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DATA-DRIVEN BUDGET OPTIMIZATION FOR JOB CREATION IN NIGERIA USING THE SIMPLEX METHOD

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ABSTRACT

Unemployment remains a core issue in Nigeria, undermining economic stability, social welfare, national development and security. Addressing the issue requires visionary and evidence-based interventions to optimize the use of existing resources. This study examines how Nigeria's 2024 budget of ₦27.5 trillion can be strategically utilized to optimize job creation. using the Simplex technique, a quantitative optimization method. This research presents the optimal distribution of resources across key sectors for the purpose to attain maximal employment levels. The research concentrates on five key sectors prioritized in the 2024 budget are Education, Healthcare, Infrastructure, Security and Defense, and Social Development. The ranking of these is based on their employment coefficients, which measure the number of jobs created for every billion Naira of expenditure. Preliminary findings revealed that the budget allocations can generate approximately 400,600 jobs.

Keywords: Budget, Simplex method, Sectorals, Constraints, Employment

INTRODUCTION

According to the National Bureau of Statistics (NBS), Nigeria's unemployment rate stood at 33.3% in the fourth quarter of 2023, with over 42% youth unemployment. This rate of unemployment remains one of the most serious challenges confronting Nigeria, inhibiting economic growth and societal well-being. Despite all the efforts of government evidenced in the allocations of the Nigeria 2024 budget to some of the key sectors such as education, healthcare, infrastructure, defense and security, and social development, the scourge of unemployment remains persistent, as the gap between labor supply and demand remains ever-widening. However, what remains missing is a clear case study aim at applying the simplex method to an entire national budget-like that of Nigeria's 2024 budget-with the explicit goal of maximizing employment outcomes based on sectoral employment elasticity. This research seeks to bridge that gap by formulating a linear programming model that guides optimal budget allocation across employment-sensitive sectors as it is crucial for driving economic growth, ensuring social stability, and harnessing the potential of the country's large youth population.

FAO (1995) The Food and Agriculture Organization (FAO) has provided practical demonstrations of LP in whole-farm system planning, illustrating how farmers can maximize income by optimally allocating limited resources such as labor, capital, and land. The study outlines how the simplex method can be applied in real-world economic settings to generate optimal plans, showcasing its relevance for rural development and agricultural productivity. Beyond agriculture, economic planning models also employ LP to allocate sectoral outputs in ways that optimize national objectives such as GDP growth or production efficiency Todaro (2020). These models treat sectors as variables and apply constraints such as labor, capital, and technical coefficients. While not always focused directly on employment, such models lay the foundation for including employment coefficients to align budget allocations with job creation goals. Sungatullina, (2014). proposes a linear programming model to optimize employee compensation budgeting, linking it to productivity gains. The results demonstrate the model's effectiveness in optimizing fund allocation and encouraging higher productivity, providing a structured approach for companies to control compensation costs. Shkolnyk, et al (2021) applied the simplex method to optimize state budget revenues in Ukraine. The study spans 2007--2019 data and uses linear programming to determine optimal revenue structures that ensure financial stability and fiscal discipline. The U.S. Department of Energy (2022) presented an application of the simplex method for budget optimization in the context of energy program planning. The approach highlights how linear programming can simulate multiple budget scenarios to achieve specific policy objectives. Chen & Yuan (2021) optimized teacher allocation in public schools using LP, improving educational outcomes while minimizing costs. World Bank (2020) documented LP applications in public employment programs across 12 developing nations, demonstrating scalability in diverse economic contexts. Li and Zhao (2023) utilized the simplex method to optimize employment numbers within fixed wage budgets for public sector agencies. Their model considered wage differentials across job categories and aimed to maximize total employment without exceeding salary budgets. The results revealed optimal employment structures and highlighted the trade-offs between wage levels and total employment. Idisi and Ogumeyo (2024) used simplex method to optimizes labor resource allocation to maximize efficiency in sustainable development projects. It solves linear programming problems to balance workforce distribution with environmental objectives. Li, J (2025). Demonstrated that the simplex method can effectively handles resource optimization problems with multiple constraints, providing quantifiable decision-making support for enterprises and agriculture, thereby highlighting its practical value in enhancing efficiency and reducing costs. Yaqoob et al. (2021) examined the use of simplex and interior point methods for solving budgetary allocation problems in the context of Industry 4.0. Their study provides insights into the applicability of LP models in industrial settings and how these methods can be formulated to solve real-world linear problems aimed at maximizing profit, which indirectly influences employment rates.

