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NSSP Report 2

Knowledge Management and Development Targets in Nigeria

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Nigeria Strategy Support Program (NSSP)

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THE NIGERIA STRATEGY SUPPORT PROGRAM (NSSP)

REPORTS

ABOUT NSSP

The Nigeria Strategy Support Program (NSSP) of the International Food Policy Research Institute (IFPRI) aims to strengthen evidence-based policymaking in Nigeria in the areas of rural and agricultural development. In collaboration with the Federal Ministry of Agriculture and Water Resources, NSSP supports the implementation of Nigeria's national development plans by strengthening agricultural-sector policies and strategies through:

- Enhanced knowledge, information, data, and tools for the analysis, design, and implementation of pro-poor, gender-sensitive, and environmentally sustainable agricultural and rural development policies and strategies in Nigeria;
- Strengthened capacity for government agencies, research institutions, and other stakeholders to carry out and use applied research that directly informs agricultural and rural policies and strategies; and
- Improved communication linkages and consultations between policymakers, policy analysts, and policy beneficiaries on agricultural and rural development policy issues.

ABOUT THESE REPORTS

The Nigeria Strategy Support Program (NSSP) reports contain information that has been gathered and discussed but is not analytical. They are circulated in order to stimulate discussion and critical comment.

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Introduction

Ajaikaiye and Olusola (2003) observed that the knowledge system of any progressive society performs a pivotal function in its development. However, they note that “in spite of this recognition, the attention given to Nigeria’s knowledge system has been weak and unstable, and has therefore affected its effectiveness and utilization.” Therefore, the challenge is for institutions and countries to determine and develop organizational practices, principles, guidelines, and approaches on how knowledge can be created, harnessed, shared, tracked, and distributed among government agencies, research communities, and the public (Riley, 2003).

In particular, Nigeria needs to establish a knowledge management system that considers the multi-dimensional perspective of poverty and agriculture. Two of these multi-dimensional areas are gender and the environment. The key government ministries most directly in charge of issues related to the interactions of gender, the environment, agriculture and poverty are the Federal Ministry of Agriculture and Water Resources (FMAWR), the Federal Ministry of Environment (FMoE), and the Federal Ministry of Women Affairs and Social Development (FMWA&SD). This study examines aspects of knowledge management in general in these three ministries and also examines the national capacity to carry out comprehensive agriculture sector modeling in particular. This study is a first step in assessing the existing knowledge management system in Nigeria with respect to the achievement of agriculture-led growth and poverty reduction.

To strategically situate future analysis of knowledge management, the study took an inventory of the national objectives related to agriculture-led growth and poverty reduction, which take into consideration gender issues as well as environmental sustainability. Relevant lessons that are systematically incorporated into existing and ongoing activities and future plans were also included in the inventory. The report then examines knowledge management in the three ministries and the capacity to carry out a comprehensive agriculture sector economic research model. Next, this paper discusses the national development targets and research results from existing literature.

Data, Tools and Literature Available Within Ministries¹

In conjunction with the research community, FMAWR is supposed to be a repository of data and knowledge relevant to agricultural policy research and analysis. Its functions extend beyond keeping data and knowledge, to include facilitating the sharing of such knowledge among stakeholders. However, the current state of data and knowledge management within the FMAWR, FMA&SD, and FMoE calls for concern. For example, the collection of data within FMAWR is based on projects and not annual data requirements of the government. The weaknesses in the data collection system have led to varying degrees of discrepancies in available data.

An assessment of the tools available in both FMAWR and FMWA&SD indicate a lack of analytical tools and personnel that can collate data and carry out data analysis. Representatives from the FMWA&SD confirmed that the majority of data issues are handled by the National Bureau of Statistics (NBS). However, among the literature acquired from the FMWA&SD, our researchers found a gender mainstreaming manual describing a number of analytical tools for examining gender related issues, which the ministry distributes to those working on gender. The FMoE appears to have good tools and capacity for analyzing environmental impacts on a project by project basis, but does only limited work on aggregate national impact analysis. In each case, it may not be a question of tools or capacity but of focus.

Data and tool availability is an established challenge facing the FMAWR. The problem of availability also applies to published reports and surveys, which contain useful information for knowledge management. Available publications within the FMAWR are not only old but are not regularly produced. For example, the

¹ This section is based on discussions with senior staff of the departments of planning, research and statistics of the FMAWR, FMWA&SD, and FMoE, chief women development officer, two professors of agricultural economics, and observations from a survey of government documents. The “ministry” in this section refers to the Department of Planning, Research and Statistics or Department of Planning, Policy Analysis, and Statistics within the various ministries as they were expected to be in charge of knowledge management issues in their respective ministries.

annual agricultural statistics report, which provides data on land use, rainfall, crop production, livestock, fisheries and forestry, has no recent editions; only a 1997 edition was found. Table 2 contains a list of publications from the FMAWR, FMWA&SD, and FMoE.

Capacity Challenges and Communication Linkages within FMAWR, FMWA&SD, and FMoE

For the ministries, one way to track analytical capacity is to ascertain the number of staff dedicated to quantitative socio-economic analysis and the level of training they have received on a yearly basis. Although this study was unable to determine the exact number of staff dedicated to such analysis, it is clear that there is a strong need for data analysts and experts in both the FMAWR and FMWA&SD. For the FMAWR, the loss of specialists began when its Planning, Research, and Statistics (PRS)/ Planning, Policy Analysis and Statistics (PPAS) department was classified as a service department. This enabled the ministry to hire staff with little quantitative or economics background. At the moment, the analytical strength of the staff is very low. The environment ministry appears to have the necessary capacity to assess the impacts of societal activities on the environment; however, it appears to lack regular data collection, and their data collection does not operate on a project by project basis.

It appears the FMAWR has a bigger challenge coordinating interaction with its stakeholders including other ministries, farmers, farmer organizations, and research institutions. The ministry meets with researchers and farmers in different fora, so the three parties do not normally have information flowing freely among them. An annual or more frequent forum for the purpose of such tripartite meeting is needed.²

A measure of communication linkages is the number and level of active participation of stakeholders in biannual and annual workshops and conferences. Among Nigerian ministries and stakeholders, the participation of key decisionmakers during the technical sessions is low. When researchers (agriculture and allied experts) hold annual meetings, policymakers from the ministry do not actively participate. Likewise, researchers do not actively participate in annual meetings of agriculture policymakers. One outcome is that the research community is unaware of the policymakers' research priorities. Other suggested means of increasing communication between policymakers and researchers include the print media and the Internet (including web-based discussions).

