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Glossary of Terms

ABP	Anchor Borrowers Programme
ATA	Agricultural Transformation Agenda
APP	Agriculture Promotion Policy
CCAC	Climate and Clean Air Coalition
CH_4	Methane
CO_2	Carbon dioxide
CSA	Climate Smart Agriculture
EPPA	Economic Project and Policy Analysis model
GDP	Gross Domestic Product
GHG	Green House Gas
HFC	Hydrofluorocarbon
ICAT	Initiative for Climate Action Transparency
FMAFS	Federal Ministry of Agriculture and Food Security
GMO's	Genetically modified Organism
GJAM	Green Job Assessment Model
GAINS	Greenhouse Gas and Air Pollution Interaction and Synergies Model
ILO	International Labour Organisation
IPCC	Inter-governmental Panel on Climate Change
ITUC	International Trade Union Confederation
JT	Just Transition
JGIT	Just and Gender Inclusive Transition
LEAP	Long-range Energy Alternative Planning Model
LULUCF	Land Use and Land Use change and Forestry
LGA	Local Government Authority
MACRO	Macroeconomic Assessment Climate Response Options Model
MESSAGA	Mitigation Energy Sustainable Scenarios Assessment Greenhous Analysis
MDA's	Ministries, Departments and Agencies
$MtCO_2$	Metric Ton per CO_2 equivalent
NBS	National Bureau of Statistics
N_2	Nitrogen Gas
NC	National Communication
NDC	Nationally Determined Contribution
NATIP	National Agricultural Technology and Innovation Policy

NETP	Nigeria Energy Transition Plan
NCCC	National Council for Climate Change
NEEDS	National Economic Empowerment and Development Strategy
NECAL	Nigeria Energy Calculator
NGO	Non-Governmental Organization
NLTP	National Livestock Transformation Plan
NLC	Nigerian Labour Congress
NCS	National Conservation Strategy
NMVOCs	Non-Methane Volatile Organic Compounds
NPK	Nitrogen Phosphorus, Potassium Fertilizer
O_2	Oxygen
PCAN	Place-Based Climate Action Network
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SDG	Sustainable Development Goals
SLCP	Short Lived Climate Pollutants
SO_2	Sulphur Dioxide
TUC	Trade Union Congress
USD	United States Dollar

Executive Summary

The assessment of sustainable development impacts on selected agriculture and forestry policies using the ICAT Sustainable Development guidance has enabled the qualitative assessment of potential impacts of selected policies. Being an action within the country's policies included in the Nationally Determined Contribution (NDC), the identification and assessment of impacts of the policy ex-ante will facilitate further tracking of the implementation and achievement of the NDC and provide a tool for informed and effective policy planning and implementation. An initial matrix presents the qualitative impact assessment developed including the identified specific impacts within each impact dimension environmental, social and economic. It presents an overview that encapsulates the primary objectives and the breadth of the assessment. The objectives of the report are twofold: firstly, to provide a comprehensive analysis of the direct and indirect impacts of agricultural policies, and secondly, select JGIT indicators of policy impact to be assessed and define data needs. The scope of this assessment is extensive, covering environmental aspects such as climate change mitigation and air quality, social factors like gender equality and job creation, and economic impacts including income levels and business opportunities.

The process of stakeholder mapping and engaging vulnerable groups in the assessment was a key component of our approach. We identified and categorized various groups that were either directly or indirectly impacted by these policies. This included farmers, women, youth, indigenous communities, and other marginalized groups. The mapping process involved understanding their unique roles, interests, and the potential impacts of policies on their livelihoods and well-being.

To ensure meaningful engagement of these vulnerable groups, several tailored strategies were employed. Firstly, we facilitated inclusive and accessible consultation sessions, ensuring that these were held in locations and languages that were accessible to the stakeholders. Special attention was given to creating a safe and welcoming environment where participants felt comfortable voicing their opinions.

Secondly, we employed participatory approaches in these sessions, where stakeholders were not just passive recipients of information but actively contributed to the discussions. This approach allowed them to express their concerns, aspirations, and suggestions regarding the agricultural policies. Furthermore, we used a variety of communication channels and tools to ensure that all groups, irrespective of their literacy level or access to technology, could participate effectively.