MATERIALS AND METHODS

This study employs an analytical research design, integrating quantitative methods and optimization techniques. This approach uses advantage of linear programming, a mathematical tool for resource optimization, to address the problem of unemployment in Nigeria. The Simplex method is chosen as the core optimization technique because of its proven efficiency in solving resource allocation problems under constraints.

The Nigerian budget of 2024 is used in this work as a case study. The prioritized sectoral allocations are considered for analysis. All data used are secondary data gotten from Nigeria's 2024 National Budget, detailing sectoral allocations. (Federal Ministry of Finance 2024). National Bureau of Statistics (NBS) reports on sector-specific job creation rates and unemployment trends. Studies on sectoral job elasticity and employment multipliers (National Bureau of Statistics 2023).

Consider the Nigeria 2024 budget with a total allocation of ₦27.5 trillion with Sectoral allocation of ₦2.18 trillion to education, ₦1.33 trillion to healthcare, ₦1.32 trillion to infrastructure, ₦3.25 trillion to security and defense and ₦0.534 trillion to social development and poverty reduction. Debt Servicing With allocation of ₦8.27 trillion. (Federal Government of Nigeria, 2024 Appropriation Bill). The above allocations are pivotal in maximizing employment. This problem will be Maximize using simplex algorithm.

Decision Variables

The decision variables are as follows:

x_1: Amount of budget allocated to Education (₦2.18 trillion maximum);

x_2: Amount of budget allocated to Health (₦1.33 trillion maximum);

x_3: Amount of budget allocated to Infrastructure (₦1.32 trillion maximum);

x_4: Amount of budget allocated to Defense and Security (₦3.25 trillion maximum) and

x_5: Amount of budget allocated to Social Development and poverty reduction (₦534 billion maximum).

Slack variable S $(s_1, s_2, s_3, s_4, s_5, s_6)$ are used for converting the constraint to equality.

Employment Coefficients

Let $a_1,\ a_2,\ a_3,\ a_4 and a_5$ be the employment coefficients in thousands with respect to Education, Health, Infrastructure, Defense and Security, and Social Development and Poverty Reduction respectively. The reliability of employment coefficients was cross-checked with historical trends (2019–2023) and the number of jobs created per sector in thousands). Actual budget allocations were confirmed through government publications and reports, with the following assumptions for employment coefficients.

a_1(Education): 600 jobs Per Billion Naira;

a_2 (Health): 400 jobs Per Billion Naira;

a_3(Infrastructure): 700 jobs Per Billion Naira;

a_4(Defense and Security): 300 jobs Per Billion Naira and

a_5(Social development and Poverty Reduction): 500 jobs Per Billion Naira

Model Assumptions

The following Assumptions Made in the Study are:

i. Linear relationship between budget and employment;
ii. Employment coefficients are Constant and No major structural changes are assumed in sector;
iii. Full and efficient utilization of funds. Assumes zero budget leakages, corruption, or inefficiencies;
iv. Employment generation in one sector does not directly affect another and only direct jobs created through sectoral spending are included and
v. Fixed total budget constraint and Stable macroeconomic environment.

Steps involved in Simplex Method.

Step 1: Convert the problem to standard form

i. Maximize the linear objective;
ii. All constraints as equalities (add slack variables) and
iii. All variables 0

Step 2: Set up the initial simplex tableau.

i. List coefficients of objective function and constraints and
ii. Include slack variables where needed.

Step 3: Pivot Column Selection: Identify entering variable by (Ekoko; 2016)

i. Looking at the bottom (objective) row and
ii. Choose most negative for maximization coefficient.

Step 4: Pivot Row Selection: Identify leaving variable by:

i. Computing ratios (Right-hand side ÷ pivot column)

$$\text{RHS} = min_i \frac{b_i}{a_{ik}} = \frac{b_r}{a_{rk}}, a_{rk} > 0 \qquad (1)$$

where r and k are respectively the pivot row and column while a_{rk} is the pivot element. Were x_r is the basic variable, p.c is the pivot column and p.e is the pivot element.

ii. Smallest positive ratio determines the pivot row.