One problem raised concerning the relationship between researchers and the government was the willingness of government to use research output. It was opined that even where policy relevant issues are analyzed and communicated to policymakers, the results of the analysis might not influence policy. The problem, then, is no longer one of awareness of the policy implications of different choices, but a lack of political will to select and implement optimal policy choices. Increasing political will might, therefore, be an issue to examine, using political economy theory. Under this agenda, issues such as legislating agricultural policy can be studied.

Communication with farmers takes place through less formal approaches. However, from the discussions held, it appears that farmer groups, which regularly informally interact with ministry officials, are increasingly politicized and unable to represent farmers. It is suggested that farmer cooperatives may be a better voice for farmers, and may lead to improved communication linkages within the ministries and between the ministries and farmers.

There is greater evidence of linkages between ministries on gender issues. The FMWA&SD have instituted a gender desk officer in each ministry to ensure that gender concerns are reflected in sectoral policies. The various gender officials meet regularly for updating and training. The FMWA&SD appear to be working with other ministries, women's cooperative societies, state governments, microfinance institutions, and farmers. This close collaborative work with other ministries is not surprising, as gender problems are cross-cutting and manifest themselves in areas under the mandate of other ministries.

² One person interviewed for this section made reference to CTA (2002) as being a good source of guidelines for increasing communication.

The FMoE created an environment desk in other ministries, including FMAWR that provides clear inputs into the ongoing changes in environmental policies. The FMoE appears to work closely with other ministries, oil companies, and large-scale organizations, judging from the guidelines laid out for environmental impact assessments.

Table 1. List of Publications from FMAWR, FMWA&SD, and FMoE

Name of Publication	Ministry
Production and area of key crops by small holder farmers 2002-2006	Project Coordinating Unit ,FMAWR
National production and area cultivated	FMAWR
Gender mainstreaming for sustainable national development	Women Affairs
National gender policy: Situation analysis and framework	Women Affairs
National gender policy	Women Affairs
Nigeria gender statistics book 2006	Women Affairs
Annual report of the ministry 2006	Women Affairs
The 1999 national policy on environment	Environment
The environmental impact assessment sectoral guidelines	Environment
Reports of the 2005 and 2006 National council on environment	Environment
2006 Annual report of the ministry of environment	Environment

Assessment of Capacity for Modeling Agricultural Growth

Adequate human and institutional capacity is crucial for successfully managing knowledge. The capacity to produce knowledge for comprehensive agriculture sector planning relies on the ability to provide the needed data and skills, and to analyze the data using appropriate tools.

Tools and Data for Modeling Agricultural Growth

Researches use a variety of macro-economic modeling frameworks to analyze, evaluate, and measure alternative policies and their likely trade-offs in the economy. These frameworks are an important component of knowledge management, as they provide the mechanism for turning data into knowledge which can be used for planning purposes.

Among these frameworks is the computable general equilibrium (CGE) model, which is increasingly, becoming an important policy planning tool in various government policy planning institutions. The growing importance of CGE models stems from the advantage they have in capturing the general equilibrium feedback effects of policy proposals on various sectors of the economy, as well as winners and losers from potential policies. CGE models are typically sectoral and have been used to build extensive knowledge on the manner in which sectors interact to arrive at economy-wide final outcomes. A description of a range of modeling tools appears below.

While there are many macroeconomic models of the Nigerian economy (see box 1), they have tended to focus less on the agricultural sector. Furthermore, none of them addresses the other important aspects of development such as the gender implications of agricultural growth policy outcomes and their impact on the environment.

At the core of any meaningful agricultural policy, planning, and analysis (including macro-modeling) is the availability of data. When data are available, other issues to grapple with are: access, quality, and reliability of such data. Access to data by policymakers and the general public affects decisionmaking and program direction. With better data, policymakers can make informed choices about how to target their limited resources. Fortunately, the basic data needed for carrying out a macro-economic analysis -- and specifically CGE modeling--are available in the country and have been successfully used to do such analysis for several years, as indicated by the publications in Box 1. What needs to be ascertained is the availability of data required for extending a basic model into one that can analyze environmental and gender issues.

Carrying out a macro-economic analysis that incorporates gender would require gender disaggregated labor force and household data. Two key sources of gender data are 1) the National Living Standard Survey (NLSS) 2004, which was implemented by the National Bureau of Statistics, and 2) the labor market

survey carried out by the National Manpower Board in 2006. Although these surveys provide sufficient data to handle some gender disaggregation, they do not allow the calculation of poverty at separate male and female levels.

It would be useful to extend macroeconomic models to consider the environment, data on the quality of land (showing level of degradation and deforestation), population density, forest cover, total land available and its distribution by use, and estimated impact of present farming practices on soil fertility. While time series data on the environment are difficult to acquire there seems to be some ad-hoc data available in Nigeria such as volume of surface and underground water (Table 2), but most of this data is before 2004. Although macroeconomic modeling needs time series data, the CGE modeling does not require time series data; however, to obtain realistic parameters researchers need to work with environmental experts and key ministry officials.

Table 2. Some available data on the environment

	Data Found	Years Covered	Source
1	Area summary of dominant vegetation and land use classes <i>It shows 34 uses of land including different forest types, gully erosion, canals etc for the 2 periods.</i>	1976/78 and 1993/95	ARD Inc (2002) Original data were collected by Geomatics International Inc
2.	Estimates of natural forest cover in southern Nigeria. <i>Indicates the different share of forest types and the corresponding percentage in forest reserves.</i>	Unclear but probably 1999 or before.	ARD Inc (2002) Original data were from beak consultants (1999)
3	Average total area per farm household	Unclear	Government of the federal republic of Nigeria (2006)
4	Estimated volume of surface water per capita	1999 - 2003	NISER (2003) Original data are from other sources
5	Estimated volume of underground water per capita	1999 - 2003	NISER (2003) Original data are from other sources
6	Irrigated area as percentage of national land area	1999 - 2000	NISER (2003) Original data is from other sources
7.	Deforested area as percentage of total forest	2000	NISER (2003) Original data are from other sources
8	Percent of land area covered by forests	1999 - 2000	NISER (2003) Original data is from other sources
9	Carbon dioxide emissions per capita	1999	NISER (2003) Original data are from other sources
10	Protected area as percentage of total land area	1999 - 2003	NISER (2003) Original data are from other sources
11	Productivity estimates of Nigerian soils	Unclear but not later than 1979	ARD Inc (2002) Original data were from Agboola , S. A.
12	Annual rate of desert encroachment	Unclear but not later than 1997	Vision 2010 Committee (1997)
13	Number of primates under threat	Unclear but not later than 1997	Vision 2010 Committee (1997)
14	Number of plant species under threat	Unclear but not later than 1997	Vision 2010 Committee (1997)
15	Severity of human induced soil degradation (Indicates this for each state)	Unclear but not later than 2004	AIAE (2006). - reports data from FAO