We also ensured that the feedback and insights gathered from these engagements were genuinely reflected in the assessment report. This involved not just listing their concerns but also incorporating their perspectives into the formulation of recommendations.

Our analysis extends into the current practices of data collection, where methods such as surveys, field studies, and the utilization of reports from government bodies and NGOs provide a foundational understanding of policy impacts. Despite the breadth of these methods, we identified significant gaps that challenge the efficacy of our monitoring efforts. A notable shortfall is observed in the granularity and accessibility of data, particularly at local and community levels, which is crucial for capturing the nuanced effects of these policies. Integrating data collection efforts across different sectors and governmental departments appears fragmented, presenting an obstacle to achieving a unified understanding of the transition's impacts. Moreover, the absence of longitudinal data collection mechanisms limits our ability to assess the long-term sustainability and effectiveness of the policies. Equally important is the participation of communities in the data collection process; our findings indicate that their direct involvement remains limited, risking the overlook of valuable insights from those most affected by the transition.

To bridge these gaps and refine our monitoring of the just transition progress, we advocate for the development of more detailed and accessible data collection methods. Such methods should aim to encompass a wide array of stakeholders, ensuring that all perspectives, especially those from local and community levels, are adequately represented and understood. Enhancing collaboration across sectors and departments is vital for knitting together disparate data collection efforts, thus offering a more cohesive and comprehensive view of the transition's impacts. The establishment of systems for longitudinal monitoring is also crucial, as it would

enable us to track the enduring effects of these policies over time. Placing a greater emphasis on participatory data collection will ensure that the voices and experiences of affected communities are not just heard but are integral to shaping the ongoing transition process.

The qualitative impact assessment of agricultural policies also yielded significant findings that have crucial implications for policy and economic strategies. Nigeria's agricultural sector heavily relies on women, who constitute a staggering 70-80% of the workforce and manage close to 75% of all farms. However, despite their critical role, they face numerous obstacles that limit their productivity and well-being. These challenges are further amplified by the growing threats of climate change, placing an undue burden on this essential workforce.

The absence of strong national unions specifically representing agricultural workers creates a significant gap in advocacy and protection for women in this sector. This lack of a collective voice makes it even more difficult for them to secure fair wages, access essential resources, and have their needs addressed in policy decisions. Addressing these existing gender gaps and empowering women farmers is crucial for ensuring a just transition towards a more sustainable and equitable agricultural future in Nigeria.

A key observation from the assessment was the shift towards climate change mitigation, evidenced by reduced emissions in rice cultivation and improved soil and fertilizer management. These outcomes highlight the effectiveness of Climate-Smart Agriculture practices and underline the need for their continued support. These practices not only align with global carbon reduction goals but also offer long-term environmental and economic benefits while contributing the NDC.

The assessment also revealed notable improvements in air quality, chiefly attributed to reduced open burning practices. This progress underpins the success of biomass management initiatives and points to the need for more stringent regulations and the promotion of cleaner alternatives. This could lead to economic advantages, such as lowered healthcare costs associated with pollution-related ailments. However, the assessment also brought to light challenges like the increase in waste generation linked to heightened production activities, signalling a need for more efficient waste management and recycling policies and investment in those initiatives.

In terms of labour and social dimensions, there were improvements in safety and working conditions in the agricultural sector, advocating for ongoing investment in worker training and safety measures. Enhanced labour conditions are likely to result in higher productivity and reduced costs related to occupational accidents. The assessment also noted significant progress in social aspects, including increased participation of women and youth in decision-making and a rise in job opportunities, reflecting social progress and economic expansion. Moreover, raising public awareness and education on climate change indicates a growing environmental consciousness, essential for sustainable practices. Finally, the assessment observed economic growth and diversification in the agricultural sector, particularly in areas such as farm mechanization and input manufacturing, highlighting the potential for broader economic growth and sectoral strengthening.

It is essential to develop a standardized framework for data collection and analysis to ensure consistency and reliability in tracking the impacts of agricultural policies. This approach and continuous stakeholder engagement and institutional capacity building should be integrated into the policy development process. This integration will facilitate more effective post-policy assessment and ensure that indicators are effectively incorporated into policy design.