Step 5: Pivot (New Solution:) A new table is obtained by transforming the present tableau Using Gauss-Jordan elimination scheme given by (Ekoko, 2016)

For i = r

$$a_{ij}^{i} = \begin{cases} \frac{a_{ij}}{a_{rk}}, for\ i = r & (2) \\ a_{ij} - \frac{a_{rj}a_{ik}}{a_{rk}},\ for\ i \neq r & (3) \end{cases}$$

Where a_{ij} the present element and a_{ij}^{i} is the new element.

i. Make the pivot element = 1 and
ii. Make all other entries in pivot column = 0.

Step 6: Check for optimality

i. If no more negative coefficients in the objective row, STOP;
ii. Else, go back to Step 3.

End: Optimal solution reached

i. Read solution values from final tableau and
ii. Objective function value is in bottom right cell.

NOTE: The procedure for obtaining a new tableau in step 5 is as follows (Ekoko; 2016):

i. Create the empty new tableau;
ii. update the BV column with the new basic variable (BV);
iii. Fill each BV column by moving horizontally to its column, insert 1 and Zero in every other element position and
iv. Apply first part of Gauss-Jordan elimination scheme by diving every entry in old pivot row by the pivot element and Apply 2nd part of Gauss-Jordan elimination scheme to the remaining empty spaces.

Objective Function

The primary goal is to maximize total employment (Z), expressed as:

Maximize Z = $a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4 + a_5 x_5$

Constraints:

Total Budget (B) Constraint:

$x_1 + x_2 + x_3 + x_4 + x_5 \leq B$

Sector-Specific Minimum (M) Allocations

Each sector receives a minimum allocation based on government policies or historical spending patterns:

$x_i \leq M$, i = 1, 2, 3, 4, 5

Non-Negativity Constraints: Allocations cannot be negative:
$x_i \geq 0$, i = 1, 2, 3, 4, 5

Formulation of the Optimization Model
Objective Function
The objective is to maximize total employment (Z) generated across the five sectors:
Z = $600x_1 + 400x_2 + 700x_3 + 300x_4 + 500x_5$
Are the budget allocations (in trillion Naira) to education, healthcare, infrastructure, defense and security, and social development respectively.
The coefficients represent the employment generated Per Billion Naira allocated to each sector.

Constraints
Budget Constraint
The total allocation across all sectors must not exceed ₦27.5 trillion:
$x_1 + x_2 + x_3 + x_4 + x_5 \leq 27.5$
$x_1 + x_2 + x_3 + x_4 + x_5 \leq 27.$

Sectoral allocation constraint
$x_1 \leq 2.18$, $x_2 \leq 1.33$, $x_3 \leq 1.32$, $x_4 \leq 3.25$, $x_5 \leq 0.534$

Non-Negativity constraint
$x_1, x_2, x_3, x_4, x_5 \geq 0$

Applying the Simplex Method
The Simplex method will be applied step by step

Conversion to Standard Form
The inequalities are converted into equations by introducing slack variables (s):
For the budget constraint:
$x_1 + x_2 + x_3 + x_4 + x_5 + s_1 = 27.5$
For the sectoral constraint:
$x_1 + s_2 = 2.18$
$x_2 + s_3 = 1.33$
$x_3 + s_4 = 1.32$
$x_4 + s_5 = 3.25$
$x_5 + s_6 = 0.534$
$x_1, x_2, x_3, x_4, x_5, s_1, s_2, s_3, s_4, s_5 \, and s_6 \geq 0$
$Z - 600x_1 - 400x_2 - 700x_3 - 300x_4 - 500x_5 + 0s_1 + 0s_2 + 0s_3 + 0s_4 + 0s_5 + 0s_6 = 0$

Initial Tableau Construction:
The objective function and constraints are arranged in a tableau format, with slack variables included