Local Capacity for Macro Economy Modeling

There are individual capacities for macroeconomic modeling within the research community as is evident in the array of macroeconomic modeling related research works in Nigeria (see Box 1), however, the capacity in public planning institutions may be far from desired. For example, the FMAWR does not conduct analysis in general, much less macroeconomic modeling exercises. Some government ministries, departments, and agencies that have direct or indirect bearing on the agriculture sector also face the same challenge. However, institutions like Central Bank of Nigeria, National Planning Commission, and Ministry of Finance seem to have the capacity for macroeconomic modeling.

While there is local experience in macroeconomic modeling, none of the models created sufficiently capture the impact of agricultural-led growth. Furthermore, gender and environmental outcomes of agricultural growth policy have not been researched. These shortcomings of the available macroeconomic models of Nigeria necessitate building a new model that will address the two concerns. Reflecting environmental aspects of economic activity in the model may be a challenge as it may require substantial changes. Reflecting gender aspects will be less of a challenge.

Box 1. Macroeconomic modeling conducted by Nigerian modelers

- Adenikinju, A.F. 2009. Analysis of Energy Pricing Policy in Nigeria: An Application of a CGE Model
- Adenikinju A. 1995. Implications of choice functional forms in a CGE model.
- Adenikinju, F. A and S. Olofin. 2009. A general equilibrium analysis of investment impacts in the Nigeria NLG industry.
- Ajakaiye, D. O. 1995. Short run macroeconomic effects of bank lending rates in Nigeria, 1987-91: A computable general equilibrium analysis.
- Ajakaiye, D. O. 1999. Macroeconomic effects of VAT in Nigeria: A computable general equilibrium analysis.
- Busari, D. 2009. Economic reforms and deforestation: Policy Simulations for Niger
- Falokun, G. O. 2009. The macroeconomic impacts of HIV/AIDS in Nigeria: A computable general equilibrium (CGE) analysis.
- Falokun, G. O. 2006. Foreign trade policy regimes and economic development in Nigeria.
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- Nwaobi, G.C. 2004. Emission policies and the Nigerian economy: Simulations from a dynamic applied general equilibrium model.
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- Nwafor, M. 2007. General equilibrium analysis of the agricultural sector in Nigeria.
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- Nwafor, M. et al. 2007. The Impacts of trade liberalization on poverty in Nigeria: Dynamic simulations in a CGE model.
- Nwafor, M. et al. 2006. Does subsidy removal hurt the Poor? A CGE – microsimulation.
- Olofin et al. 2003. A computable general equilibrium analysis of Nigeria's trade competitiveness.
- Taiwo, I.O et al. 2009. The political economy of minimum wage in Nigeria.

Tracking Knowledge, Institutional Capacity, and Communication Linkages

Development Targets

We make an inventory of Nigeria's present objectives and targets as well as lessons from previous research in the areas of pro-poor, gender, and environmentally-sensitive agriculture-led growth. This

inventory is undertaken to assist in guiding future knowledge management and quantitative analysis to support comprehensive agriculture-led growth planning.

Examining national development goals will allow us to observed trade-offs in the achievement of different objectives and verify internal consistency. Due to the interdependence of different aspects of economic and social activities, the pursuit of one objective can reduce progress in the pursuit of another. It is therefore necessary to document and consider these trade-offs in making growth plans. Furthermore, examining the nation's development objectives one is able to ascertain if they are internally consistent. It is plausible that the various targets set in different sectors and for different development indices may not be consistent with each other.

Nigeria Government's Development Objectives and Targets

The various development objectives and targets set by the government of Nigeria, as described in key government documents, are discussed below. The most important strategic objectives of the government are the 7-Point Agenda and the National Economic Empowerment and Development Strategy II (NEEDS II). While the 7-Point Agenda indicates the top priorities of the government, the NEEDS II is the current poverty reduction strategy paper for the country. In addition to these 2 documents, the national policies on gender and environment as well as the agriculture sector strategy were reviewed. From these documents and others, an inventory of the government's macroeconomic, agriculture, poverty reduction, environment and gender objectives and targets was conducted.

Key Macroeconomic Objectives/Targets/Strategy Elements³

1. The major vision in the country is to become the 20th largest economy in the world by 2020 – known as vision 20: 2020. Reference to this goal is made in the NEEDS II document.
2. Growing the economy by 10 percent from 2008-2011 in order to achieve objective (1) above
3. Effective revenue and expenditure management
4. Debt service sustainability
5. Improved the value of the nation's currency
6. Inflation targets of 8.5 percent (2007-2008); 7.5 percent (2008-2009) and 6.5 percent (2010 – 2011)
7. Narrowing the gap between lending and borrowing rates.
8. Budget deficit not to exceed 3 percent of nominal GDP
9. Average increase of oil production by 2.5 percent per annum(p.a.) (2008-2011)
10. Improved job creation especially in the informal sector and small and medium scale enterprises
11. Aggregate investment to grow at an average of 8 percent p.a. (2008-2011)
12. Manufacturing capacity utilization to increase by 60 percent p.a. and 70 percent in 2011 – in the anticipation that energy supply would be improved.
13. Agriculture, as the leading sector, is to grow at two digit rates during the period (2008-2011)
14. Financial sector to contribute more than the present 1 percent of GDP

Key Agriculture Sector Objectives/Targets/Strategy Elements⁴

1. A 5-10 fold increase in yields and production under the present administration, i.e. within the next 4 years
2. Encouragement of commercial farming
3. Minimum annual growth of 10 percent. Crop production is to grow by 10 percent, livestock production by 2.5 percent, forestry by 8 percent, and fishery by 9 percent
4. Five percent employment generation in the agriculture sector
5. Three billion US dollars in agriculture exports by 2011 – mainly from cassava, rice, cocoa, vegetable oil, and cotton
6. Increase in cultivatable arable land by 10 percent annually
7. Increase in cassava production by 25 percent in the first two years and 50 percent in the following two years
8. At least 10 percent annually increase of the production of eleven of the "Commerce 44" agriculture commodities.

