

How to  
Produce a  
Debt Sustainability  
Analysis using the  
MTDS Template

## *A User Guide*

MAY 2020



## Our Profile

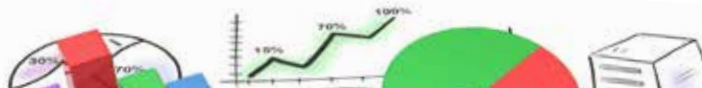
### Partnership to Engage, Reform and Learn (PERL)

The Partnership to Engage, Reform and Learn (PERL) is a five-year governance programme, funded by the UK's Department for International Development (DFID). The programme focuses support on governments, citizens, and evidence-based advocacy. PERL provides assistance to governments in the core areas of policy development and implementation. This is done by assisting them in tracking and accounting how these policies, plans and budgets are used in delivering public goods and services to promote growth and reduce poverty to the citizenry. The programme supports citizens to engage with these processes.

The PERL programme is being delivered through three 'pillars' which plan together to support sustainable service delivery reforms: Pillar 1 Accountable, Responsive & Capable Government (ARC); Pillar 2. Engaged Citizens (ECP); and Pillar 3. Learning, Evidencing and Advocacy Partnership (LEAP). The programme works at the federal level, in the partner states of Kano, Kaduna and Jigawa, and through regional learning and reform hubs in the South West, South East and North-East areas of Nigeria.

#### Disclaimer

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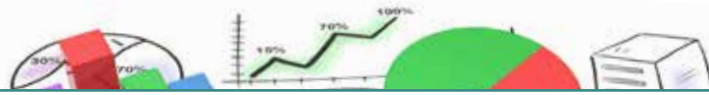


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# Abbreviations and Acronyms

AfDB	African Development Bank
AfDF	African Development Fund
ARC	Accountable, Responsive and Capable Government
BEPD	Budget and Economic Planning Directorate
CPIA	Country Policy and Institutional Assessment
DFID	Department for International Development
DMO	Debt Management Office (of the Federal Government)
DMUD	Debt Management Unit Department
DSA	Debt Sustainability Analysis
FAAC	Federation Account Allocation Committee
GDP	Gross Domestic Product
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IGR	Internally Generated Revenue
IMF	International Monetary Fund
INT	Interest
MTEF	Medium Term Expenditure Framework
MTFF	Medium Term Fiscal Framework
PERL	Partnership to Engage, Reform and Learn
PFM	Public Financial Management
PR	Principal
Rev	Revenue
WB	World Bank



# Overview of the DSA Toolkit

The Debt Sustainability Analysis (DSA) Toolkit is designed to support states to make informed decisions around debt financing. It provides templates that will allow states to take a look at their historical dynamics in terms of debt stock and debt servicing costs, and to analyse the advantages and disadvantages of various forward-looking debt strategies under different macro-fiscal scenarios.

States governments should undertake a DSA on an annual basis – the results of which should inform the subsequent budget process in terms of how much a state can afford to borrow in a sustainable manner, and how much their existing debt portfolio will cost to service (including under any macro-fiscal shock scenarios).

## The benefit of the DSA Toolkit:

The toolkit encompasses a set of linked MS Excel templates that allow for relatively simplistic data entry and forecasting. They have been developed based on the learning from various technical assistance interventions. They also include guidance on debt liquidity and solvency ratios that can guide states in their decision-making process. Finally, a number of macro-fiscal scenarios have been proposed which are based on the current risks facing the Nigerian states. Ultimately, the toolkit will support better informed fiscal decision making and hence improved value for money in terms of public resources utilization.

## Structure of the toolkit:

The DSA toolkit comprise three main document templates and this User Guide, which contains instructions on how to prepare the documents.

- Debt Profile template (MS Excel): this template should be populated with five years' worth of historical data (draw-down and servicing (interest and principle)) as well as some revenues figures for benchmarking purposes. It uses the data entered to generate three reports which form part of the Debt Profile and Debt Sustainability Report.
- Medium Term Debt Strategy (MTDS) template (MS Excel): this template provides a number of different debt scenarios (based on different loan types – e.g. long or short maturity, concessional or commercial, domestic or foreign) and options for stress testing each scenario (e.g. exchange rate shock or revenue shortfall) to help inform decision making on future debt drawdown. It generates a number of outputs (tables and graphs) which form part of the Debt Profile and Debt Sustainability Report.
- Debt Profile and Debt Sustainability Report template (MS Word): this template provides sections for the outputs from the above two MS Excel templates and areas for written analysis and recommendations to be added.

In addition to this User Guide, populated examples of the above three templates have been included in the Toolkit (for the fictional state of Wazobia) so that users can appreciate what the completed documents should look like.

## Who should use this toolkit?

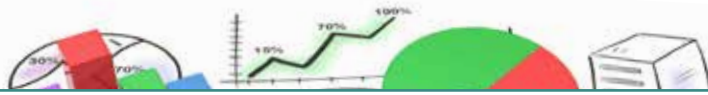
The Toolkit is primarily intended for State level Debt Management Departments to assist them to produce the annual Debt Profile and Debt Sustainability Report. This report should be produced after the year-end and before the start of the budget cycle (it should inform the borrowing plan in the Medium-Term Fiscal Framework). In the same vein, it may also be used (and modified as necessary) by Consultants providing technical assistance to state governments in the area of Debt Management.

## The scope of the toolkit

The DSA Toolkit allows user to collate and model data and a number of quantifiable macro-fiscal scenarios based on which the future path of debt stock and servicing costs will be forecast. These forecasts and scenarios should be used to inform decision making – thus the Toolkit will not, in itself, provide answers, rather, it will provide information for management to make the decisions.

The model also requires reliable and timely data – the importance of regular capturing of debt data (loan agreements, draw-down and servicing (disaggregated into principle and interest) is a key requirement.

Finally, as with all MS Excel based tools, the MTDS and Debt Profile template have been developed for use by persons experienced in MS Excel. The models have been protected in order to reduce risk of accidental deletion of formulas that are key to providing reliable outputs. The models can be updated/modified, but this should be done by those with appropriate levels of MS Excel skills, the accompanying manual should be updated accordingly, and the updated versions should be thoroughly tested before use. If the model is modified in any way, the original developers cannot be held responsible for any errors in outputs.



# 1. Introduction

## 1.1 Importance of Effective Public Debt Management

Effective public debt management is the cornerstone of financial stability and sustainable fiscal policy. A large government debt portfolio can generate substantial risk to its balance sheet, with potential to undermine key development objectives. Countries and states therefore need capable debt management offices to design medium-term strategies, which appropriately balance cost and risk, and execute financing transactions efficiently.

Debt financing is an integral and very important aspect of public financial management. In most Nigerian governments, capital investments are more often than not financed with debt either from internal or external sources. Beside capital investment financing, which requires more structured longer tenured loans, governments from time to time may have a need to obtain short term debts to bridge financing gaps for operational expenditure. These types of monies are often obtained from the money markets, or through contractor financing or bills payable.