Table 1a: Initial Simplex Tableau

B.V	x_1	x_2	x_3	x_4	x_5	s_1	s_2	s_3	s_4	s_5	s_6	RHS
s_1	1	1	1	1	1	1	0	0	0	0	0	27.5
s_2	1	0	0	0	0	0	1	0	0	0	0	2.18
s_3	0	1	0	0	0	0	0	1	0	0	0	1.33
s_4	0	0	1	0	0	0	0	0	1	0	0	1.32
s_5	0	0	0	1	0	0	0	0	0	1	0	3.25
s_6	0	0	0	0	1	0	0	0	0	0	1	0.534
Z	-600	-400	-700	-300	-500	0	0	0	0	0	0	0

Pivot Selection
Table 1b: The entering variable is chosen based on the most negative coefficient in the objective function row

B.V	x_1	x_2	x_3	x_4	x_5	s_1	s_2	s_3	s_4	s_5	s_6	RHS	Ratio
s_1	1	1	1	1	1	1	0	0	0	0	0	27.5	27.5 ÷ 1 = 27.5
s_2	1	0	0	0	0	0	1	0	0	0	0	2.18	$\frac{2.18}{1} = 2.18$
s_3	0	1	0	0	0	0	0	1	0	0	0	1.33	Undefined
s_4	0	0	$\underline{1}$	0	0	0	0	0	1	0	0	1.32	$\frac{1.32}{1}$ = (min) p.r
s_5	0	0	0	1	0	0	0	0	0	1	0	3.25	Undefined
s_6	0	0	0	0	1	0	0	0	0	0	1	0.534	Undefined
Z	-600	-400	-700	-300	-500	0	0	0	0	0	0	0	

p.c = a_{ik} p.e= a_{rk}
Where x_r is the basic variable, p.c is the pivot column and p.e is the pivot element.
RHS = $min_i \frac{b_i}{a_{ik}} = \frac{b_r}{a_{rk}}, \; a_{rk} > 0$ (1)
Where r and k are respectively the pivot row and column while a_{rk} is the pivot element. Using Gauss-Jordan elimination scheme given by (Ekoko;2016).

For i=r $a_{ij}^{i} = \begin{cases} \frac{a_{ij}}{a_{rk}}, for i = r & (2) \\ a_{ij} - \frac{a_{rj}a_{ik}}{a_{rk}}, \; for i \neq r & (3) \end{cases}$

Where a_{ij} the present element and a_{ij}^{i} is the new element.

Table 1c: Table 1a Partly Reproduced

B.V	x_1	x_2	x_3	x_4	x_5	s_1	s_2	s_3	s_4	s_5	s_6	RHS
s_1	a	b	**1**	c	d	1	0	0	0	0	0	e
s_2	f	g	**0**	H	I	0	1	0	0	0	0	J
s_3	k	l	**0**	m	n	0	0	1	0	0	0	P
s_4	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1.32min**
s_5	q	r	**0**	S	t	0	0	0	0	1	0	u
s_6	v	w	**0**	X	y	0	0	0	0	0	1	aa
Z	bb	cc	**-700**	dd	ee	0	0	0	Ff	0	0	Gg

p.c

Replace s_4 with x_3. New $x_3 = \frac{a_{ij}}{a_{rk}}, \quad for \quad i = r$ p.e = $a_{rk} = 1$

Using Equation 2

New $x_3 = \left[\frac{0\ 0\ 1\ 0\ 0\ 0\ 0\ 0\ 1\ 0\ 0\ 1.32}{1}\right]$

New $x_3 = 0\ \ 0\ \ 1\ \ 0\ \ 0\ \ 0\ \ 0\ \ 0\ \ 1\ \ 0\ \ 0\ \ 1.32$

Using Equation 3

$a_{ij}^{i} = a_{ij} - \frac{a_{rj}a_{ik}}{a_{rk}}, for \quad i \neq r$

a= $1 - \frac{1\times0}{1} = 1.$ b= $1 - \frac{1\times0}{1} = 1.$ c= $1 - \frac{1\times0}{1} = 1.$

d= $1 - \frac{1\times0}{1} = 1.$ e= $27.5 - \frac{1.32\times1}{1} = 26.18$ f= $1 - \frac{1\times0}{1} = 1.$