Addressing environmental concerns, there is a need for stronger regulations against harmful practices like open burning, and a push towards cleaner alternatives, which could lead to economic benefits such as reduced healthcare costs. Concurrently, the challenge of increased waste generation calls for the development of efficient waste management and recycling policies, potentially creating new economic opportunities in the recycling sector.

A shift towards sustainable energy use in agriculture, especially in irrigation, indicates a move towards renewable energy, suggesting a policy direction that supports renewable technologies to reduce energy costs and enhance energy security for farmers, and targeted subsidy reforms. Improvements in labour conditions, including safety and working conditions, necessitate continuous investment in worker training and safety protocols, which can lead to higher productivity and lower accident-related costs.

The significant impact of increased training and skill development, and focus on education can drive innovation and efficiency, leading to a more skilled workforce. Increased participation of women and youth in decision-making to trigger inclusivity and economic expansion. Enhancing public awareness and education on climate change is also crucial, as an informed population can contribute to more sustainable consumer and business practices calling for support for entrepreneurship and innovation in agriculture.

1.0 Introduction

1.1 Overview of the Agriculture and Land Use, Land-Use Change, and Forestry (LULUCF) Sectors in Nigeria

Contribution to National Economy and Employment

The agricultural sector is a cornerstone of Nigeria's economy, making a substantial contribution to the nation's Gross Domestic Product (GDP) and employment. In the second quarter of 2023, agriculture accounted for approximately 21% of Nigeria's GDP—with the largest contribution coming from crop production[1] and employed 70% of the country's workforce. While the agricultural sector in Nigeria experienced a slow start in 2023 with a -0.90% growth in the first quarter compared to 3.16% the year before, it showed signs of recovery in the second quarter. There was a growth of 1.5% in real terms compared to the same period in 2022[2]. This resilience underscores agriculture's critical role in Nigeria's economy, providing a foundation for stability and growth. Considering the essential role that agriculture plays in the country, proactive policy interventions are needed to ensure the downsides of the net-zero transition do not erode the manifold benefits and process made in the sector.

Role in Climate Mitigation and Adaptation

Agriculture and LULUCF can increasingly be a part of the solution to address rapid climate variability, environmental degradation, and biodiversity loss. Nigeria's NDC highlights a more ambitious commitment to climate action showing clear intent to reduce its emissions by as high as 47% conditional on international finance by 2030 and achieve net-zero by 2050. Despite this there is little knowledge of how the LULUCF and agriculture sector will contribute to the targets however based on information submitted in the 3rd National Communication (NC) there would need to be a reduction of 20% which can be achieved through adoption of the National Forest Policy and other national policies to help support ambition under these climate initiatives or improve data on the land sector to ensure the contributions of the ag sector is properly accounted for. The NDC estimates the mitigation potential of nature-based solutions at about 115 $MtCO_2e$, with the top three solutions being agroforestry, improved forest management, and forest restoration, constituting about 89 $MtCO_2e$ of the total potential[3]. However, due to a lack of clarity and detailed projections for the sector emissions by 2030, there remains significant uncertainty in these estimates. In response, Nigeria's REDD+ Strategy aims to reduce forestry emissions by 20% by 2050, aligning with the broader updated NDC target of 47% conditional

[1] Nigeria: GDP by agricultural sector 2023 | www.statista.com

[2] Nigeria: GDP by agricultural sector 2023 | www.statista.com

[3] Nigeria | Climate Action Tracker." https://climateactiontracker.org/

reduction[4]. These initiatives are part of Nigeria's broader efforts to integrate climate action into its development path, acknowledging the crucial role of the forestry sector in both climate change mitigation and adaption. The government's efforts to expand the NDC's gas coverage, including actions in the waste sector and the inclusion of hydrofluorocarbons (HFCs), alongside a green jobs assessment and the exploration of nature-based and clean cooking solutions, reflect a multi-faceted approach to climate mitigation and adaptation. The full implementation of Nigeria's conditional target is estimated to require about USD 177 billion from 2021 to 2030, highlighting the scale of investment needed to achieve these ambitious goals.