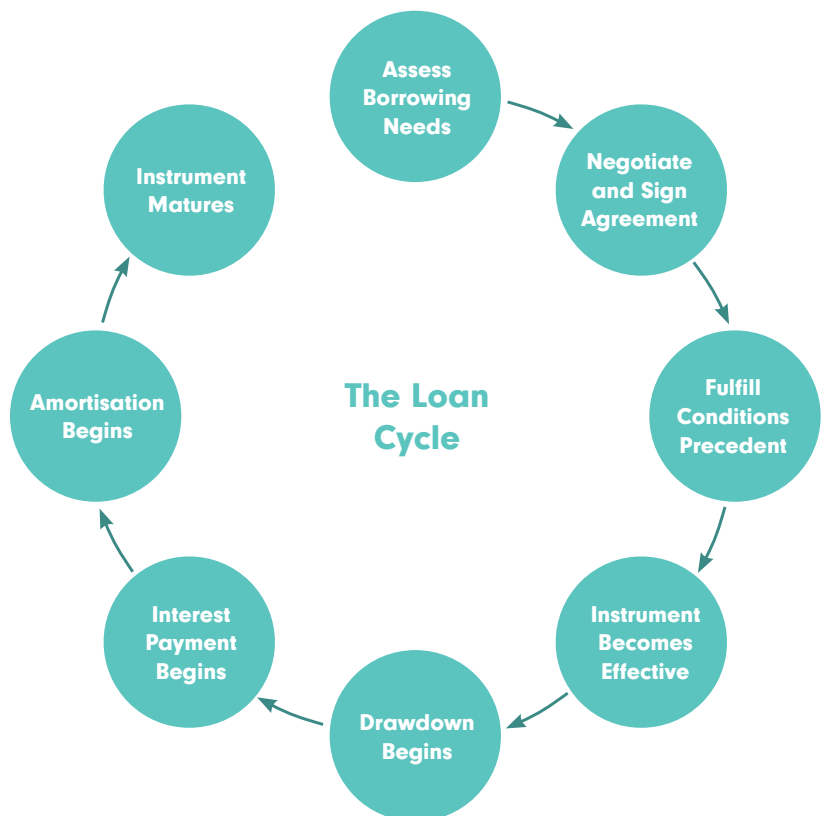
Owing to the recent financial squeeze and economic difficulties being experienced by the country, as a result of the drastic fall in oil revenues since 2015, most state governments have resorted to excessive borrowing to fund both recurrent and capital expenditures. On an economy-wide scale, excessive government borrowing from the capital and money markets may crowd out the private sector from the market, and has the tendency to impair productivity with other consequential effects on economic growth, jobs and tax revenues to government. This gives credence to the necessity to have an on-going analysis on states' debts to advise governments accordingly.

Many states have ambitious development plans requiring large capital expenditures on infrastructural developments and efforts to boost education and skills development. In order to implement these plans, the states have to leverage both internal and external funding sources that have significant implications for the states' debt profiles and sustainability. A number of these sources include the World Bank, the African Development Bank, the Islamic Development, the Federal Government (bailout loans), Nigeria capital and money markets, and public private partnerships.

In order to avoid the dangers of excessive debt burdens, state governments need to build capable debt management departments which are able to routinely collect debt data (both external and domestic), ensure timely debt servicing, and can carry out regular debt profile and debt sustainability analyses.

## 1.2 The Loan Cycle – Concepts and Procedures

This section outlines the basic debt concepts and the processes involved in public debt management.



**Figure 1: The Loan Cycle**

We will walk through the outline process of the loan cycle (from borrowing to full debt repayment) using the diagram to the right.

**i) Assessment of Borrowing Needs**

- Careful examination of the borrowing needs (why borrow?).
- Does the state have capacity to absorb & use the technology involved productively?
- Would there be enough capacity to pay back the loan as per agreed Terms and Conditions?
- Identification of the appropriate type & source of credit.
- The impact of the new loan on the existing debt portfolio.

**ii) Selection & Negotiations of the loan agreement**

- The process can be very complex.
- Strategies on how to approach potential lenders/investors.
- Demonstrate your ability to repay the loan.
- Provide Economic Information Memorandum.

**iii) Signing of loan agreement**

- Authorised representative signatures from both borrower(s) and lender(s).
- It is just a confirmation for execution. Not automatic that funds are available for drawdown.
- Commitment fees or Management fees could be charged thereafter on the undisbursed loan amounts.

**iv) Fulfilment of conditions precedent**

- Conditions set forth which must be complied with by borrower before the loan is available for disbursement.
- These conditions vary from creditor to creditor. But the common ones include:
  - Board resolution authorising execution of such loan agreement.
  - Satisfactory Legal opinion from both parties.
  - Govt/CB approval on all relevant financial matters.

**v) Loan effective (available for draw-down)**

- Availability period would always be fixed.
- No withdrawals allowed after the availability period (Final Disbursement Date).
- The period can be extended upon borrower's request.

**vi) Disbursements (Drawdowns)**

- Draw down can be in one or several instalments.
- Interest calculations will be triggered once disbursements start.
- Disbursements after final disbursement date may be automatically cancelled.

**vii) Amortizations, Debt Service Payments**

- Principal payments immediately after the grace period payable in instalments.
- Interest payments charged on outstanding debt, which is payable in arrears.
- Other payments (commitment fees, administrative, etc).

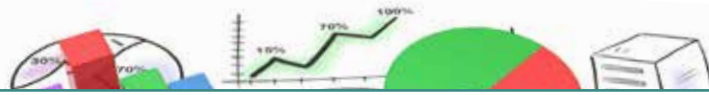
**viii) Loan maturity**

- Loan is fully paid up: no amount remains outstanding on the loan.
- Loan is forgiven: Outstanding amounts are written off.
- Loan account closed and loan is matured.

**ix) Other Developments include:**

- **Enhancements:** for some reasons the original loan amount may no longer be enough to accomplish the intended project, and thus additional funds are required.
- **Cancellations:** disbursed amount appeared to be more than what was exactly required for the project. The excess amount no longer required and is cancelled, usually at the borrower's request.
- **Restructuring:** the profile of the loan repayment can be amended through a number of restructuring forms, such as, rescheduling, write-off, refinancing, prepayment, debt conversion.
- **Loan recall:** where the creditor may decide to terminate the contract and declare the entire loan should immediately be paid back together with interest, usually in the case of borrower default.





### 1.3 Debt Sustainability Analysis for States

Debt Sustainability Analysis (DSA) is a tool that is used as part of a framework developed by the World Bank and the International Monetary Fund to help guide countries and donors in mobilizing critical financing for low-income countries, while reducing the chances of an excessive build-up of debt.

DSA is a structured examination of a state which involves the following steps:

1. An analysis of a state's projected debt burden over the next 20 years and its vulnerability to external and policy shocks;
2. An assessment of the risks of domestic and external debt distress in that time, based on indicative debt burden thresholds that depend on the quality of the state's policies and institutions; and
3. Recommendations for a borrowing strategy that limits the risk of debt distress.

DSA for states is becoming quite important. State governments are taking on more responsibilities in areas of public investment and the provision of goods and services. Financing the resulting additional subnational expenditures has relied primarily on Federal government funds and the state's own revenue sources. But these sources of funding have not adequately kept pace with growing expenditure and investment needs. This has led to a dramatic increase in debt-financed subnational public expenditure.

The analysis and assessment of fiscal and debt sustainability have long been central to broader macroeconomic surveillance and analysis undertaken by central governments and international financial institutions, such as the IMF and World Bank. These assessments tend to focus primarily on central governments.

Subnational governments tend to have limited sources of revenue, limited flexibility with respect to both investment and expenditure decisions, and less discretion than central governments with respect to financing options.

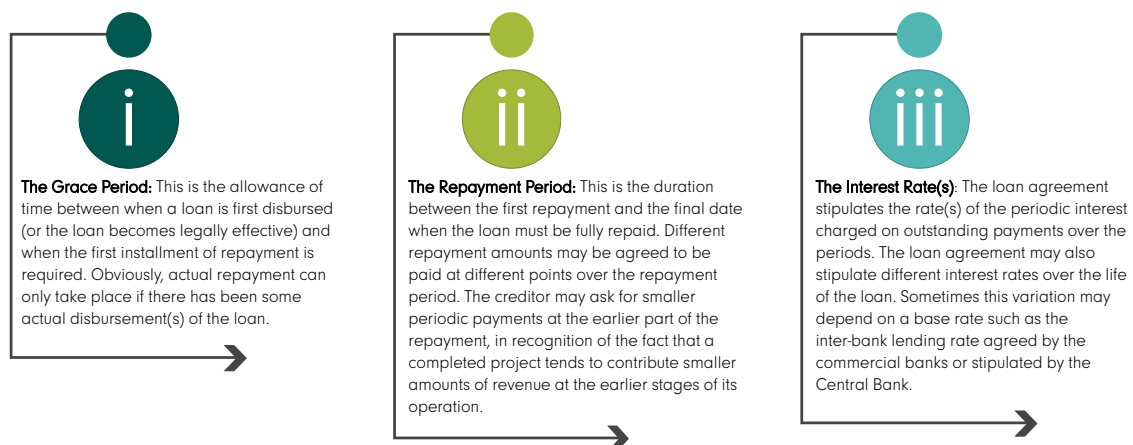
The benchmarks or indicators of debt sustainability at the subnational level should be developed on a case-by-case basis, reflecting guidelines that are relevant to the government in question. Moreover, a standard set of data and robust forecasts for key subnational macroeconomic and fiscal variables (e.g., subnational output, revenue and expenditure growth, etc.) are not always available, making it necessary to customize the subnational fiscal and debt framework to the information at hand.