³ Sources: Objectives 1-13, NPC (2007); Objective 14, Financial Systems Strategy 2020 (FSS 2020)

⁴ Sources: Objectives 1-2, GON 2007; Objectives 3-10, NPC 2007; Objectives 11-21, FMARD 2006.

9. Reduction of food imports from five to zero percent of total import
10. At least 20 percent annual increase in properly trained new and young entrants into the agriculture profession
11. One hundred and fifty million tons of cassava p.a. (2007-2009)
12. Six million tons of milled rice p.a. (2007-2009)
13. One million hectares of oil palm during the period (2007-2009)
14. Six hundred and seventy-five thousand tons of soya beans during the period (2007-2009)
15. Five million tons of cotton seed p.a. (2007-2009)
16. Fourteen million metric tons of maize p.a.
17. Increase in rubber production by 6000 metric tons p.a.
18. Production of five thousand cartons of fruit juice (2007-2009).
19. Promote on farm processing of agriculture produce from the current 0-5 percent of output to 30 percent by 2009
20. Reduce post harvest loses of non perishable and perishable commodities from the present 20 percent and 40 percent to 5 percent and 15 percent by 2009
21. Delivery of 60,000 metric tons of fertilizer for the period (2007-2009)

Key Poverty Reduction Objectives/Targets/Strategy Elements⁵

1. Reduce poverty by 30 percent by 2011 as a prelude to reducing it by 50 percent in 2015
2. Ensure that growth comes from agriculture, small and medium scale enterprises, and the informal sector in order to reduce poverty
3. Use safety nets to protect those vulnerable in economic reform, particularly the aged and disabled
4. Aim to reduce inequality as measured by the gini coefficient
5. Reduce agricultural population in poverty by one-half each year
6. Create 2 million jobs in 2008; 2.5 million in 2009 and 2010; and 3 million in 2011⁶
7. Reduce the unemployment rate to no more than 5 percent by 2011
8. Reduce poverty by 40 percent in 2011 and lift 30 million Nigerians out of poverty.

Key Environmental Objectives/Targets/Strategy Elements⁷

1. Secure quality environment adequate for good health and wellbeing
2. Conserve and use the environment and natural resources for the benefit of the present and the future
3. Restore, maintain, and enhance the ecosystems and ecological processes essential for the functioning of the biosphere with a view to preserving biological diversity and the principle of optimum sustainable yield in using the country's living natural resources and ecosystems
4. Raise public awareness and promote understanding of the essential linkages between the environment and development, and encourage private participation in environmental management
5. Cooperate with other countries, international organizations, and agencies to achieve optimal use of trans-boundary natural resources and abatement of trans-boundary environmental degradation
6. Limit industrial emissions and improve the management of solid waste.

Specific Targets/Strategy Elements⁸

1. Reduce deforestation by 10 percent of the 2007 level by planting 7340 hectares of forest plantation annually
2. Control soil erosion and flood by constructing at least 30 km of relevant structures annually
3. Reduce the rate of desertification by 5 percent annually through shelter belt establishment
4. Protect the natural shoreline by at least 5 kilometers of protective walls annually
5. Construct through public-private partnerships, at least one sanitary land fill in 20 cities by 2011
6. Eliminate gas flaring by 2008
7. Reduce environmental pollution in urban areas by 20 percent each year

⁵ Sources: Objectives 1-7, NPC 2007; Objective 8, NPC 2008

⁶ This section of the NEEDS II document states that a CGE model will be built specifically to assess job creation alternatives in the economy.

⁷ NPC 2007

⁸ Sources: Objectives 1-10, NPC 2007; Objective 11-25, FEPA 1999.

8. Achieve 10 percent local content increase each year (2008-2011)
9. Reverse the loss of biodiversity by 20 percent each year from 2008–2011
10. Phase out persistent organic pollutants by 10 percent each year (2008-2011)
11. Encourage optimum production with land resource protection
12. Encourage farming systems based on natural adaptations and maintenance of soil fertility
13. Avoid practices which encourage desertification and erosion
14. Discourage cultivation of marginal lands and encourage off-farm contributions
15. Regulate the production, use, storage, transportation, marketing, sale and disposal of agricultural chemicals
16. Minimize agro-chemical input by using high yield early maturing crop varieties
17. Promote the use of manures and other soil conditioners
18. Promote integrated pest management
19. Increase efficient water use and management
20. Comply with the use of sustainable river basin concept in water management
21. Sustain productivity of natural vegetation
22. Protect wildlife
23. Promote rational exploitation of forest resources for both domestic and export purposes on a long term basis
24. Promote alternative sources to wood energy use and to improve efficiency of current wood use
25. Improve the efficiency in consumption of vegetation resources through improved technology and other means

Key Gender Related Objectives/Targets/Strategy Elements⁹

The overall goal of the government in this area is “to promote gender equality and women empowerment in the social, economic, and political sectors for sustainable democracy and development” NPC (2007).

The broad objectives are:

1. To promote gender sensitization and value-re-orientation that will create equity in all sectors by 2008
2. To promote equality in access and opportunity for production and income activities for women and youth by 2011
3. To adopt gender-aware policies and ensure implementation of gender sensitive agreements-national, regional and international by 2009
4. To achieve gender equity in access and opportunities in education and training by 2009
5. To increase representation of women in politics and decision making by at least 30 percent at state & federal levels by 2011
6. To reduce gender based violence by 2009
7. To empower and provide safety nets to vulnerable women, children, youths, persons with disability, the elderly, widows and trafficked persons by 2010
8. To strengthen gender responsive interventions in HIV/AIDs and reproductive health services by 2008
9. To strengthen the capacity of National coordinating national gender mainstreaming efforts by 2008
10. To establish gender focal points and mainstream gender in decisionmaking and planning in all governmental structure at all levels by 2010
11. To build institutional capacity for implementation and evaluation of gender sensitive policies and programs by 2009
12. To foster gender responsive research (sex-disaggregated data/gender statistics) planning and budgeting between 2008 to may 2011, and
13. Remove all gender-based barriers (including tenure security, access to credit and inputs) facing women in agricultural production and enhance the visibility, productivity, valuation and documentation of women’s work in the agriculture sector by 2010.