1.2 Just Transition and Gender Inclusion in Agriculture and LULUCF Sectors

In the complex and urgent scenario of climate change, integrating the principles of Just Transition and Gender Inclusion in the LULUCF sectors presents a transformative pathway towards sustainability and equity. Recognizing that climate change disproportionately affects women, particularly in agriculture-dependent communities, and acknowledging their crucial role in both adaptation and mitigation strategies, a gender-inclusive approach ensures that climate actions are effective and equitable. Meanwhile, the Just Transition framework advocates for a shift towards sustainable agricultural practices and responsible land use that not only reduces emissions but also safeguards the specihoods and cultures of local communities, especiallly those most vulnerable to climate impacts. The 2020 National Action Plan on Gender and Climate Change for Nigeria delineates a comprehensive approach to integrating gender considerations into agricultural and land use sectors, emphasizing the pivotal role of women in these areas. It acknowledges the distinct roles that women and men play in agriculture and land use, suggesting the collection of sex-disaggregated data as a means to understand the disparate impacts climate change has on them. This data is crucial for tailoring interventions that address the specific vulnerabilities and capacities of women in these sectors.

The plan advocates for the enhancement of women's participation in decision-making processes related to climate change mitigation and adaptation. By creating opportunities for women to express their concerns and priorities, the plan aims to ensure that a diverse range of perspectives, thereby enriching the decision-making process, informs Just Transition and LULUCF strategies.

In recognition of the transformative potential of climate-smart agriculture technologies and practices, the action plan shows the importance of facilitating women's access to these resources. Through targeted training programs and extension services designed to meet the unique needs of women farmers, the plan seeks to empower women with the tools and knowledge necessary for sustainable farming practices.

[4] Nigeria REDD+ Readiness Package 2022:
https://www.forestcarbonpartnership.org/system/files/documents/nigerias_redd_readiness_package_final.pdf

Addressing gender inequalities in land ownership and access is another critical component of the plan. It highlights the existing disparities that hinder women's full participation in agriculture and land use, proposing Just Transition and LULUCF strategies that advocate for secure land tenure rights for women. This approach not only seeks to rectify inequalities but also to ensure women's empowerment and economic independence.

The plan also calls for gender-responsive budgeting in climate action initiatives, emphasizing the allocation of resources that specifically address women's needs in the context of climate change. This strategic financial planning is key to ensuring that gender considerations are integrated into climate action, making these efforts more inclusive and effective.

This holistic approach, blending gender inclusivity with a Just Transition, underlines the necessity of addressing socio-economic disparities while pursuing environmental goals, ultimately leading to a resilient, equitable, and sustainable future for all.

1.2.1 The Concept of Just Transition and Its Relevance

The IPCC Special Report on Climate Change and Land[5] confirms that to become fit for purpose in an era of climate change, agriculture must move away from intensive and industrialized approaches towards food systems based on agroecology and less and better meat. But efforts to dramatically cut greenhouse gases (GHGs) in the agriculture sector could also bring major disruptions to peoples' lives.

Agriculture is not only a source of food production but also a cornerstone of rural economies and cultural identities. Transitioning towards more sustainable agricultural practices, such as organic farming or agroecology, can bring about significant changes in farming methods (especially those that are heavily fossil fuel dependent), land use, and market dynamics. Without careful planning and support for the transition in Nigeria, this could exacerbate existing inequalities, jeopardize livelihoods, and lead to social unrest especially across smallholder farmers, rural communities and women. Additionally, the agriculture sector is particularly vulnerable to the impacts of climate change and environmental degradation, making it imperative to ensure that any transition is fair, inclusive, and resilient. They may be wary that top-down and simplistic climate policies will leave large sections of rural communities stranded without support like subsidy and social inclusion following such drastic changes like the recent fuel subsidy removal that saw food inflation skyrocketing to over 27.5%, with few options for secure livelihoods. There is already deep injustice across the food system. Farmers and workers are already being squeezed and exploited by a system that concentrates wealth, land and power in fewer and fewer hands.[6] Women farmers face additional barriers and burdens. Meanwhile, 26.5 million Nigerian are expected to be food insecure by 2024[7] and over 84 million currently living below poverty line[8].

