasis on distributive aspects. As in the complete system of National Accounts (United National, 1968) and in the Input – Output framework, transactions in a particular

year appear in a matrix format showing receipts on the rows and outlays in the columns. In other words, this framework shows how sectoral value added accrues to production factors and their institutional owners; how these incomes, corrected for net current transfers are spent; and how expenditures on commodities lead to sectoral production and value added. The Leakages from this cycle (in the form of payments abroad or savings) are also shown. In turn, capital finance may then be linked to savings, thereby presenting a glimpse of the dynamics in an economy (Keuning, et.al, 1988). Indeed, the essence of a SAM lies in its comprehensive recording of the inter-relationships at the meso-level. This means a disaggregation of the household sector (plus the various categories of value added) and primary inputs into production and final (household) demand are linked.

Here, the compilation of a SAM is divided into eight steps or phases (as shown in figure 5.1). Practically, the distinctions between these steps are not very clear and sometimes the results of an earlier stage are re-adjusted in order to circumvent a latter problem. The use of computers has greatly enhanced the possibilities of the flexibility feature of SAM construction.

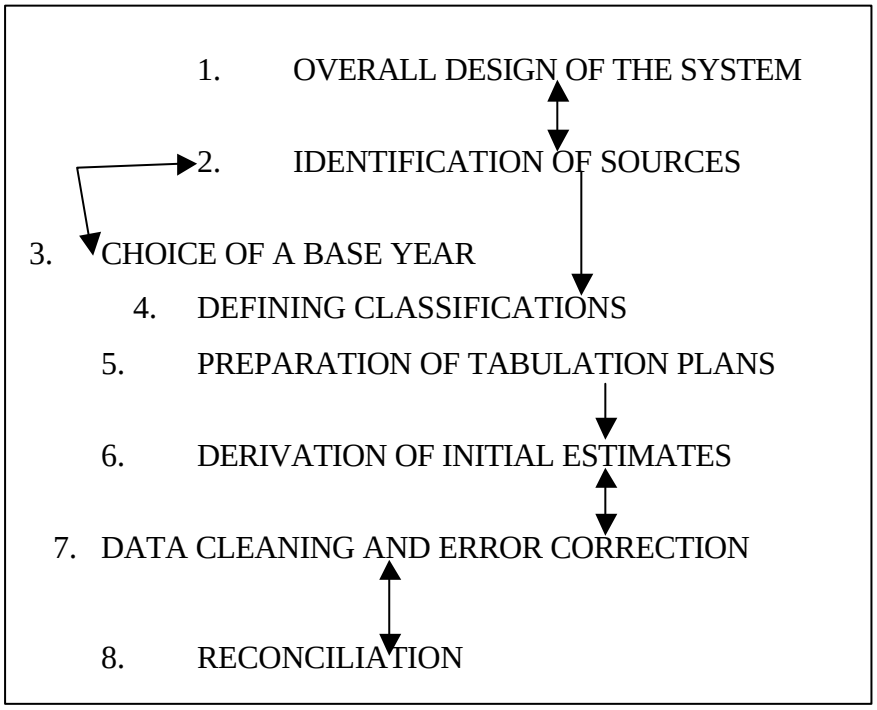

Figure 5.1 FLOW CHART OF SAM CONSTRUCTION

Thus, a SAM must always contain detailed information about the incomes and outlays of institutions (household groups, companies and the government and relevant accounts for the rest of the world) and about the production structure (i.e. an input – output). The rest of

design depends on national socio-economic structure, policy needs and availability of data and resources. Table 5.1 presents an example of a complete SOCIAL ACCOUNTING MATRIX (SAM) Framework. Instructions, asset and transactions are the three fundamental elements of social accounting. The institutions of a society are to be understood for our purposes as legal entities have two key attributes, specifically, that they can own assets and incur liabilities; and engage in transactions. It therefore follows that people, government departments and private companies are all examples of institutions. The assets, which can be owned by an institution, are of two main types that are referred to as real and financial assets. The real assets include physical or real capital (Plants buildings, equipment, stocks of finished products, raw materials and work in progress); Natural resources (law, minerals, water, air, vegetation) and Human resources (skills of different types). The Financial claims include claims on households (mortgages, loans and credits); on companies (equity, loans) and on government (securities, money). Transactions are fundamental elements in economics. There are three varieties: gifts (or unrequited transfers); the sale/purchase of a good or service; and the sale / purchase of a financial asset.