⁹ Sources: Objectives 1-12, NPC (2007); Objective 13, Federal Ministry of Women Affairs (2006b).

Specific objectives and targets include¹⁰:

1. Increase the share of women in paid employment
2. Increase the share of youth in paid employment
3. Increase the share of women and youth who have access to factors of production
4. Increase the percentage of women who have equal value for work and labor
5. Increase the percentage of expenditure for equal employment opportunities
6. Increase the percentage of budgetary allocation to women and youth
7. Increase the number of women and youth trained
8. Increase the number of women and youth that have become gainfully employed
9. Increase primary and secondary enrolment
10. Increase percentage accessing vocational training
11. Ensure equal access of men and women to formal and informal education by 2015
12. Remove the government bias against food crop production
13. Remove barriers which deny women access and control over natural resources
14. Improve sanitary conditions and safe water supply in rural and urban slums
15. Involve women in reforestation programs and ensure alternative sources of fuel energy to replace the use of firewood so as to check deforestation
16. Reduce the number of women in core poverty group
17. Improve domestic and international market access for women's products especially among those in the core poverty group
18. Increase the number of firms operated by women especially those in the core poverty group.
19. Improve wage equality and employment opportunity for same skill levels.
20. Review tax codes to ensure equal pay for equal work

Observed Trade-offs in the Achievement of Policy Objectives

Since the various sectors of the economy are interdependent, there are potential trade-offs in the pursuit of the policy objectives in one sector on another. This occurs because growth in one sector will have both positive and negative effects on other sectors. For example, a growing manufacturing sector may likely take away labor from agriculture. Similarly, growth in the agriculture sector will also affect the environment in some ways. It is therefore important when setting targets to weigh potential trade-offs in order to limit the extent one sector negatively impacts on others. Some potential tradeoffs between the agriculture and environment objectives as well as those related to gender objectives are given as follows:

Agriculture

1. Oil spills in the economy damage mangrove trees which serve as fuel wood source (ARD Inc 2002)
2. Poorly constructed canals and causeways affect the crops, fishing grounds and drinking water supplies in the Niger Delta (ARD Inc 2002)
3. High value of the Naira has been able to limit agricultural exports in the past by making them more expensive (Oyejide 1986; Olashore 1991)
4. Trade liberalization , particularly , the policy of cheap imports has successfully reduced domestic agricultural production in the past
5. Expansion of other sectors will take away labor from agriculture (Iyoha and Oriakhi [2002])

Environment

1. The literature review reveals that agricultural activities affect the environment in two key areas: Soil fertility loss and deforestation. Each has other consequences and associated problems for the environment. Soil fertility loss is caused by poor land management practices: "efforts at agricultural development so far seems to have favored the well known capitalistic option of intensive use of chemical fertilizers, high yielding plant varieties and medium to large scale irrigation systems to the neglect of more affordable and environmentally friendly practices as appropriate crop rotation, use of farm residues as manure, fodder, and energy source" (Vision 2010 Committee 1997).

¹⁰ Sources: Objectives 1-10, NPC (2007); Objective 11, Federal Ministry of Women Affairs (2006a); Objective 12-20, Federal Ministry of Women affairs (2006b).

Reduction in the duration and frequency of fallow periods, the slash and burn methods of farm clearing, overgrazing and other poor farming techniques lead to growing decline in soil fertility in the country (ARD Inc 2002). The impacts of declining soil fertility are compounded because an infertile soil is more vulnerable to soil erosion and desertification (ARD Inc 2002). The increased cultivation of marginal lands in search for larger farm areas also increases the risk of desertification (Federal Republic of Nigeria 2002). If the present poor farming techniques are used to meet the kind of targets described for the agriculture sector, much more loss of soil fertility and its negative effects can be expected.

2. Deforestation: This is the second major impact of agricultural activities on the environment. It is caused by conversion of forest areas to agricultural land use (including plantations) and non-sustainable logging and firewood gathering (World Bank 1990). It has been observed that increases in the prices of cash and export crops normally cause a greater conversion of forest and other plant covers into agricultural land uses. The danger with deforestation is that it leads to loss in biodiversity, increased erosion, and desertification. Biodiversity is important because it provides a rich source of materials for pharmaceutical development, disease or pest resistant crops as well as economic amenities. It also facilitates the necessary balance in the ecosystem. The combined effect of deforestation and declining soil fertility is that present GDP is increased at the expense of GDP of future generations. This leads many to regard the growth generated with these processes present as unsustainable growth.

Gender

1. It is important to observe whether 'men's' crops are being promoted and 'female' crops being regarded as less important (Akanji 2004).
2. Fiscal policy in the form of fuel subsidy removal increases the work burden of women as they have to spend more time to gather firewood (Garba et al. 1997).
3. Belt tightening economic reforms increase the use of girls as house-maids, commercial sex workers and other forms of survival strategies (Garba et al. 1997)
4. Increased agricultural output causes men to claim lands which women had earlier been allowed to cultivate. This occurs due to traditional practices which make it difficult for women to own land (Garba et al. 1997).
5. Decreasing soil fertility and environmental degradation in general causes "more of women's time to be spent searching for scarce fuel wood, walking further to get unpolluted water and working increasingly marginal agricultural lands to produce enough food for subsistence" (World Bank 1990).

Possible Considerations for Future Strategies – Lessons from Nigeria's Economic Growth History

A key aspect of knowledge management is to ensure that lessons from previous experiences and research are applied towards the achievement of current objectives and targets. In this way, knowledge is treated as an asset to be used in institutions the same way physical assets are used. The table below makes an inventory of several factors that can affect growth in the near future, and provides food for thought for future analysis. The lessons are stated by author.