[5] IPCC Special Report 2018: https://www.ipcc.ch/srccl/
[6] https://www.mdpi.com/2073-445X/9/4/101
[7] https://reliefweb.int/report/nigeria/265-million-nigerians-projected-be-food-insecure-2024
[8] https://www.worldbank.org/en/country/nigeria/overview

The transformation of food systems towards agroecological approaches that work for people and nature must therefore be done in a way that works for farmers, farm workers, processors and marginalized communities, including low-income urban consumers living in city suburbs. The system must provide them with the support, safety nets and social protection required to make these shifts, and to improve working conditions and livelihoods.

A just transition in Nigerian agricultural context must address – and not exacerbate – injustices. The term “just transition” does not only define **WHAT** the new system will look like, but it also defines **HOW** that transformation is carried out. The process is expected to be genuinely inclusive and participatory. It must identify key actors, particularly those that are marginalized and ignored such as women farmers.

Farmers, workers and communities must be given a seat at the table and opportunities to shape their own future. The Focal Ministries Departments and Agencies (MDA’s) must act as midwives for just transitions in the sector, to facilitate effective transformations on the scale required. Thus with the involvement of communities, they can identify barriers, concerns and gaps, and develop comprehensive policy frameworks that provide joined-up solutions, social protection and positive opportunities for a better food system that works for farmers and the climate. In this way many communities that might otherwise resist climate action can become powerful advocates for change.

1.2.2 Assessing the Impact on Farmers and Communities

The transition towards a more sustainable future presents both challenges and opportunities for our agricultural sector. As we move towards a "just transition," one that prioritizes environmental well-being while ensuring social equity, it's crucial to assess its impact on farmers and their communities. However, this shift raises concerns about the potential impact on farmers and the communities they support. The overall impact of the just transition on Nigerian farmers and communities will depend on how it's managed. With careful planning, proactive support systems, and a focus on social equity, the transition can be a positive force for environmental sustainability, improved livelihoods, and a more resilient agricultural sector. However, without proper planning and support, the transition could have negative consequences for food security, rural livelihoods, and social stability.

The just transition in agriculture must be undertaken in a way that works for farmer groups, processors, marketers, farmers and workers, not against them, incentivize, remove multiple taxation (multiple produce taxes), provide required infrastructure (access road, energy for processing, small dams for irrigation, land development), and increase ease of export (reduce barriers, temporal storage systems at the airport for perishables, organized quality control protocol). It needs to recognize and address the fact that many are already being unfairly squeezed by the system (food inflation at 27.33%[9]) and by climate change; that smallholders and those practicing agroecology/conservation agriculture do not get the support that they

[9] https://www.cbn.gov.ng/rates/inflrates.asp

deserve; that women face particular barriers and burdens; and that the system still leaves over 26 million people with food insecurity. Unless the transition addresses these pre-existing inequalities, it will likely only work for the most powerful stakeholders, and harm the very people whose role will be central to a climate-safe and food secure future.

It has been stated that large-scale industrialization of crops and livestock farming is at the core of agriculture's harmful contribution to climate change, though Nigeria has more of small-scale players in the sector (80%[10]) being encouraged to transition to commercial practices to enable increased production to meet local demands, fill our reserves and export. These farmers are being squeezed by the big agribusiness companies that they depend on for seed and agrochemicals (ever increasing cost, negatively skewed off-taker models and low pricing). At the same time, they are being paid less and less by these large-scale aggregators that purchase their produce. For many, making a profit is only possible if done on a large scale. The logic that dominates commercial scale agriculture and policies is often "Get big or get out", rewarding farming approaches that harm the climate, undercut other farmers and erode communities. Meanwhile, smallholder farmers, rural women and those that would rather be responsible stewards for the wellbeing of land and animals are usually penalized instead of supported by policy frameworks and services. In the Northeast and some states in the Northwest, the farming landscape has been transformed in the past decade, as thousands of small farmers have been forced off their land due to increasing insecurity, heightened farmer header crisis, deadly retaliations evacuating multiples communities added to the pressure of commercializing farming activity if profit is expected. For predominantly small and even medium-size farmers, the conventional and competitive commercial farming economy can be an extremely challenging place to survive with subsidy removal on PMS and Diesel. The pressures facing farmers must therefore be the starting point for a just transition in agriculture. The transition can and must provide a real alternative to this race-to the-bottom and precarious way of life. Instead of forcing farmers to work against nature to produce more and more to survive economically, a just transition should include systemic changes to agricultural, energy and environmental policy to provide farmers with the technical, economic and political support to work with ecosystems. And it should reward the smallholder agroecological farmers that are already leading the way.