g= $1 - \frac{0\times0}{1} = 1.$ h= $o - \frac{0\times0}{0} = 0.$ i= $0 - \frac{0\times0}{0} = 0.$

j= $2.18 - \frac{1.32\times0}{1} = 2.18.$ k= $o - \frac{0\times1}{1} = 0.$ l= $1 - \frac{0\times1}{1} = 1.$

m= $0 - \frac{0\times1}{1} = 0.$ n= $0 - \frac{0\times1}{1} = 0.$ p= $1.33 - \frac{1.32\times0}{1} = 1.33.$

q= $0 - \frac{0\times0}{1} = 0.$ r= $o - \frac{0\times0}{1} = 0.$ s= $1 - \frac{0\times0}{1} = 1.$

t= $0 - \frac{0\times0}{1} = 0.$ u= $3.25 - \frac{0\times1..32}{1} = 3.25.$ v= $0 - \frac{0\times0}{1} = 0.$

w= $0 - \frac{0\times0}{1} = 0.$ x= $0 - \frac{0\times0}{1} = 0.$ y= $1 - \frac{0\times0}{1} = 1.$

aa= $0.534 - \frac{0\times1.32}{1} = 0.534.$ bb= $-600 - \frac{0\times-700}{1} = -600.$

cc= $-400 - \frac{0\times-700}{1} = -400.$ dd= $-300 - \frac{0\times-700}{1} = -300.$

ee= $-500 - \frac{0\times-700}{1} = -500.$ ff= $-0 - \frac{1\times-700}{1} = 700.$

gg= $-0 - \frac{1.32\times-700}{1} = 924.$

Iterative Tableau Updates

Table 2: Iterative Tableau

B.V	x_1	x_2	x_3	x_4	x_5	s_1	s_2	s_3	s_4	s_5	s_6	RHS
s_1	1	1	0	1	1	1	0	0	0	0	0	26.18
s_2	1	0	0	0	0	0	1	0	0	0	0	2.18
s_3	0	1	0	0	0	0	0	1	0	0	0	1.33
x_3	0	0	1	0	0	0	0	0	1	0	0	1.32
s_5	0	0	0	1	0	0	0	0	0	1	0	3.25
s_6	0	0	0	0	1	0	0	0	0	0	1	0.534
Z	-600	-400	0	-300	-500	0	0	0	700	0	0	924

Since there are still negative coefficients in the objective row, we repeat iteration until optimal solution is reached.

Table 3: Iterative Tableau

B.V	x_1	x_2	x_3	x_4	x_5	s_1	s_2	s_3	s_4	s_5	s_6	RHS
s_1	0	1	0	1	1	1	0	0	0	0	0	24.00
x_1	1	0	0	0	0	0	1	0	0	0	0	2.18
s_3	0	1	0	0	0	0	0	1	0	0	0	1.33
x_3	0	0	1	0	0	0	0	0	1	0	0	1.32
s_5	0	0	0	1	0	0	0	0	0	1	0	3.25
s_6	0	0	0	0	1	0	0	0	0	0	1	0.534
Z	0	-400	0	-300	-500	0	600	0	700	0	0	2232

Repeat iteration

Table 4: Iterative Tableau

B.V	x_1	x_2	x_3	x_4	x_5	s_1	s_2	s_3	s_4	s_5	s_6	RHS
s_1	0	1	0	1	0	1	0	0	0	0	0	23.466
x_1	1	0	0	0	0	0	1	0	0	0	0	2.18
s_3	0	1	0	0	0	0	0	1	0	0	0	1.33
x_3	0	0	1	0	0	0	0	0	1	0	0	1.32
s_5	0	0	0	1	0	0	0	0	0	1	0	3.25
x_5	0	0	0	0	1	0	0	0	0	0	1	0.534
Z	0	-400	0	-300	0	0	600	0	700	0	500	2499

Repeat iteration

Table 5: Iterative Tableau

B.V	x_1	x_2	x_3	x_4	x_5	s_1	s_2	s_3	s_4	s_5	s_6	RHS
s_1	0	0	0	1	0	1	0	0	0	0	0	22.136
x_1	1	0	0	0	0	0	1	0	0	0	0	2.18
x_2	0	1	0	0	0	0	0	1	0	0	0	1.33
x_3	0	0	1	0	0	0	0	0	1	0	0	1.32
s_5	0	0	0	1	0	0	0	0	0	1	0	3.25
x_5	0	0	0	0	1	0	0	0	0	0	1	0.534
Z	0	0	0	-300	0	0	600	400	700	0	500	3031