Table 3. Some lessons from Nigeria's economic growth history

1	World Bank. 2003. Nigeria Policy Options for Growth and Stability <ul style="list-style-type: none"> • Growth would require (a) an increase in private sector investment rate and (b) an increase in the productivity of both public and private investments. Export diversification would be necessary to achieve this • Between 1965 and 2001 the main sources of growth were, in decreasing order of importance, services, agriculture, oil and the manufacturing sector • Successfully growing oil exports without growing non-oil will decrease private investment due to macroeconomic volatility associated with dependence on oil.¹¹
2	Garba. 2000. An Analysis of the Implementation and Stability of Nigerian Agricultural Policies 1970-1993 <ul style="list-style-type: none"> • "No agricultural programs outlived the political regimes that introduced them while each new regime put in place new programs."
3	Government of Nigeria. 2006. Support to NEPAD-CAADP Implementation. National Medium Term Investment Program <ul style="list-style-type: none"> • 3 key criteria for choosing investments and , by extension , policies would be (a) investments that will aid food self sufficiency and food security for the poor rural society (b) Investments that utilize available opportunities and comparative advantage (c) Investments that will remove constraints to agricultural , rural income and rural employment growth. • Investments which conserve and generate foreign exchange are of more importance
4	Donovan, W. G. 1996. Agriculture and Economic Reform in Sub-Saharan Africa <ul style="list-style-type: none"> • The use of fiscal policy (e.g. subsidy) has proved to be a key factor in fertilizer supply and agricultural output in Nigeria • Prohibiting exports of some export crops in the past caused gluts and the associated fall in prices. • Exchange rate depreciation in the 1979–94 period favored agricultural expansion but pulled resources away from manufacturing. • Apart from economic policy, technology is highlighted as being a key determinant of agricultural output in Nigeria.
5	IFAD 2001. Country Strategic Opportunities Paper <ul style="list-style-type: none"> • Growth in urban areas can be expected to lure labor away from rural areas and agriculture. • Key constraints to rural poverty alleviation include (a) Land degradation (b) rural infrastructure (c) Post harvest services (d) over centralization of government functions.
6	Okolo, D. 2004. Regional Study on Agricultural Support - Nigeria's case <ul style="list-style-type: none"> • Politicians often favor short pay-back period projects to the detriment of agriculture • There appears to be a bias towards funding urban projects by the policy makers who are urban dwellers.
7	World Bank 1990. Towards the Development of an Environmental Action Plan for Nigeria <ul style="list-style-type: none"> • Lack of credit which is needed to increase yield (purchase of fertilizer etc) often causes farmers to use marginal lands. This further reduces overall soil fertility and increases soil vulnerability to erosion and desertification.
8	Federal Republic of Nigeria. 2002. Sustainable Development in Nigeria <ul style="list-style-type: none"> • Agriculture is important as the largest non-oil foreign exchange generator. • Plans to expand oil production can further hurt the environment if the present level of pollution continues. • The level of oil-spills on farms is a source of agricultural land loss in the Niger Delta. • Oil prospecting also degrades the mangrove forest.
9	UNEP. 2002. Integrated Assessment of Trade Liberalization and Trade Related Policies - A Country Study on the Export Crop Sector in Nigeria <ul style="list-style-type: none"> • Improved cocoa prices in the past put pressure on already declining rain forests • Without access to credit farmers resorted to less efficient but cheaper soil harming technologies and practices.
10	Budina et al. 2007. Nigeria's Growth Record: Dutch Disease or Debt Overhang Volatility of government expenditure has seriously reduced growth over the years. Expenditure was found to be more volatile than oil revenue.
11	United Nations Development Program, UNDP. 2006. Nigeria Delta Human Development Report. Nigeria <ul style="list-style-type: none"> • Oil companies reduce the country's biodiversity at their ramp sites, flow stations and terminals. • Oil and other production activities (e.g. sand miners) disturb water habitats and flows and reduce fishermen's incomes.

¹¹ If the recent trend of saving earnings from oil exports revenue above the budgeted price continues, this will not be a problem. Otherwise the country can expect a repeat of the historical fluctuations in the macroeconomy due to oil price fluctuation.

12	Iyoha and Oriakhi. 2002. Explaining African Economic Growth Performance: The Case of Nigeria
	<ul style="list-style-type: none"> • Between 1960 and 1997 total factor productivity (TFP) growth accounted for 83 percent of per capita income growth • However TFP has declined from 6.36 in 1961-1977 to .723 in 1988 – 1997. In the 1978-1987 period it was negative at -5.52 • Author supports the view that Immediate causes of poor growth record are (a) high cost of doing business (b) non competitiveness of domestic producers (c) falling investment/GDP ratio (d) poor planning , data base and capital projects management and (e) political instability
13	World Bank. 2005. Joint IDA-IMF Staff Advisory Note on the NEEDS
	<ul style="list-style-type: none"> • Recommends that projections be done in line with past growth experience and recognizes the achievements (some of which exceeded targets) in the past few years. • Recommends that more growth scenarios be generated as was done by other countries in their planning.
14	Ayo.1988. Development Planning in Nigeria
	<ul style="list-style-type: none"> • Projects should be cited in areas of the country where there is comparative advantage • The overall strategy of the third development plan was to use oil resources to develop other sectors but as at the time a 5th plan was being considered the strategy envisaged was that of removing the focus from oil to the manufacturing and agriculture sector and encouraging the link between the 2.
15	Dike, E. 1991. Economic Transformation in Nigeria. Growth, Accumulation and Technology
	<ul style="list-style-type: none"> • A supply side or demand side approach to growth maybe pursued. However evidence in Nigeria indicates that the 2 are required and that overall growth is tied to the growth of the agriculture sector. • Closing the technology and income gap between urban and rural areas is important for any growth effort • Reducing import dependency will also be necessary.
16	Idachaba. 2006. Good Intentions Are Not Enough. Collected Essays on Government and Nigerian Agriculture
	<ul style="list-style-type: none"> • There have been conflicts between stabilizing food prices and guaranteeing a reasonable average price for crops. There necessarily has to be a trade off. • In regions where export crops compete with food crops for the same resources conflicts will arise from the twin objectives of increasing exports and achieving food self sufficiency. • There necessarily needs to be a trade-off between food imports dependency and farm inputs dependence as the country does not produce adequate quantities of the later. Achieving self reliance in the 2 simultaneously will be very difficult.
17	Kayode and Usman.1989. Nigeria Since Independence - The first 25 Years: The Economy
	<ul style="list-style-type: none"> • The agriculture sector competes with others in the economy for resources- human, technical and financial. However over the years a mix of factors has made agriculture less attractive. • There has been an excessive dependence by the agriculture sector on external factors. Initially it was dependence on external prices and lately it has been dependence on imported inputs and implements.
18	Manyong. 2005. Agriculture in Nigeria: Identifying Opportunities for Increased Commercialization and Investment
	<ul style="list-style-type: none"> • There are 4 key constraints to agricultural growth (a) Technical – pests , diseases, infrastructure , poor technology and extension services, poor inputs supply and high environmental hazards (b) Resource – labor shortages, low agricultural productivity and increasing pressure on land (c) Socioeconomic – high cost of farm inputs, poor marketing systems, land tenure system, poor foreign demand growth, high dependence of food imports etc and (d) organizational – predominance of small scale unorganized farmers makes interaction with farmers difficult. • The most important constraint to agricultural investment is infrastructure. This was based on a survey of several stakeholders across the regions. Other key constraints are financial, economic and technical constraints. • A partial equilibrium analysis ranked the following as the most important products where actions for increasing investments should be taken first – in order of decreasing importance (a) Cassava (b) Yam (c) maize (d) millet (e) groundnut (f) rice (g) Sorghum (h) Poultry (i) leafy vegetables and (j) cowpea. It should be noted that forestry products were not included as data was not available.
19	Garba et al. 1997. Women and economic reforms in Nigeria
	<ul style="list-style-type: none"> • Women do most of the subsistence work while men – who own the land traditionally - see investment in new technologies as poor utilization of scare resources. • One of the reasons the Structural adjustment program ‘failed’ was the conflict between economic objectives and social welfare.