Upscaling the agricultural sector as proposed in the National Agricultural Technology and Innovation Policy (NATIP) policy is pushing for mainstream commercial agriculture across critical value chains. Therefore, conversations with farmers can often begin with the starting point of their livelihoods and visions for rural vitality, instead of a narrative of blame. How are they being affected by dynamics such as corporate control, low wages, health, and social cohesion? Are they concerned about the loss of soils and low productivity on their farms? How is climate change affecting them, increasing flooding and drought, resistant pest and diseases? What are their visions for the food system? Conversations like these are needed across the value chain for each priority crop targeted for national food security (rice, wheat, cassava etc.). They can enable communities engaged to move beyond the fear that the transition to climate-friendly

[10] https://babbangona.com/uncommon-facts-about-smallholder-farmers-in-nigeria

forms of agriculture does not need to be a burden on their already-difficult way of life. Instead, it can be a solution to their problems.

1.2.3 Social Inclusion and Empowerment

Women make up 70-80% of the agricultural labour force in Nigeria[11] and account for almost 75% of the farming population.[12] But they are disadvantaged by numerous barriers, which are becoming more extreme in the face of climate change. Due to patriarchal and cultural norms, women are usually expected to be responsible for caring for children and elderly family members and feeding the family. In rural areas, girls and women are responsible for fetching water and firewood. This unpaid work rather leaves them less time for agricultural work in general including farming effectively and leave them exhausted and with no time for leisure.

Cultural pressures or low educational attainment will often discourage women from participating actively in community planning processes, meaning that their perspectives are not heard or addressed in local decision-making. Educational or cultural barriers, fear of violence and lack of infrastructure may also mean that women are unable to sell their products in local markets or are at greater risk of being exploited.[13]

Policies can add additional barriers. Even though women may account for more than half of the farmer population in the country, it is a known fact that men are the default farmers (land title owners). Policies that discourage women's land tenure or access to finance reduce their ability to make investments for more effective farming and adaptation[14]. In many scenarios extension services seems to ignore women farmers and agroecological farming techniques, only providing support and advice to men to grow cash crops for export or where cultural/religious barrier does not allow male and female communication. If women were to have the same access to productive (financial) resources as men, they could lift 100-150 million people out of hunger. [15] These injustices and burdens are deepening in the face of climate change. When wells dry up, women and girls must undertake longer journeys to fetch water. Crop failure and loss of livelihoods will often lead girls to be pulled out of schooling before their brothers. Women often report higher incidences of domestic violence when drought brings crop failure and leaves families hungry.

Major communities especially in northern Nigeria have laws that impede women's economic opportunities, such as those which bar women from factory jobs, working at night, or getting a job without permission from their husband. Crop failure and hunger can drive women to undertake transactional sex work in desperation to feed their families, exposing themselves to violence and HIV. Climate-induced migration, in which mainly men leave their families in rural areas to seek work in cities or abroad is leaving many communities with few men, driving the

[11] https://cirddoc.org/women-lead-agriculture-in-nigeria/
[12] https://sahelconsult.com/wp-content/uploads/2019/05/Sahel-Newsletter-Volume-7.pdf
[13] https://sahelconsult.com/wp-content/uploads/2019/05/Sahel-Newsletter-Volume-7.pdf
[14] https://sahelconsult.com/wp-content/uploads/2019/05/Sahel-Newsletter-Volume-7.pdf
[15] https://www.ifad.org/en/web/latest/-/these-numbers-prove-that-rural-women-are-crucial-for-a-better-future?

feminization of agriculture, and further increasing the burdens on women. If agricultural transitions are gender-blind, ignoring the people that grow the majority of the food eaten in Nigeria, and the daily realities and challenges that women farmers face, they will be both unjust and ineffective. A gender inclusive just transition in agriculture is an opportunity to advance women's rights in agriculture, and that opportunity should be seized.