TABLE 5.1:A COMPLETE SOCIAL ACCOUNTING MATRIX (SAM) FRAMEWORK

	INSTITUTIONS			PRODUCTION			
	DOMESTIC						
	CURRENT	CAPITAL	REST OF WORLD	FACTORS	ACTIVITIES	PRODUCTS	PHYSICAL CAPITAL
(1) DOMESTIC INSTITUTIONS							
(2) CURRENT ACCOUNTS	Unrequited domestic transfers	O	Non factor income received from abroad	Net National product	Taxes on activities	Taxes on activities	O
(3) CAPITAL ACCOUNTS	Savings	O	O	O	O	O	Opening real assets
(4) REST OF THE WORLD	Non-factor income paid abroad	O	O	Factor income paid abroad	O	Imports	O
(5) FACTORS	O	O	Factor income received from abroad	O	Value added	O	O
(6) ACTIVITIES	O	O	O	O	O	Output	O
(7) PRODUCTS	Consumption	O	Exports	O	Expenditure	O	Investment
(8) PHYSICAL CAPITAL	O	Closing real assets	O	O	Consumption of fixed capital	O	O
(9) FINANCIAL CLAMS ON							
(10) DOMESTIC INSTITUTIONS	O	Closing claims	Closing claims on domestic institution	O	O	O	O
(11) REST OF WORLD	O	Closing claims on the rest of the world	Closing liabilities of the rest of the world to out economy (-)	O	O	O	O
(12) APPRECIATION OF ASSETS HELD BY DOMESTIC INSTITUTIONS	O	O	O	O	O	O	Appreciation of real Assets
(13) REST OF THE WORLD	O	O	O	O	O	O	O
(14) Ó	Allocation of income	Closing net worth	Utilization of net claims	Allocation of income	Total costs	Aggregate supply	Closing assets (gross)

TABLE 5.1: (CONTD.)

	ASSETS			APPRECIATION OF ASSETS HELD BY			
	FINANCIAL CLAIMS ON						
	DOMESTIC INSTITUTIONS	REST OF WORLD	DOMESTIC INSTITUTIONS	REST OF THE WORLD	Ó		
(1)							
(2)	O	O	O	O	Current income		
(3)	Opening Claims	Opening Claims on the rest of the world	Net holding gains	O	Closing worth		
(4)	Opening claims domestic institutions	Opening liabilities on the rest of the world to our economy (-)	O	Net holding gains	Net claims on domestic resources		
(5)	O	O	O	O	Factor income		
(6)	O	O	O	O	Total revenue		
(7)	O	O	O	O	Aggregate demand		
(8)	O	O	O	O	Closing assets (gross)		
(9)							
(10)	O	O	O	O	O		
(11)	O	O	O	O	O		
(12)	Appreciation of claims	Appreciation of claims	O	O	Net holding gains		
(13)	Appreciation of claims	Appreciation of liabilities (-)	O	O	Net holding gains		
(14)	O	O	Net holding gains	Net holding gains			

A basic tenant of social accounting is to treat all transactions as cash transactions either because they implications in terms of the ownership of assets can be expressed as a sequence of cash transactions (Pyatt, 1991).