### 1.4 Calculating the Concessionality of Debt

#### 1.4.1 The Net Present Value

The concessionality of a loan refers to how cheap a loan is in comparison with the cost of a standard market loan. Concessionality is calculated by taking into account the terms of the loan, at the start of the loan agreement. The actual transactions (actual disbursements as well as actual principal, interest, and other payments) often deviate from the initial terms as the loan is implemented in subsequent years.

Concessionality is determined broadly by the following features of the loan.



**The Maturity Period** is the duration between when the loan agreement becomes effective and when the loan is expected to be fully repaid. The maturity period is the sum of the repayment period plus the grace period.

Underlying the computation of the concessionality of a loan is the time value of money. Money in hand now is more valuable than money to be received in the future. So, in order to compare cash flows over future periods (both inflows and outflows), the amounts need to be discounted back to the present (**the present value**), using a standard interest rate (**the discount rate**). The discount rate is different from the interest rate(s) of the loan.

Adding the present value of inflows and subtracting the present value of outflows produces the **net present value (NPV)**. To the borrower, the disbursements are **inflows** and the principal and interest payments (as well as other payments) are **outflows**.

**Figure 2: Net Present Value Formula**

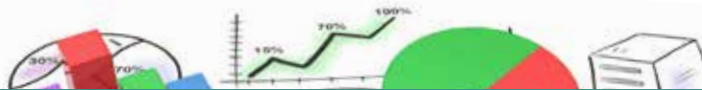
$$NPV = \sum_{t=0}^n \frac{Rt}{(1+i)^t}$$

Assuming the periods are in years, the above formula reads:

NPV is the sum of amounts R (inflows and outflows) in each of the years (t = 0 to n), where each amount is discounted to the present (t equals 0).

In effect the NPV compares the inflows (future disbursements) against the outflows (future payments) in the common present value terms. In general, you expect the NPV to be positive because the disbursements of the loan amount take place mostly in the early years of the loan cycle while the repayments take place in the later years.

With regards to the NPV, the longer the grace period, the lower the PV of payments. Also, the longer the repayment period, the lower the PV of the repayments (which would be spread out further into the future). In contrast, interest payments are costs which are additional to the amounts required to repay the disbursed loan amount. So, the smaller the interest rate the better for the borrower.



## 14.2 The Grant Element as a Measure of Concessionality

The grant element is central to the determination of the concessionality of debt and is closely associated with the concept of net present value. But the actual calculation of the grant is quite complex.

### Box 1: Calculating the Grant Element

#### GRANT ELEMENT CALCULATION

The formula below is one of the simpler ones

$$GE = (1 - ZG - ZM - ZX) * 100$$

where

GE = Grant element

$$ZG = R1 * (1 - 1/C1) / (A * D)$$

$$ZM = (1/NR) * (1/C1) * ((1 - 1/C2) / D)$$

$$ZX = (R2 / (A * NR)) * (1/C1) * ((1/C2) - 1 + D * NR) / (D * D)$$

M = Maturity

G = Grace period

A = Number of repayments per year

INT = Interval between the commitment date and the first repayment date minus the interval between two successive repayments =  $G - 1/A$

DR = Repayment duration =  $M - INT$

I = Discount rate (10% = 0.1)

R1 = Interest rate during grace period

R2 = Interest rate during repayment period

D = Discount rate per period =  $((1 + I)(1/A)) - 1$

NR = Total number of repayments =  $A * DR$

C1 =  $(1 + I)INT$

C2 =  $(1 + I)DR$

An indicative but highly simplified formula to approximate the grant element is:

$$GE = (LA - PV) / LA * 100$$

Where:

GE is Grant Element Percentage

LA is Loan Amount (assumed to be fully disbursed at the start of the loan period)

PV is the sum of the present value amounts of the periodic payments till maturity.

The basic idea is that if a loan is fully repaid then PV should be equal to LA, without any financial advantage (in present value terms) for either the borrower.

Where the loan amount (LA) is greater than the present value of the repayments and interest payments (PV), it means that the borrower has received some financial concession, in present value terms.

A grant is where GE equals 100%. That is, PV equals 0, no principal repayments or interest payments.

The higher the value of GE, the more concessional the loan.

Conversely, the smaller the GE, the more expensive the loan. A negative GE means in effect the borrower is paying back more than the financial value of the loan.

The general requirement by the IMF/World Bank for low income countries is that GE should be 35 per cent or higher. Countries that have benefited from debt relief are often required to seek new loans with at least a GE of 45 per cent.

## 2. The State Debt Profile Template

### 2.1 Sources of Data

The Debt Management Department (DMD) is responsible for compiling the data for assessing the state's historical debt profile. This data also provides the base case scenario when carrying out the debt sustainability analysis.

DMD should collect debt and revenue data on a monthly basis, which would be summarized into quarterly and annual data. The annual debt data should be checked against the annual reports published by the Office of the Accountant General.

**TABLE 2.1 Annual Debt Data Entries (2014 – 2018)**

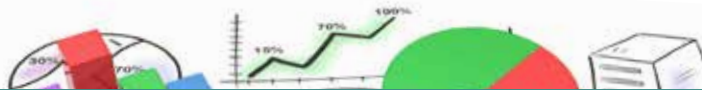
Item	Return to Main Menu	2014	2015	2016	2017	2018
1	<b>YEAR</b>					
2	<b>Exchange Rates</b>					
3	End of Year USD Exchange Rates	167.50	196.50	304.50	305.25	306.50
5	<b>Debt Categories</b>					
6	<b>Internal Debt</b>					
7	New Internal Loans	6,000,000,000	10,000,000,000	5,000,000,000	8,000,000,000	5,500,000,000
8	Internal Loan Repayments	0	7,000,000,000	7,000,000,000	4,500,000,000	4,000,000,000
9	<b>Internal Loans End Year Stocks</b>	<b>13,000,000,000</b>	<b>16,000,000,000</b>	<b>14,000,000,000</b>	<b>17,500,000,000</b>	<b>19,000,000,000</b>
10	Other Government Liabilities	1,400,000,000	1,200,000,000	0	0	300,000,000
11	<b>Total Internal Debt Stocks</b>	<b>14,400,000,000</b>	<b>17,200,000,000</b>	<b>14,000,000,000</b>	<b>17,500,000,000</b>	<b>19,300,000,000</b>
12	Domestic Interest Payments	560,000,000	3,000,000,000	2,500,000,000	3,600,000,000	3,000,000,000
13	<b>Contractors' Arrears</b>					
14	Net Increase (New Debt)	2,000,000,000	0	1,000,000,000	0	7,000,000,000
15	Net Decrease (Payments)	0	7,000,000,000	0	4,000,000,000	0
16	<b>Total Contractors' Arrears</b>	<b>17,000,000,000</b>	<b>10,000,000,000</b>	<b>11,000,000,000</b>	<b>7,000,000,000</b>	<b>14,000,000,000</b>
17	<b>Gratuity, Pensions, &amp; Salary Arrears</b>					
18	Net Increase (New Debt)	0	2,500,000,000	8,000,000,000	4,000,000,000	6,000,000,000
19	Net Decrease (Payments)	1,500,000,000	0	0	0	0
20	<b>Total Gratuity, Pensions, &amp; Salary Arrears</b>	<b>2,500,000,000</b>	<b>5,000,000,000</b>	<b>13,000,000,000</b>	<b>17,000,000,000</b>	<b>23,000,000,000</b>
21	<b>External Debt</b>					
22	New Ext Disbursements	1,160,000,000	890,000,000	1,260,000,000	2,160,000,000	1,360,000,000
23	External Principal Repayments	90,000,000	130,000,000	110,000,000	110,000,000	89,000,000
24	<b>Total External Loans - Debt Stocks</b>	<b>9,070,000,000</b>	<b>9,830,000,000</b>	<b>10,980,000,000</b>	<b>13,030,000,000</b>	<b>14,301,000,000</b>
25	External Interest Payments	850,000,000	755,000,000	965,000,000	1,150,000,000	1,272,000,000
26	<b>Accounts Data</b>					
27	<b>Revenues</b>					
28	All FAAC Revenue	81,000,000,000	85,000,000,000	71,000,000,000	77,000,000,000	73,000,000,000
29	Internally Generated Revenue (IGR)	37,000,000,000	15,000,000,000	32,000,000,000	38,000,000,000	40,000,000,000
30	Other Revenues / Grants	5,000,000,000	3,000,000,000	2,500,000,000	1,500,000,000	2,200,000,000

The exchange rates information is available on the Central Bank of Nigeria (CBN) website, which publishes near daily exchange rates for the major foreign currencies, US Dollar, the Euro, British Pound, and the Japanese Yen.