Landlessness, insecure access and control over land, and lack of recognition of communal land tenure present major barriers to social justice, food security, adaptation and addressing climate change. This is a particular problem in many parts of Nigeria triggered by insecurity, unlicensed illegal mining activities (damaging arable lands) and farmer herder crises. Women farmers in particular face legal, economic or cultural barriers to access and control over land in Nigeria. Communal or traditional lands that have been used by communities for generations are often at risk of being grabbed by community heads, in the rush for attracting illegal miners, minerals or commodities (tree logging and charcoal production). All too-often, when smallholder farmers are forced off their land, they end up working as poorly paid labourers for people that have taken over their former farms. Secure access and control over land is a critical ingredient in achievement of women's rights.[16]

Without documentation, security of land tenure - including communal or collective land rights – many women cannot access finance to make investments towards more sustainable and resilient ways of farming. Improving soils, controlling erosion, planting trees, managing water systems or changing land use can be expensive and take years to bear fruit (literally). When future access is insecure, farmers may not be motivated to make long-term investments or adopted highly advocated climate smart practices. The recent IPCC Special Report on Climate and Land identifies the need to improve land tenure and access - particularly for women - as a key strategy for enabling transitions to sustainable land management approaches[17].

Worker exploitation and low wages are extremely prevalent across the agriculture industry, in all parts of the world not only in Nigeria. Women make up a major part of this workforce. A relatively low percentage of the world's farm workers are unionized, which means that the vast majority are not collectively bargaining for decent wages or work conditions from their employers. There are no existing functional national unions in Nigeria bargaining for the welfare of agricultural workers; this is existent in the oil & gas sector. The heavy use of agrochemicals such as pesticides and fertilizers also present health threats to smallholder farm workers, who cannot afford the recommended protective wears. The seasonal nature of agriculture means that many employers prefer to take on high numbers of temporary workers at harvest time, often without formal employment contracts that bind the farms to ensure decent wages, conditions, health and safety, or secure employment. But even as the commercial farming system can be highly exploitative, shifting to farming systems that are better for the climate and work with nature must also avoid creating new risks for workers. Using labour to replace agrochemicals

[16] ActionAid "From Marginalization to Empowerment" (2013) https://actionaid.org/sites/default/files/from_marginalisation_to_empwerment_final_ research_report.pdf

[17] IPCC Special Report 2018: https://www.ipcc.ch/srccl/

could enhance employment opportunities but also increase the intensity of labour and physical demands of work. If employer farmers are already struggling to make ends meet, they are less likely to pay workers fairly. Additional economic burdens from investing in the transition to agroecological farming approaches could exacerbate this risk. Transitions in agriculture must therefore take account of the risk to workers, and ensure farmer owners' and plantation owners' responsibility and ability to pay fair wages and ensure decent working conditions.

A JGI transition must provide opportunities for positive change when transforming sectors. The International Trade Union Confederation (ITUC) sees the goal of a just transition as going beyond protecting livelihoods in the context of climate change, to also improving well-being, rights and opportunities for workers. It can also be an opportunity to organize and build collective power, to create jobs that end poverty, respect labour rights, and create a sustainable environment. Key goals of a just and gender inclusive transition should therefore be to ensure decent jobs, social protection and social inclusion, while also addressing the climate crisis.

Symbolism and rushed approaches must be avoided farmers and farm workers can often harbour deep suspicions that "just transition" discourse is performative, not thought through properly, or is used to green-wash business-as-usual, as evidenced by some other failed agricultural policies in the country like the presidential fertilizer initiative, anchor borrowers programme etc. They need to see and be convinced by real plans beyond the usual, and need to be reassured about the future, the need for action and justice, the possible benefits, and the urgency of climate action before they can be persuaded to support and join the transition. Poorly planned transitions could also backfire. There is a risk that the language of "climate emergency" and "urgency" could create pressure for quick climate solutions that end up harming farmers and workers, particularly those that are already marginalized, and that undermine processes for careful planning, inclusiveness and addressing inequality. There is therefore a need to balance the need for urgent climate action with the potential risk of job losses, alienating workers, causing harm to smallholder farmers and indigenous peoples and increasing inequality. Human rights, participation of communities – particularly those that are marginalized - and other social considerations must therefore be central to processes and plans to shift power in the agricultural system.