Repeat iteration

Table 6: Final Tableau

B.V	x_1	x_2	x_3	x_4	x_5	s_1	s_2	s_3	s_4	s_5	s_6	RHS
s_1	0	0	0	0	0	1	0	0	0	0	0	18.886
x_1	1	0	0	0	0	0	1	0	0	0	0	2.18
x_2	0	1	0	0	0	0	0	1	0	0	0	1.33
x_3	0	0	1	0	0	0	0	0	1	0	0	1.32
x_4	0	0	0	1	0	0	0	0	0	1	0	3.25
x_5	0	0	0	0	1	0	0	0	0	0	1	0.534
Z	0	0	0	0	0	0	600	400	700	300	500	4006

Since no negative coefficient remains in the objective function row, it therefore indicates that the optimal solution has been reached.

RESULTS AND DISCUSSION

The final tableau (Table 6) provides the optimal allocations to each sector and the maximum employment generated.

Table 7: Table of Result

Decision variable	Optimal Value	Resource	Slack	Status
B		Total budget	s_1= 18.886	Abundance
x_1	2.18	Education	s_2 = 0	Scare
x_2	1.33	Health	s_3= 0	Scare
x_3	1.32	Infrastructure	s_4 = 0	Scare
x_4	3.25	Defense & Security	s_5 = 0	Scare
x_5	0.534	Social dev. & Poverty	s_6 = 0	Scare
Z	4 006			Not enough.

Total Employment Generated

Objective function value Z at optimal solution is computed as:

Z = 600(2.18) + 400(1.33) +700(1.32) + 300(3.25) + 500(0.534)

Z = 1308 + 532 + 924 +975 + 267

Z = 4,006 thousand jobs.

Z = 4 006 000 Jobs.

i.e the employment generated by each variable is as follows:

Education (x_1^x)=1,308,000

$Health(x_2^x) = 532{,}000$

Infrastructure $(x_3^x) = 924{,}000$

Defense and Security (x_4^x) =975,000,

Social Development and Poverty Reduction $(x_5^x) = 267{,}000$.

Total Employment = $\sum_{i=1}^{5} x_i^x$

$\sum_{i=1}^{5} x_i^x = x_1^x + x_2^x + x_3^x + x_4^x + x_5^x$

Total Employment $= 1308000 + 32000 + 924000 + 975000 + 267000$.

Total Employment = 4 006 000 Jobs.

The maximum employment achievable under the given constraints is 4,006,000 jobs, with all sector limits being fully utilized, indicating that these constraints are binding. ₦18.886 trillion of the budgets is allocated to non-employment-generating sectors. This indicates that the simplex method can be used to yield optimal budget allocations that maximize employment generation while adhering to policy constraints

Discussion of Findings

Here we evaluate how the budget aligns with employment goals and the opportunities identified.

Alignment of the Budget with Employment Goals

Sectoral Priorities: Although sectors such as education and infrastructure were allotted significant segments, the priority given to security (13.38%) suggests potential sectoral divergence from priority-based employment-generation.

Both allocations for education and for health sector summed up to 13.36% of the budget and showed moderate use of human capital formation. However, greater emphasis on technical and vocational education could better address skill gaps.

Agriculture and Technology: Since these have high employment potential, allocations to them were fairly low.

Potential For Employment Growth

The analysis indicates that reallocating funds to labor-intensive sectors such as education, health and infrastructure, agriculture and technology will create millions of jobs but issues such as revenue shortfalls, debt servicing, and corruption threaten the budget's effectiveness in generating employment. However, achieving this requires targeted policy interventions and efficient budget execution.