Each state government is obligated to send the Federal Debt Management Office (DMO) the quarterly domestic data, using the DMO template.

The states also receive semi-annual reports from the DMO regarding each state's external debt information which is maintained centrally by the DMO.

Capital expenditure information is obtained from the Ministry of Finance and Planning which prepares the Medium-Term Expenditure Framework (MTEF).



**TABLE 2.2 Historical Public Debt Ratios (2014 – 2018)**

<a href="#">Return to Main Menu</a>						
<b>Wazobia State Public Debt Profile Ratios (Historical) 2014-2018</b>						
<b>Debt Profile Ratios</b>	<b>Thresholds</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Debt Stock (Solvency) Ratios</b>						
Domestic Debt/Total Revenue	100.00%	27.56%	31.26%	36.02%	35.62%	48.87%
External Debt/Total Revenue	150.00%	7.37%	9.54%	10.41%	11.18%	12.41%
<b>Total Debt/Total Revenue of the Preceding Year (See Note 1 below)</b>	<b>250.00%</b>	34.93%	40.81%	46.43%	46.81%	61.29%
<b>Source of Debt</b>						
% Domestic Debt	N/A	78.89%	76.61%	77.58%	76.10%	79.74%
% External Debt	N/A	21.11%	23.39%	22.42%	23.90%	20.26%
<b>Debt Service (Liquidity) Ratios</b>						
<b>Total Debt Service / FAAC Revenue of the Preceding Year (See Note 1 below)</b>	<b>40.00%</b>	3.70%	22.08%	12.44%	18.82%	10.86%
External Debt Service /Total Revenue	5.00%	0.76%	0.86%	1.02%	1.08%	1.18%
Domestic Interest Payments /Total Revenue	5.00%	0.46%	2.91%	2.37%	3.09%	2.60%
Domestic Interest Payments/IGR	15.00%	1.51%	20.00%	7.81%	9.47%	7.50%
<b>Note1: Requirements under the Fiscal Sustainability Plan (2016) - "revenue of preceding 12 months"</b>						

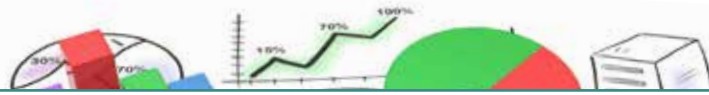


## 2.2 The Debt Profile Template Worksheets

[ To unprotect worksheets: use password wygpfm ]

**TABLE 2.3 Debt Profile Template (List of Worksheets)**

Worksheet	Input / Output	Description
O.1 Debt Data Entries	Input	<p><b>Internal Loans</b>            End Stocks Year 1 =            End Stocks Year 0 plus New Disbursement Year 1            Less Repayments Year 1            Interest Payments</p> <p><b>Contractors' Arrears:</b>            Enter the arrears at the end of each year; the system will calculate Net increases or net decreases for the year.</p> <p><b>Pensions and Gratuity Arrears</b>            Enter the arrears at the end of each year; the system will calculate Net increases or net decreases for the year.</p> <p><b>External Loans</b>            End Stocks Year 1 =            End Stocks Year 0 plus New Disbursement Year 1            Less Repayments Year 1            Interest Payments</p>
O.2 Profile Debt Data (5 Years)	Output	Displays 5-year debt data by source, extracted from the worksheet "O.1 Debt Data Entries". For each category of debt it shows debt stocks, new debt, principle repayments and interest payments (if any). It also shows revenue figures for comparative purposes.
A. Debt Data (By Source)	Output	This worksheet reorganizes the data by debt stocks, debt service, and revenues, based on the extracts in worksheet "O.2 Profile Debt Data (5 Years)" The two tables are essentially the same except that the second table is in millions so that it can be copied more easily into a report.
B. Historical Debt Profile	Output	This worksheet uses the worksheet "A. Debt Data (By Source)" to generate the debt profile ratios.



## 3. The MTDS Template

### 3.1 The Original MTDS Worksheets

The Medium-Term Debt Strategy (MTDS) tool was adapted and rearranged so that it can easily be used to undertake debt sustainability simulations for Nigerian states.

The main change to the standard template is the use of Revenues instead of Gross Domestic Product (GDP) for assessing debt sustainability for states. This is because many states in Nigeria are yet to establish reliable procedures for determining their GDP.

State revenues have also been used by the Nigerian Federal Government when it stipulates debt performance guidelines for states in its lending agreements with the states.

The original worksheets can be grouped into three categories:

- The **data worksheets**, consisting of "Advanced & Detailed Parameters", "Debt Data Projections", and "Macro and Market Data". Their titles describe their data contents. They are very detailed and they include hyperlinks back to the Menu page. Most of these worksheets require limited or no further data entry from the user – this is because a new worksheet ("1. Parameters & Debt Data", explained below) has been included in the DSA-MTDS in which the few user-modifiable parameters have brought together.
- The **strategies worksheet**. this is one worksheet "Detailed Strategy Data", but is quite large and contains the strategy tables as well as their derived data flows. The user can easily get lost in the details, obscuring the central DSA task, which is to understand and define the alternative debt strategies for obtaining the required debt financing of projects. This worksheet has therefore been augmented by prefixing the simpler worksheet "2. Alternative Debt Strategies", which contains just the alternative strategy tables.
- The **DSA run and results display** has similarly been separated out into the "3. Run DSA & View Results". In the original worksheets, running the simulations and reviewing the results involved moving from one part of the worksheet to the other. This has now been simplified by moving into a single worksheet.

All the worksheets are described in the table below.

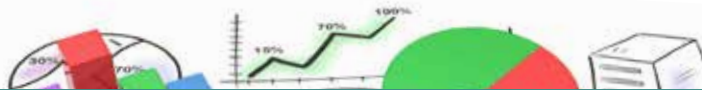
<sup>1</sup> The MTDS is a slight adaptation of the standard template developed by the IMF/World Bank which they use for debt sustainability assessment of sovereign countries.

[ To unprotect worksheets: use password wygpfm ]

**TABLE 3.1 The MTDS Template (List of Worksheets)**

<b>Worksheet</b>	<b>Input / Output</b>	<b>Description</b>
1. Parameters & Debt Data	Input	Basic parameters: the state, base DSA year. The current debt profile data, debt instrument types with their standard terms; foreign currencies and exchange rates.
2. Alternative Debt Strategies	Input	Macro-economic and fiscal parameters; The 4 alternative borrowing strategies.
3. Run DSA & View Results	Input / Output	This includes the "Run DSA" button and displays the outcome of the DSA simulation run for each of the four strategies. The resultant debt ratios are parametrised using state revenue rather than state GDP figures as the latter are not widely available (nor forecast).
4. Advanced Parameters	Output	These are detailed parameters, not to be changed by the user. The essential parameters have been presented for modification in the worksheet "1. Parameters & Debt Data".
5. Debt Data Projections	Output	A calculation worksheet in the template which generates the debt flows and stocks according to the different scenarios.
6. Macro and Market Data	Output	A calculation worksheet in the template which generates future macro-economic projections.
7. Detailed Strategy Data	Output	The compilation of analysis data for each strategy.
8. 3Y_OUTPUT 9. 4Y_OUTPUT 10. 5Y_OUTPUT 11. 8Y_OUTPUT	Output	The data flows and stocks for each strategy for 3 years, 4 years, 5 years, and 8 years accordingly.
12. Strategy 1 Results 13. Strategy 2 Results 14. Strategy 3 Results 15. Strategy 4 Results	Output	The ratios and chart outputs for each strategy. These results are GDP based.
16. Total_Debt Projections	Output	These projections combine the flows and stocks for both pre-existing debt and new debt.
17. New_Debt (Original Crncy)	Output	The projections of flows and stocks for only new debt, in the loan currency.
18. New_Debt (Domestic Crncy)	Output	The projections of flows and stocks for only new debt, in local currency.
19. FX	Output	Old info on foreign currencies.