	<ul style="list-style-type: none"> Any economic reform program should aim to transform the economy into a service and industrialized economy through agriculture led growth rather than aim at making growth agriculture dominated in the long run.
20	<p>World Bank. 2006. Getting Agriculture Going in Nigeria. Framework for a National Growth Strategy</p> <ul style="list-style-type: none"> The 3 key constraints to agricultural growth are (a) Low productivity of agriculture (b) Private under investment in agriculture (c) non-competitiveness of the export sector. A final factor that affects all 3 is the weakness of the institutional and policy environment. 6 actions that need to be taken to improve agricultural growth are (a) development of markets and agribusiness (b) Reforming research and extension (c) Strengthening agricultural inputs supply system (d) Expanding irrigation capacity (e) Improving financial systems (f) Improving competitiveness Key considerations in targeting activities are (a) Concentrate on high potential areas (b) Prioritize crops destined for domestic markets (c) Pursue exports selectively (d) Recognize regional needs and priorities (e) Pay close attention to post harvest activities (f) Use safety nets as appropriate.
21	<p>Soludo, C. C. 2006. Nigeria: Economic Growth Drivers and Financing Challenges. Presentation by the Central Bank of Nigeria Governor</p> <ul style="list-style-type: none"> In the short term, agriculture and crude petroleum (70% of GDP) hold the key to growth. Because primary sectors are volatile diversification into industry and services are the key to sustainable growth The determinants of growth are (a) security of lives and property (b) Sound macro policies (stable prices) (c) infrastructure (d) finance (e) Efficient facilitation of business (f) fight against corruption (g) human capital. Value for money spending can generate more than 10% growth.
22	<p>World Bank. 2007. Nigeria Competitiveness and Growth. Country Economic Memorandum</p> <ul style="list-style-type: none"> The 2 binding constraints to growth in Nigeria are (a) Infrastructure and (b) Poor business environment – taxation, trade facilitation, business registration and licensing and contract enforcement. This was based on an analysis of other constraints such as low savings etc using the Hausman-Rodrick-Velasco approach to determine binding constraints to growth. They report that this finding is in line with various private sector opinions in different fora. To ensure that the poor participate in growth benefits : (a) Raise agricultural productivity (b) Encourage transition from informal to formal status of enterprises (c) find ways of giving some of the oil windfalls to Nigerians (particularly poor Nigerians)
23	<p>NPC. 2007. National Economic Empowerment and Development Strategy II</p>
	<ul style="list-style-type: none"> The critical success factors for achieving growth are (a) Justice and good governance (b) Security of life and property (c) Physical and human infrastructure (d) A professionalized and result oriented public service and (e) strong collaboration among tiers of government on development initiatives.

Recent Growth Scenarios

When analyzing growth options and making development plans, it is necessary to consider several options towards achieving the same set of objectives. This increases the creativity of planners and encourages robust plans which have considered several options. Recent growth scenarios that have been articulated by government and non-government agencies are discussed below. This list is intended as a stimulant for future growth analysis.

NEEDS II

The NEEDS II describes the government's medium term vision and goals for the different sectors of the economy. It is the follow-up to the country's first poverty reduction strategy paper, NEEDS. While NEEDS covered 2004-2007, NEEDS II covers the 2008 – 2011. It sets national and sectoral growth targets that will allow the country to achieve the Vision 20: 2020 as well as MDG1 target of halving the 1990 proportion of poor people by 2015. An average national growth of above 10 percent is targeted for the period while poverty is to be reduced by 30 percent by 2011 and by 50 percent by 2015 (NPC 2007). The growth targets are shown in Table 4.

Table 4: Growth Targets In Needs II

Sector	2008	2009	2010	2011
Agriculture	10.63	10.91	11.09	11.18
Solid Minerals	7.89	8.85	9.70	9.99
Manufacturing	12.66	13.25	13.86	14.31
Building & Construction	10.20	10.92	11.54	11.63
Transport	6.11	6.92	7.67	8.03
Communication	10.97	11.29	11.72	12.09
Government Services	9.91	10.07	10.11	10.12
Distribution	12.21	12.88	13.53	14.05
Others	14.38	17.53	20.46	19.63
GDP	9.30	10.50	11.50	11.70

World Bank Analysis

According to World Bank 2003 analysis, the NEEDS II target of a 10 percent GDP growth rate, which would require growth of 13 percent from key non-oil sectors, is not feasible (World Bank 2007). This is partly because very high investment to GDP ratios would be required to achieve this target. These ratios would have to increase from the 21 percent in 2005 to 38 percent in 2010 and over 40 percent after 2010. Furthermore, total factor productivity would have to increase by 7 percent per annum. The World Bank study showed the expected poverty levels after 10 years at different growth rates (in percentages): 52 percent at a 3 percent growth rate, 41 percent at a 5 percent growth rate, 27 percent at a 8 percent growth rate and 19 percent at a 10 percent growth rate. However it describes an alternative growth strategy that sees growth reaching 7 percent per annum compared to the period average of 5 percent. This would require investment and GDP ratios of 30 percent in 2010 and 35 percent in 2015. The study emphasizes the need to make this growth broad based in order to reduce poverty. It also notes that the expected growth will increase demand for foreign inputs and equipment, and can lead to a balance of payments deficits in a few years.