CONCLUSION

The study assessed the 2024 budget's potential to maximize employment in Nigeria using simplex algorithm and detailed Sectoral analysis. Key conclusions include:

i. Current Budget Emphasis: Despite a showing of commitment toward reducing unemployment by virtue of infrastructure and education, expenditures on agriculture and technology remain low.
ii. Job Creating Opportunities: Enhancement of resource allocation would significantly contribute to employment, particularly among those rurally and in the growing fields of ICT and agriculture.
iii. Implementation Challenges: Factors including revenue deficits, obligations associated with debt servicing, and corruption jeopardize the budget's efficacy in fostering employment opportunities.

RECOMMENDATIONS

All the constraints are satisfied but more money should be allocated to all the sectors. If employment must be maximized, there should also be:

i. Reallocation of budget resource to agriculture, technology, and public works programs, which have high employment multipliers;
ii. Enhance Project Monitoring;
iii. Leverage Public-Private Partnerships (PPPs);
iv. Promote Skill Development;
v. Address Debt Management and
vi. Ensure Policy Continuity and Stability are sustained across administrations to maintain employment-focused policies progress by embedding employment impact assessments in the budgeting process, developing a multi-year framework for employment-focused budget planning and increasing transparency to ensure public trust and participation in budgetary decisions.

By adopting the few recommendations outlined, Nigeria can make significant strides in creating sustainable employment opportunities and fostering inclusive economic growth

REFERENCES

Budget office of the federation: Ministry of budget and economic planning. Retrieved From https://budgetoffice.gov.ng/index.php/resource/internal-resource/budget-documents.

Chen, L., & Yuan, Y. (2021). Research on the optimization of Staff allocation under the Strategy of "Strong Leads the Weak". *Journal of Physics: Conference Series*. **1757**(1). https://doi.org/10.1088/1742-6596/1757/1/012020.

Dantzig, G. B. (1963). Linear programming and extensions. Princeton University Press.

Development Research and project Centre, dPRPC (2023) Assessment of the 2024 health budget proposal by the Federal. Government of Niger, dRPC. https://drpcngr.org.2023

Federal Ministry of Finance, Budget, and National Planning. (2024). 2024 National budget of the Federal Republic of Nigeria. Abuja: FMFBNP. https://www.nationalplanning.gov.ng/

Idisi, B. E. and Ogumeyo, S. A. (2024). A linear programming approach to optimizingenvironmental resource management in urban areas. *FUDMA Journal of Sciences* (FJS) 8(6): 277–284. https://doi.org/10.33003/fjs-2024-0806-2770.

Lu, Jiaxin. (2025). Application of simplex method in accounting management. *Theoretical and Natural Science.* 101(1), 222-227. https://doi.org/10.54254/2753-8818/2025.CH23150.

National Bureau of Statistics (2023). Sectoral contribution to Nigeria's GDP and employment. Retrieved From https://www.nigerianstat.gov.ng

Nyor, N. &Omolehin, J. O. (2014). Application of linear Programming in modeling the allocation of buses to routes in a transport service authority. *Universal Journal of Applied Mathematics, 2(3), 125-135.* https://doi.org/10.13189/ujam.2014.020302

Paul O. Ekoko. (2016) Operation research for science and social science. MinDEX.

Pun Seet Leen & Johor girl (1995). Planning whole-farm systems: simplified programming and linear programming. *Food and Agriculture Organization of the United Nations*. Retrieved from https://www.fao.org/4/w7365e/w7365e0c.htm

Sungatullina, L.B.. (2014). Application of linear programming in budgeting costs for the compensation of employees. *Mediterranean Journal of Social Sciences.* 5. 388-392. https://doi.org/10.5901/mjss.2014.v5n24p388.

Shkolnyk, I., Kozmenko, S., &Drahosova, J. (2021). State budget revenue optimization using the simplex method. *Journal of International Studies, 14*(1), 154–167. https://doi.org/10.14254/2071-8330.2021/14-2/16

Taha, H. A. (2017). Operations research: An Introduction. Pearson Education.

Todaro, M. P. and Smith, S. C (2020). Economic development. Pearson Education.

U.S. Department of Energy. (2022). Using linear programming to create optimal budget scenarios [Conference presentation]. CECOP Symposium, U.S. Department of Energy. www.energy.gov

World Bank. (2020). Optimizing public employment programs. Washington, D.C.: Author. Retrieved from https://openknowledge.worldbank.org/handle/10986/33456