### 3.2 The Basic Debt Data Entry Worksheet

#### Worksheet: "1. Parameters & Debt Data"

TABLE 3.2 DSA BASIC DATA AND PARAMETERS

DSA PARAMETERS (SET BY USERS)						
State Government	WAZOBIA					
Base Year of Data	2018					
EXCH RATES AT END OF BASE YEAR						
<b>ONLY 4 FOREIGN CURRENCIES: (All foreign loans must be denominated in one of these 4 currencies.)</b>						
USD	304.50	US Dollar	<b>(USD must be in this first row)</b>			
AUA	429.73	African Unit of Account				
EUR	350.50	Euro				
GBP	404.99	British Pound				
SDR	426.30	IMF Special Drawing Rights				
DEBT PROFILE IN THE BASE YEAR						
CREDITORS & CREDITOR TYPES	LOAN CURRENCY	Base Year DOD (in Millions of Loan Currency)	Maturity (years)	Grace Period (years)	Nominal Int Rate	Concessional/Market
Mult_Creditor1	SDR	40.00	40	10	0.75%	Concessional
Mult_Creditor2	AUA	10.00	30	10	1.50%	Concessional
Mult_Others1	USD	0.00	20	5	1.50%	Concessional
Mult_Others2	USD	0.00	20	5	2.00%	Concessional
Bilateral_1	USD	20.00	20	2	2.00%	Concessional
Bilateral_2	USD	0.00	20	2	3.00%	Concessional
Bilateral_Others	USD	0.00	20	2	5.00%	Concessional
Foreign_Comm	USD	0.00	10	2	12.00%	Mkt
Comm_Banks	NGN	0.00	3	0	15.00%	Mkt
FG_SUPPORT	NGN	43,300.00	20	2	8.00%	Concessional
PAY_ARREARS	NGN	75,200.00	3	0	0.00%	Concessional
3Yr Bond	NGN	0.00	3	0	20.00%	Mkt
5Yr Bond	NGN	0.00	5	0	18.00%	Mkt
10Yr Bond	NGN	0.00	10	0	15.00%	Mkt
20Yr Bond	NGN	0.00	20	0	14.00%	Mkt

The new data entry worksheet "1. Parameters & Debt Data" (shown above) consists of simple parameters and the current debt profile data.

The user selects the state from a dropdown list.

The user would also select the currencies (in addition to the USD) which apply to the external debt portfolio.

The debt portfolio has two parts (foreign and domestic). The foreign creditors could be multilateral, bilateral or commercial.

Domestic debt could be loans from the Federal government, commercial banks, state bonds, or quite often payment arrears (arrears of payments to contractors or gratuity or pension arrears).

Note that the foreign loans are in millions of the particular foreign currency of the loan, while the domestic loans are in millions of the local currency, the Naira.

### 3.3 How to Prepare the Alternative Borrowing Strategies

#### 3.3.1 Economic and Fiscal Parameters

A number of parameters, which provide the fiscal projections for the DSA, are defined at the top of the worksheet "2. Alternative Debt Strategies", as show in TABLE 3.3 below.

**TABLE 3.3 Fiscal Projections**

<b>I. CAPITAL EXPENDITURE PLAN (MAIN REASON FOR NEW BORROWINGS)</b>			
	STATE: WAZOBIA		
	<b>ALL AMOUNTS ARE IN MILLIONS OF LOCAL CURRENCY</b>		
BASE YEAR	<b>2018</b>		
<b>MACRO-ECONOMIC, REVENUE, &amp; FISCAL PARAMETERS</b>			
Annual Local Currency Depreciation	1.00%	Relative to the main loan currencies	
<b>GDP (of Base Year)</b>	3,000,000	Local currency (in millions)	
<b>Projected GDP Growth Rate</b>	5.00%		
Total Revenue (inc grants)	116,000	3.00%	<b>ANNUAL TOTAL REV GROWTH</b>
FAAC (% of Total Revenue)	75.00%		
Recur Expenditure (exc. Int & Princ)	49,744	2.00%	<b>ANNUAL RECUR EXP GROWTH</b>
	<b>ALL AMOUNTS ARE IN MILLIONS OF LOCAL CURRENCY</b>		
<b>CAPITAL EXPENDITURE PLAN (The Main Reason for New Long-term Borrowings)</b>			
Capital Expenditure: Start Amount	75,000	5.00%	<b>ANNUAL INCREASE</b>
Balance Capital Reserve Fund	5,000	1,500	<b>ANNUAL CAP RESERVE USAGE</b>

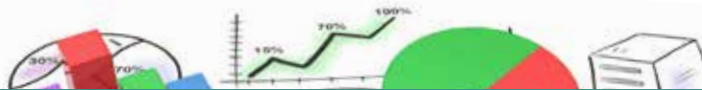
These parameters represent assumptions regarding various economic and fiscal trends.

- Annual **Local Currency Depreciation** is expected to be around 1 per cent.
- State **Gross Domestic Product** (GDP), at the base year level of about 3 trillion Naira, is expected to grow at the annual rate of about 5 per cent.
- Similarly, **total state revenue**, which was 116 billion Naira in the base year, is expected to grow at the annual rate of 3 per cent.
- Recurrent expenditure** (about 49.7 billion Naira in the base year) is expected to rise at the annual rate of 2 per cent.
- Capital expenditure** is a major variable in the DSA simulation. It represents the government's infrastructural plans for the state, usually outlined in the Medium-Term Expenditure Framework (MTEF). The base year amount (here shown as 75 billion Naira) should be the capital expenditure in the base year. The annual increment of 5 per cent is the trend the government expects (usually based on the expected increase in revenues and the start of new capital projects). In this hypothetical case, capital expenditure is expected to increase at the rate of 5 per cent but revenue is only expected to increase at the rate of only 3 per cent. The annual shortfall means

that the government is likely to embark on new long-term borrowings (external or domestic). Note that recurrent expenditure is also expected to increase at the annual rate of 2 per cent.

- Capital Reserve Fund** could be useful for financing some of the capital expenditure, if the amount is substantial. In this case, it is 5 billion Naira. Beside it is the usage rate, which is 1.5 billion Naira per annum. It means that the reserve fund will be drawn down in just over three years.

The user should change these values, according to the specific information of the state. The annual trend rates are critical for capturing the government's fiscal expectations and policies.



### 3.3.2 Stress Testing Parameters

The two common factors that can introduce shocks to the DSA simulation are revenue shocks and exchange rate shocks. This can be effected using the value series in Table 3.4.0 below (extracted from the Worksheet "2. Alternative Debt Strategies").

A stress test involves the introduction of a shock event and assessing how well the alternative borrowing strategies would perform.

As shown in the table below, in the normal simulation the shock values are 0, in which case the default revenue growth rate and default exchange rate depreciation are used.

**TABLE 3.4.0 Default simulation, without any shocks**

<b>FOR SIMULATING REVENUE AND EXCHANGE RATE SHOCKS</b>									
2018	2019	2020	2021	2022	2023	2024	2025	2026	
	Significant reduction in revenue								
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	<b>PROJECTED TOTAL REVENUES</b>								
116,000	119,480	123,064	126,756	130,559	134,476	138,510	142,665	146,945	
	Special depreciation of the local currency								
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	<b>PROJECTED LOCAL CURRENCY DEVALUATION</b>								
	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

Sometimes as the economy goes into a crisis, the local currency is drastically devalued. This would be reflected in the table below, for example, where the normally steady 1 per cent depreciation of the local currency suddenly jumps to 30 per cent.