Because a SAM can also be seen as extension of as input – output (I-O) matrix, such as table usually serves as a fruitful starting point. If an I-O matrix is available, the main tasks which remain are: linking primary incomes and final demand (mapping factor incomes to household incomes after correction for transfers, to consumption expenditures): Disaggregating primary incomes (by factor type) and part of final demand, namely household consumption expenditures (by household group) and fixed capital formation (by sector in which the investment takes place and possibly by investing institution); collecting supplementary information on savings, interinstitutional transfers (taxes, dividends government subsidies and grants to private institutions, transfers between household groups and the like), current transactions with the rest of the world not shown by the balance of trade (factor services interest payments, emigrant remittances) and ideally, the flow of funds. Commonly, the supplementary data can be obtained from a variety of sources and minimally needed are: National Accounts, demographic data, survey data on wages and entrepreneurial incomes, household budget survey, government statistics, itemized balance – of – payments data, and for a flow of funds block, financial data, usually collected by the Central Bank are indispensable. If no nation-wide source for certain information is available, even individual company accounts and micro-studies can be useful combined with some common-sense notions about the representatives of the results, they indicate at least the order of magnitude of the variable concerned. After identifying data sources, and with bearing in mind recent fluctuations in economic conditions, a reference year for the SAM should be chosen. For the Nigerian case, we plan to choose 1990 as our base year (given the existence of 1990 input – output table as compiled by the Federal office of statistics of Nigeria) unless otherwise.

6.0 MODEL SOLUTION TECHNIQUE

The solution of a large-scale computable general equilibrium model is a difficult computational problem that in the past has limited the application of such models. Modelers often had to tailor the model's structure to particular solution method, and frequently devoted as much time or more to grappling with solution algorithms on mainframe computers as was spent in pursuit of economic insights. Moreover, these models could not be moved to other

environments because of the specialized programming knowledge needed and also because of data formats.

Indeed, model building in a strategic planning environment is a dynamic process, where models are used as a way to unravel the complex real-world situation of interest. This implies not only that a model builder must be able to develop and modify models continuously in a convenient manner but also that a model builder must be able to express all the relevant structural and partitioning information contained in the model in a convenient short-hand notation. Only by providing a capability to express partitioning, mappings, nesting and conditional information can we expect to be able to communicate the complexities interest in large-scale real-world phenomena (Bisschop and Meeraus, 1982).

GAMS (General Algebraic Modelling System) is a computer language which was originally developed to assist economists at the World Bank in the quantitative analysis of economic policy questions (Meeraus, 1983; Brooke, Kendrick, and Meeraus, 1987). At the time of its conception and initial development, Linear Programming (LP) was the standard framework in which market equilibrium modes were constructed. Subsequently solution algorithms and lodes for general nonlinear programming representations became more common and alternative economic paradigms were developed (Ruther Ford, 1995).

However, the situation is rapidly changing because of the increasing power and availability of personal computer that allows every modeler to have desktop access to computational resources. Thus, the development of packaged software to solve complex mathematical (statistical) problems has permitted modelers to return their attention to economics; and such packages include GEMPACK, GEMODEL, GAUSS, etc. Here, we intend to Calibrate the constructed Nigerian AGE – SAM based model using the modern software.

7.0 ANTICIPATED RESULTS AND DISSEMINATION

The National governments, international organizations, private sectors and civil societies are today making substantial effort to incorporate poverty reduction measures in their regular operations. In particular, the Federal Government of Nigeria retains the vestiges of good systems for planning, budgeting, managing and controlling of public resources. But their performance has deteriorated to such as extent that they provide negligible assurance that resources are used entirely for their intended purpose. The same is true at the state and

local level. To return to an acceptable level of financial accountability and poverty reduction will require sustained action over several years. Our research result is therefore expected to provide a quantitative policy framework for the various poverty reduction measures of the stakeholders. It is also expected to be an essential component in our efforts to establish the basis for Long-term and sustainable development in Nigeria. This is in addition to contributing to existing knowledge and future research in macro-modelling.

Indeed, our research output will be published accordingly and disseminated to the various professional economists and policy makers in the nation and the rest of the world. Such policy-making institutions include the National Planning Commission, the presidency, Central Bank of Nigeria, United Nations, World Bank, International monetary Fund, the African Development Bank, the Africa union, Economic Community of West African States, African Economic Research consortium and poverty reduction networks.

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