NEEDS

NEEDS is a home grown poverty reduction strategy and Nigeria's plan for prosperity. It is a process of development anchored on a vision based on the constitution, the Kuru declaration, previous initiatives such as Vision 2010, and nationwide consultation. NEEDS has four key strategies which includes reorienting values, reducing poverty, creating wealth, and generating employment.

Table 5. Incidence of poverty under different growth scenarios in NEEDS (%)

Scenario	GDP Growth p.a	2000 (Actual)	2015	2030
A	3.6	70	75	80
B	5	70	70	70
C	7	70	35	17

Source: NPC 2004.

NEEDS points out that although the 7 percent growth can decrease poverty much faster it might not work if growth is propelled by the mining and quarrying sector rather than agriculture and small and medium scale enterprises.

NISER Analysis

The Nigerian Institute for Social and Economic Research (NISER) projected economic variables for 2001 to 2015 using a CGE model (Ajakaiye and Olomola 2003). NISER then interviewed policymakers, the

business community, and opinion leaders on the requirements for growth and poverty reduction. The requirements they found were:

1. A gradual appreciation of the Naira from N126 in 2001 to N98 (2005), N77 (2010) and N57 (2015)
2. Gradual decline in the cost of borrowing from 31.2 percent in 2001 to 19.37 (2005), 15.46 (2010) and 12.54 (2015)
3. Steady increase in minimum wage rate from N5,500 in 2001 to N12602 by 2015
4. Steady growth in government capital expenditure from 43 percent in 2001 to 54 percent in 2015
5. Steady growth in crude exports from 8.8 percent in 2001 to 12 percent in 2015
6. Faster growth in non-oil exports from 13 percent in 2001 to 29 percent in 2015
7. Rapid increase investments from 18 percent growth in 2001 to 23 percent in 2015

According to NISER research, these outcomes will lead to growth of real per capita income ranging from 7.2 percent per annum in 2015 to 9.3 percent in 2005. Daily per capita income would also increase from US\$1 in 2001 to US\$4.4 in 2015. However, due to its design the model was not able to state the expected decreases in poverty level. With the above requirements in place, GDP growth rate would average 8 percent during the period. The investment and GDP ratios required to achieve this are 5.6 (2005), 4.92 (2010) and 4.4 (2015).

Vision 2010

In the late 1990s, the federal government set up a committee of Nigerians to draw up a vision of where the country should be by the year 2010. The establishment of the committee and its objectives was common knowledge in the country, at least in the urban areas and by the media. The Vision 2010 Committee aimed at achieving the GDP growth rate of 10 percent and above from 1998 to 2010 and holding the inflation level to not more than 5 percent. It had the aspiration of making Nigeria an industrialized nation by 2010. Extreme poverty was to be eradicated and the incidence of poverty was to be reduced to 20 percent of the population by 2010. The core objectives through which this was to be achieved were (Vision 2010 Committee 1997):

1. Reduce public dominance in the economy and strengthen public-private sector partnerships
2. Use oil income to diversify the economy
3. Increase the use of technologies to grow the small and medium scale enterprises
4. Fully develop the oil and gas sector and use them to develop the rest of the economy
5. Achieve substantial improvements in the financial system
6. Achieve substantial improvements in the macroeconomic environment
7. Improve service sectors and assets considerably
8. Maintain all assets effectively
9. Make Nigeria more attractive internationally
10. Achieve food security
11. Reduce population growth to under 2 percent
12. Sectoral targets to achieve these are shown in Table 6.

In the report, five growth scenarios were presented:

1. GDP growth of 3.2 percent p.a., population growth of 2.5 percent and gini index of 0.46. This scenario would increase the size of poor people from 44.13 million in 1995 to 57 million in 2010.
2. GDP growth of 7 percent p.a., 2 percent population growth and 0.46 gini would lead to 23.14 million people in poverty by 2010 (16 percent of the population). Expenditure per capita would double. If inequality is reduced further to 0.3 this would be achieved faster.
3. GDP growth rate of 3.5 percent and 2.8 percent population growth rate would increase the number of poor people from 44.13 to 59.6 million in 2010 and 72.4 in 2020. The assumed gini coefficient is not stated here but might be taken as the prevailing 0.46.
4. The stated best scenario would be 7 percent GDP growth rate, not more than 2 percent population growth rate and 0.46 gini index.
5. Finally, the ideal scenario is stated as 10 percent GDP growth rate, less than 2 percent population growth rate and a gini of 0.3.

Table 6. Sectoral targets in the Vision 2010 report

Sector	Targeted growth rate p.a. (1998 – 2010)	Targeted Investment growth rate - p.a (1998 – 2010)
Petroleum and Gas	7	24
Manufacturing	22	40
Agriculture	6	18
Transport and communication	15	25
Mining	9	26
Building and Construction	25	22
Education and health	14	30
Utilities	13	28

They highlight the importance of income equality in achieving poverty reduction and recommend that:

1. both public and private wages should be kept above the poverty line,
2. thirty percent of the national budget and 50 percent of all foreign aid should be spent on the social sectors,
3. production be made more labor intensive especially in the rural areas, and
4. there should be an increase in focus on living conditions and safety nets for the poor.

Center for Econometric and Allied research (CEAR)'s quasi-CGE Consistency Check Models

The Center for Econometric and Allied research (CEAR)'s quasi-CGE model was built to check the consistency of targets in the first perspective plan (Iwayemi 1995) and was the model used for macroeconomic projections in NEEDS II. The CEAR effort at analysis was followed by a more complete general equilibrium model which improved on it (Iwayemi 1995). Eventually a 52 sector model of the Nigerian economy was built for to carry out perspective planning (UNDP 1995). It uses a 1989 social accounting matrix which appears to be the most detailed one of the Nigerian economy. However, although the entire exercise is documented in nine very comprehensive volumes, it is unclear to what extent the model was used by policymakers. Policymakers did use the NPC-CEAR MAC-MOD for macroeconomic projections in NEEDS II, and derived the NEEDS II targets from the model. From the results of the model it can be observed that sub-sectoral targets were not considered in detail.

Conclusion

This review illustrates that capacity within Nigeria does exist for conducting macroeconomic modeling, but there has been limited modeling of the agriculture sector. Furthermore, existing models have not yet considered issues related to the environment and gender. Therefore, there is a need to develop an appropriate model that addresses these issues with respect to the agriculture sector. However, running the macroeconomic scenarios is not sufficient. The data collected for the analysis needs to be accessible for future use and the knowledge generated shared with stakeholders.

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