**TABLE 3.4.1 Applying a 30% exchange rate devaluation in 2022**

<b>FOR SIMULATING REVENUE AND EXCHANGE RATE SHOCKS</b>									
2018	2019	2020	2021	2022	2023	2024	2025	2026	
	Significant reduction in revenue								
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	<b>PROJECTED TOTAL REVENUES</b>								
116,000	119,480	123,064	126,756	130,559	134,476	138,510	142,665	146,945	
	Special depreciation of the local currency								
	0.00%	0.00%	0.00%	30.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	<b>PROJECTED LOCAL CURRENCY DEVALUATION</b>								
	1.00%	1.00%	1.00%	30.00%	1.00%	1.00%	1.00%	1.00%	1.00%

Recently, in Nigeria, because of the sharp reduction in the price of oil, federal and state revenues also reduced significantly. Since then, revenues have recovered somewhat. But another drop can happen again. For example, if it is assumed there is a 25 per cent drop in a state's revenue in 2022, this would be entered accordingly, resulting in a different series of revenues over the planning horizon.

**TABLE 3.4.2 Applying a 25% revenue reduction in 2023**

<b>FOR SIMULATING REVENUE AND EXCHANGE RATE SHOCKS</b>									
<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	
	<b>Significant reduction in revenue</b>								
	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%	0.00%	0.00%
	<b>PROJECTED TOTAL REVENUES</b>								
116,000	119,480	123,064	126,756	130,559	97,919	100,857	103,883	106,999	
	<b>Special depreciation of the local currency</b>								
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	<b>PROJECTED LOCAL CURRENCY DEVALUATION</b>								
	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

Obviously, it is possible for both revenue and exchange rate shocks to happen in the same year(s).

The impacts of these shocks are demonstrated in the Wazobia example document (section 2.4 “DSA Stress Testing”).

### 3.3.3 The Concept of A Borrowing Strategy

The simplest way to think of the borrowing strategies is to consider that for each year the state government has an amount it wants to borrow. Then the simple question would be how to allocate the borrowing among different types of creditors.

However, this decision is not so simple, especially considering that the state often cannot just decide who to borrow from. Certain creditors may not want to lend to the state, and in the case of foreign creditors, the Federal Government has to give its permission.

Even where the state government is in a position to select a creditor, such as borrowing from domestic commercial banks, the government has to negotiate the terms and choose the creditor with the best terms, especially the interest rate.

These complications notwithstanding, the creditor type mix represented by the different strategies could be considered the government’s borrowing preferences, which the government should work to realise, so that the government can borrow as cheaply as possible, while minimizing various risks such as currency fluctuations involved in foreign borrowing.

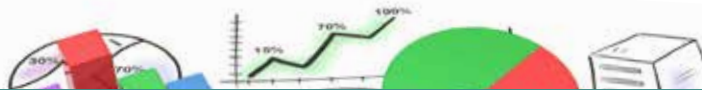
Usually the government has to balance various factors against one another. Loans from domestic sources (such as the commercial banks) tend to be subject to high interest rates in comparison with foreign multilateral and bilateral creditors. But domestic loans are not subject to foreign exchange risks.

There is one parameter which users can adjust, in order to decide the overall mix of foreign and domestic new borrowing, as shown in Table 3.5 below.

In this example, the user determines the mix in two steps. Up to 2021 (that is 2019, 2020, and 2021), new foreign loans will be 70 percent (while domestic loans are 30 per cent). Note that this is new borrowing, irrespective of the proportion of external/ domestic in the current debt portfolio.

In the second step, from 2022, the user wants new borrowing to be apportioned equally between external and domestic borrowing.




**TABLE 3.5 Proportions between external and domestic borrowing**

<b>II. ALTERNATIVE CREDITOR COMBINATIONS (DEBT STRATEGY)</b>	
<b>NEW BORROWING : EXTERNAL RATIO</b>	
To 2021	From 2022
<b>70%</b>	<b>50%</b>

There are two possible reasons for this approach. In the first few years of the planning horizon, the state may not have much choice as some long-term foreign loans may still be disbursing (since in the MTDS template, new borrowing includes new disbursements of previously contracted loans). Also, it may require some institutional preparations to convince domestic creditors to provide long-term loans.

### 3.3.4 The Alternative Borrowing Strategies

Let's compare the base strategy (Table 3.6) and an alternative strategy (Table 3.7).

**TABLE 3.6 The Base Strategy**

	<b>Strategy 1</b>		The historical mix of creditors							
	STATE: <b>WAZOBIA</b>									
	Strategy		2019	2020	2021	2022	2023	2024	2025	2026
<b>Mult_Creditor1</b>	SDR_1	External	80%	80%	80%	80%	80%	80%	80%	80%
<b>Mult_Creditor2</b>	AUA_2	External	8%	8%	8%	8%	8%	8%	8%	8%
<b>Mult_Others1</b>	USD_3	External	11%	11%	11%	11%	11%	11%	11%	11%
<b>Mult_Others2</b>	USD_4	External	1%	1%	1%	1%	1%	1%	1%	1%
<b>Bilateral_1</b>	USD_5	External	0%	0%	0%	0%	0%	0%	0%	0%
<b>Bilateral_2</b>	USD_6	External	0%	0%	0%	0%	0%	0%	0%	0%
<b>Bilateral_Others</b>	USD_7	External	0%	0%	0%	0%	0%	0%	0%	0%
<b>Foreign_Comm</b>	USD_8	External	0%	0%	0%	0%	0%	0%	0%	0%
<b>Comm_Banks</b>	NGN_9	Domestic	50%	100%	100%	100%	100%	100%	100%	100%
<b>FG_SUPPORT</b>	NGN_10	Domestic	50%	0%	0%	0%	0%	0%	0%	0%
<b>PAY_ARREARS</b>	NGN_11	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
<b>3Yr Bond</b>	NGN_12	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
<b>5Yr Bond</b>	NGN_13	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
<b>10Yr Bond</b>	NGN_14	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
<b>20Yr Bond</b>	NGN_15	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
	<b>Total</b>	<b>External</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
	<b>Total</b>	<b>Domestic</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

The base strategy is a "do nothing" strategy. It is assumed that the government will undertake its new borrowings from the same mix of creditors as it has been doing in the past. The amounts of new borrowings may vary from year to year, but the government will borrow from the same set of creditors in the same proportions.

There is a slight change between 2019 and 2020, because it is expected that Federal Government support will stop. The state government will then be forced to go to other domestic lenders and borrow short-term (from commercial banks).

TABLE 3.7 An Alternative Strategy

	Strategy 2	More bilateral debt (correspondingly reducing the multilateral debt component)								
	Strategy		2019	2020	2021	2022	2023	2024	2025	2026
Mult_Creditor1	SDR_1	External	80%	80%	80%	30%	30%	30%	30%	30%
Mult_Creditor2	AUA_2	External	8%	8%	8%	10%	10%	10%	10%	10%
Mult_Others1	USD_3	External	11%	11%	11%	10%	10%	10%	10%	10%
Mult_Others2	USD_4	External	1%	1%	1%	20%	20%	20%	20%	20%
Bilateral_1	USD_5	External	0%	0%	0%	30%	30%	30%	30%	30%
Bilateral_2	USD_6	External	0%	0%	0%	0%	0%	0%	0%	0%
Bilateral_Others	USD_7	External	0%	0%	0%	0%	0%	0%	0%	0%
Foreign_Comm	USD_8	External	0%	0%	0%	0%	0%	0%	0%	0%
Comm_Banks	NGN_9	Domestic	50%	100%	100%	100%	100%	100%	100%	100%
FG_SUPPORT	NGN_10	Domestic	50%	0%	0%	0%	0%	0%	0%	0%
PAY_ARREARS	NGN_11	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
3Yr Bond	NGN_12	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
5Yr Bond	NGN_13	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
10Yr Bond	NGN_14	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
20Yr Bond	NGN_15	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
	<b>Total</b>	<b>External</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
	<b>Total</b>	<b>Domestic</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Now compare the base strategy with Strategy 2 (TABLE 3.7 above). The domestic debt component remains the same, but the state government has decided to take active steps to move away from its total reliance on multilateral donors and approach bilateral donors (that is individual foreign countries).

Note that to be realistic, the status quo is maintained for the first three years, so the allocation of 30 per cent of foreign loans to bilateral donors only starts from 2022. To convince bilateral donors to start lending to the state, state government officials may have to visit and present their capital investment projects to those governments. Those foreign governments may seek some demonstration that the state can manage its finances well and carry out a number of fiscal reforms, including establishing an effective debt management department.

### 3.4 The Alternative Debt Strategies Worksheet

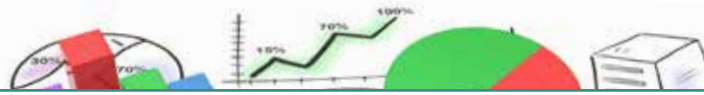
#### Worksheet: "2. Alternative Debt Strategies"

This worksheet basically enables the user to specify the alternative borrowing policies of the state government.

Note that the four sample strategies are essentially general recommendations to the state government, so as to improve the state's debt and project financing practices.

A strategy in effect has three dimensions:

- First you determine the proportion (in percentage terms) between external and domestic. In cell C24, the value 70% means 70% external (and 30% domestic) up to 2021, while 50% in cell D24 means 50% external (and 50% domestic) from 2022.
- Then separately for external and domestic, each instrument type is allocated a share again as a percentage. So total allocations for external have to add up to 100%, similarly total allocations for domestic have to add up to 100%.
- Finally, for each instrument type the percentage allocations over the years may vary.



In each strategy it is assumed that the state government pays its contractors, gratuity, and pensions in a timely manner, accumulating minimal arrears. Apart from distorting the economy of the state (not to talk of the pain and hardship suffered by pensioners), arrears have little financing value. It is noted that these arrears tend to accumulate to the same levels every year. The sample strategies also take into account the fact that it would take a couple of years for the government to implement new borrowing policies. For example, government has to demonstrate improved budgeting practices and a competent and empowered debt management unit, through regular debt information collation and reporting.

**Strategy 1: BASELINE CREDITOR MIX: The historical mix of creditors**

**TABLE 3.8.1 Strategy 1 (Baseline)**

	<b>Strategy 1</b>		The historical mix of creditors							
	STATE: WAZOBIA									
	Strategy		2019	2020	2021	2022	2023	2024	2025	2026
<b>Mult_Creditor1</b>	SDR_1	External	80%	80%	80%	80%	80%	80%	80%	80%
<b>Mult_Creditor2</b>	AUA_2	External	8%	8%	8%	8%	8%	8%	8%	8%
<b>Mult_Others1</b>	USD_3	External	11%	11%	11%	11%	11%	11%	11%	11%
<b>Mult_Others2</b>	USD_4	External	1%	1%	1%	1%	1%	1%	1%	1%
<b>Bilateral_1</b>	USD_5	External	0%	0%	0%	0%	0%	0%	0%	0%
<b>Bilateral_2</b>	USD_6	External	0%	0%	0%	0%	0%	0%	0%	0%
<b>Bilateral_Others</b>	USD_7	External	0%	0%	0%	0%	0%	0%	0%	0%
<b>Foreign_Comm</b>	USD_8	External	0%	0%	0%	0%	0%	0%	0%	0%
<b>Comm_Banks</b>	NGN_9	Domestic	50%	100%	100%	100%	100%	100%	100%	100%
<b>FG_SUPPORT</b>	NGN_10	Domestic	50%	0%	0%	0%	0%	0%	0%	0%
<b>PAY_ARREARS</b>	NGN_11	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
<b>3Yr Bond</b>	NGN_12	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
<b>5Yr Bond</b>	NGN_13	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
<b>10Yr Bond</b>	NGN_14	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
<b>20Yr Bond</b>	NGN_15	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
	<b>Total</b>	<b>External</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
	<b>Total</b>	<b>Domestic</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

This strategy assumes the government will not or cannot adopt different borrowing arrangements from the past. This usually means a fire-fighting approach because of poor cashflow management, borrowing short-term from commercial banks at very high interest rates.

While the state government might benefit from grants and concessional loans by foreign donors, they may not be available to finance long term economic development and infrastructure requirements of the state.



**Strategy 2: DIFFERENT CREDITOR MIX: Reduce external debt, in favour of more domestic debt****TABLE 3.8.2 Strategy 2 (More Domestic Debt)**

	<b>Strategy 2</b>	More bilateral debt (correspondingly reducing the multilateral debt component)								
	<b>Strategy</b>		2019	2020	2021	2022	2023	2024	2025	2026
Mult_Creditor1	SDR_1	External	80%	80%	80%	30%	30%	30%	30%	30%
Mult_Creditor2	AUA_2	External	8%	8%	8%	10%	10%	10%	10%	10%
Mult_Others1	USD_3	External	11%	11%	11%	10%	10%	10%	10%	10%
Mult_Others2	USD_4	External	1%	1%	1%	20%	20%	20%	20%	20%
Bilateral_1	USD_5	External	0%	0%	0%	30%	30%	30%	30%	30%
Bilateral_2	USD_6	External	0%	0%	0%	0%	0%	0%	0%	0%
Bilateral_Others	USD_7	External	0%	0%	0%	0%	0%	0%	0%	0%
Foreign_Comm	USD_8	External	0%	0%	0%	0%	0%	0%	0%	0%
Comm_Banks	NGN_9	Domestic	50%	100%	100%	100%	100%	100%	100%	100%
FG_SUPPORT	NGN_10	Domestic	50%	0%	0%	0%	0%	0%	0%	0%
PAY_ARREARS	NGN_11	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
3Yr Bond	NGN_12	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
5Yr Bond	NGN_13	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
10Yr Bond	NGN_14	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
20Yr Bond	NGN_15	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
	<b>Total</b>	<b>External</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
	<b>Total</b>	<b>Domestic</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

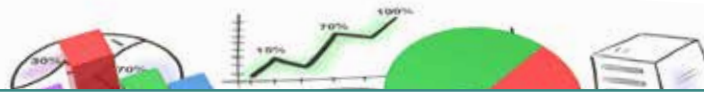
The main objective for reducing external debt is to reduce exchange rate risks. Although the interest rates of foreign loans are often low, if the local currency devalues, which it often does, the state finds its debt stocks and debt service rising while its revenues are not rising that much or may even be reducing.

**Strategy 3: DIFFERENT CREDITOR MIX: Increase the tenor of domestic debt instruments (that is, longer term domestic loans)****TABLE 3.8.3 Strategy 3 (Longer-Term Domestic Debt)**

	<b>Strategy 3</b>	Switching to longer term domestic debt								
	<b>Strategy</b>		2019	2020	2021	2022	2023	2024	2025	2026
Mult_Creditor1	SDR_1	External	80%	80%	80%	30%	30%	30%	30%	30%
Mult_Creditor2	AUA_2	External	8%	8%	8%	10%	10%	10%	10%	10%
Mult_Others1	USD_3	External	11%	11%	11%	10%	10%	10%	10%	10%
Mult_Others2	USD_4	External	1%	1%	1%	20%	20%	20%	20%	20%
Bilateral_1	USD_5	External	0%	0%	0%	30%	30%	30%	30%	30%
Bilateral_2	USD_6	External	0%	0%	0%	0%	0%	0%	0%	0%
Bilateral_Others	USD_7	External	0%	0%	0%	0%	0%	0%	0%	0%
Foreign_Comm	USD_8	External	0%	0%	0%	0%	0%	0%	0%	0%
Comm_Banks	NGN_9	Domestic	50%	100%	100%	0%	0%	0%	0%	0%
FG_SUPPORT	NGN_10	Domestic	50%	0%	0%	0%	0%	0%	0%	0%
PAY_ARREARS	NGN_11	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
3Yr Bond	NGN_12	Domestic	0%	0%	0%	50%	50%	50%	50%	50%
5Yr Bond	NGN_13	Domestic	0%	0%	0%	50%	50%	50%	50%	50%
10Yr Bond	NGN_14	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
20Yr Bond	NGN_15	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
	<b>Total</b>	<b>External</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
	<b>Total</b>	<b>Domestic</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Longer term loans (longer repayment periods) tend to be cheaper than short term loans. But more importantly, a longer-term bond often means that the project it finances may start contributing to the revenues of the state before the government has to pay back the loan.




**Strategy 4: DIFFERENT CREDITOR MIX: Seek even longer term domestic debt instruments**
**TABLE 3.8.4 Strategy 4 (Long-Term State Bonds)**

		<b>Strategy 4</b>	Even longer term domestic debt							
	<b>Strategy</b>		2019	2020	2021	2022	2023	2024	2025	2026
<b>Mult_Creditor1</b>	SDR_1	External	80%	80%	80%	20%	20%	20%	20%	20%
<b>Mult_Creditor2</b>	AUA_2	External	8%	8%	8%	10%	10%	10%	10%	10%
<b>Mult_Others1</b>	USD_3	External	11%	11%	11%	10%	10%	10%	10%	10%
<b>Mult_Others2</b>	USD_4	External	1%	1%	1%	10%	10%	10%	10%	10%
<b>Bilateral_1</b>	USD_5	External	0%	0%	0%	30%	30%	30%	30%	30%
<b>Bilateral_2</b>	USD_6	External	0%	0%	0%	20%	20%	20%	20%	20%
<b>Bilateral_Others</b>	USD_7	External	0%	0%	0%	0%	0%	0%	0%	0%
<b>Foreign_Comm</b>	USD_8	External	0%	0%	0%	0%	0%	0%	0%	0%
<b>Comm_Banks</b>	NGN_9	Domestic	50%	100%	100%	0%	0%	0%	0%	0%
<b>FG_SUPPORT</b>	NGN_10	Domestic	50%	0%	0%	0%	0%	0%	0%	0%
<b>PAY_ARREARS</b>	NGN_11	Domestic	0%	0%	0%	0%	0%	0%	0%	0%
<b>3Yr Bond</b>	NGN_12	Domestic	0%	0%	0%	30%	30%	30%	30%	30%
<b>5Yr Bond</b>	NGN_13	Domestic	0%	0%	0%	25%	25%	25%	25%	25%
<b>10Yr Bond</b>	NGN_14	Domestic	0%	0%	0%	25%	25%	25%	25%	25%
<b>20Yr Bond</b>	NGN_15	Domestic	0%	0%	0%	20%	20%	20%	20%	20%
	<b>Total</b>	<b>External</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
	<b>Total</b>	<b>Domestic</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

While Strategy 3 might include bonds that mature in a few years, Strategy 4, if well designed and executed, could provide project financing of ten to twenty years. Some of it could even be in the form of partnerships between the state government and the private sector.

### 3.5 The DSA & Results Worksheet

**TABLE 3.9 Strategy Simulation Results**

**1. DSA SIMULATION RUN**

Run All the 4 Strategies

The projected outcomes for each strategy are shown below.

**ALL AMOUNTS ARE IN MILLIONS OF LOCAL CURRENCY**

**2. PROJECTED ANNUAL CAPITAL EXPENDITURE**

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL NEW CAPITAL EXP.
	78,750.00	82,687.50	86,821.88	91,162.97	95,721.12	100,507.17	105,532.53	110,809.16		751,992.32 NGN
										MILLIONS

**3. PROJECTED GROSS FINANCING NEED (ASSUMED AS NEW DEBT)**

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	TOTAL NEW DEBT
	20,045.30	23,009.97	24,362.50	18,758.98	20,852.18	22,577.28	24,442.58	26,456.85		180,505.64 NGN
										MILLIONS

**4. THE RESULTS FOR EACH STRATEGY**

**Strategy 1:** Description: The historical mix of creditors

YEAR	Thresholds	2018	2019	2020	2021	2022	2023	2024
Total Revenue	NGN	116,000.00	119,480.00	123,064.40	126,756.33	130,559.02	134,475.79	138,510.07
FAAC Revenue		87,000.00	89,610.00	92,298.30	95,067.25	97,919.27	100,856.84	103,882.55
Total Debt Stocks (Debt)			76,165.07	90,122.91	106,801.86	127,224.05	151,243.58	178,500.87
Total Debt Service (TDS)			11,536.42	15,127.41	18,707.42	14,756.05	19,780.96	24,485.87
Debt/Prev Yr Total Rev	250.00%		65.66%	75.43%	86.79%	100.37%	115.84%	132.74%
TDS/Prev Yr FAAC	40.00%		13.26%	16.88%	20.27%	15.52%	20.20%	24.28%

**Strategy 2:** Description: More domestic debt

YEAR	Thresholds	2018	2020	2021	2022	2023	2024
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This worksheet is where the DSA simulation is carried out.

There are four numbered elements.

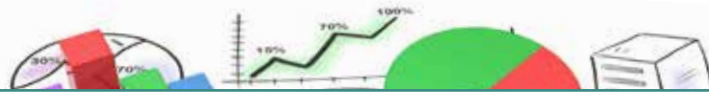
#### Item 1: The DSA Simulation Run button

When you have set the parameters, added the debt data, and defined the alternative debt strategies (worksheets "1. Parameters & Debt Data" and "2. Alternative Debt Strategies"), you can then proceed to run the simulation by clicking the button labelled "Run All the 4 Strategies".

But before you click the button, you must enable macros to be executed in the template. Note the warning at the top of the worksheet "SECURITY WARNING Macros have been disabled" followed by the button labelled "Enable Content". You have to click this button and enable macros before you can run the simulation.

This warning is restored and macros are disabled each time this workbook (MTDS template) is opened.

You may also want to review the information under items 2 and 3 below before you run the simulation.



## Item 2: Projected Annual Capital Expenditure

These capital expenditure projections are based on the simulation parameters you set in the worksheet "2. Alternative Debt Strategies", namely: Capital Expenditure Start Amount (C17) and the associated annual percentage increase (D17).

## Item 3: Projected Gross Financing Need (Assumed New Debt)

The projected financing need could be zero, if the projected capital expenditure can be funded from the annual revenue or from capital reserves.

If the gross financing need amounts are zero or insignificant, it means you need to increase the projected capital expenditures. Otherwise there is no point doing the simulations.

## Item 4: Simulation Results for the Four Strategies

After running the simulations, the results for each strategy will be updated.

You can then review the performance of each strategy, according to the two criteria:

- Total Debt to Previous Year Total Revenue (**Debt/Prev Yr Total Rev**), and
- Total Debt Service to Previous Year FAAC Revenue (**TDS/Prev Yr FAAC**).

As users become comfortable using the template, they can review the original outputs of the template, which are available towards the end of the workbook.



## 4. Conducting the DSA Using the MTDS Template

### 4.1 Determine the Government's Borrowing Requirements and Borrowing Plan

For the state to achieve long-term economic development the government has to undertake some major capital projects. The annual revenues are normally insufficient for such capital expenditures, after taking into account the regular annual revenue expenditures (salaries, pensions, office maintenance, schools, and so forth).

The MTDS framework allows the user to specify (through a number of parameters) the expected annual amounts of state revenues, the revenue expenditures, and amounts that would be available for capital expenditures.

The user also enters the state's funding requirements for capital expenditures, which can be determined by the state's Ministries of Finance and Economic Planning, usually involving the use of the Medium-Term Expenditure Framework (MTEF).

For each year of the planning horizon, the borrowing requirement would be the balance of funds still required after taking into account amounts available from the year's revenues and allocations from capital reserves.

### 4.2 Select the Appropriate Borrowing Strategy

The MTDS framework provides up to eight years planning period. The borrowing plan indicates how much the government plans to borrow each year to meet its capital expenditure requirements.

The borrowing plan can be considered fixed. The MTDS alternative strategies framework allows the user to decide the mix of the various types of debt instruments and which particular creditors to use so as to best meet the government's capital project financing needs.

Each type of debt instrument has different characteristics which impact the governments cashflows and ability to meet its future debt servicing obligations in different ways, as explained in section 2.3 above.

### 4.3 Undertake Simulations and Review the Results

The MTDS workbook provides a tool which allows the user to carry out simulations assuming a variety of scenarios.

The user should first project into the future the usual historical levels of revenues, capital expenditures, exchange rate variations, and so forth, as well as the usual sources of borrowing and debt instruments. This is called the "Base Scenario". This assumes that the government will not review or change its current (or default) borrowing policies.

The base scenario provides a benchmark against which other scenarios can be compared.

Simulations should be carried out by varying revenue projections, exchange rate fluctuations, as well as possible changes in creditors' lending practices.

As explained in section 2.4.2, the strategies can be subjected to stress tests, by introducing shocks in terms of unusual reductions in annual revenues or large devaluations of the local currency.









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