False solutions as new technologies are proposed as climate solutions (record of many failed so-called climate smart solutions), a just transition must take great care to foresee and avoid potential socio-economic and environmental harm they might bring. Even as new technologies are often assumed to bring progress, challenging questions must always be asked about who controls the technology (and who doesn't), who would benefit (and who would lose out), whether the impacts of new technologies are reversible (or not), and other possible unintended consequences from profound and largescale changes in farming systems. Solutions that increase inequality, concentrate control, wealth and power in fewer hands, threaten land rights, agricultural biodiversity and farmers' livelihoods, or green-wash business-as-usual corporate practices, should not be promoted under a just transition. Even as there is now widespread scientific consensus that the world must move away from large-scale agribusiness, the sector will likely continue attempts to defend their interests by presenting themselves as the solution to

the climate problem. Proactive attempts to repackage industrial approaches of GMOs, fertilizers and factory-farm feeding operations as “Climate Smart Agriculture,” “precision agriculture,” “sustainable intensification” or “reducing emissions intensity per kilo” could sound appealing to many farmers and governments who would understandably like to see themselves as climate leaders while minimizing disruption to their way of doing things.

Hi-tech approaches based on data and algorithms are foreseen by some to be the future of low-impact farming. There is even futuristic talk of agricultural drones that can transform farming in the country as there was a recent launch a government seed fund for agrotech start-ups in the country showing commitment to data driven agriculture sector, and reduce the need for pesticides and labour, for example. But farming systems that quickly adopt automation may strongly favour only those farmers wealthy enough to own expensive technology (since there is no strong equipment financing or credit scheme that smallholder farmers and cooperatives can benefit from), effectively eliminating the need for workers, and forcing poor farmers out of the system. Technology development to support women farmers, farm workers and labourers is essential, however, this could include devices to save drudgery, innovations in the preservation of water and biodiversity, easier food processing to save women’s time, or safe transport for women to be able to sell their produce. However most technological innovations are gender-blind, at best only benefiting men, or at worst threatening communities.

2.0 National Determined Contributions (NDC) and Relevant Agriculture, Land Use, and Land Use Change and Forestry Policies

a. **Updated NDC**

Nigeria's updated Nationally Determined Contribution (NDC) in 2021 focuses on sustainable agricultural practices as a key component of its climate action strategy. This includes implementing climate-smart agriculture, sustainable land management, agroforestry, and the use of improved crop varieties to improve productivity, resilience, and reduce greenhouse gas emissions. From an environmental perspective, the NDC aims to enhance sustainable land use and forest management reduction in deforestation and land degradation, crucial for biodiversity conservation and ecosystem services. Socially, the emphasis is on improving rural livelihoods and food security, recognizing the critical role of agriculture in sustaining communities. Economically, the focus is on boosting agricultural productivity and resilience against climate impacts, which is vital for the nation's economy. The NDC highlights the importance of gender considerations, acknowledging the significant role women play in agriculture and the necessity of their inclusion in climate action strategies.

2.1 Agriculture and LULUCF Policies in Nigeria

The term "Just Transition" is not explicitly mentioned in the key agricultural and forestry policies in Nigeria from 2006 to 2023. However, the principles underlying these policies do align with some aspects of the Just Transition movement, which emphasize a fair and equitable shift towards sustainable and environmentally friendly practices. Some of these policies are highlighted below.

b. Agricultural Promotion Policy (APP) 2016-2020[18]

This policy built on the successes of the Agricultural Transformation Agenda (ATA), which was in place from 2011-2015. The APP aimed to address key agricultural gaps, focusing on improving productivity, enhancing food quality standards, and increasing agricultural exports. It prioritized crops such as rice, wheat, maize, fish, dairy milk, soya beans, poultry, horticulture, sugar for domestic focus, and cowpeas, cocoa, cashew, cassava, ginger, sesame, oil palm, yams, beef, and cotton for export markets. The policy also emphasized the need for investments in infrastructure, improved distribution systems for fresh foods, rigorous food quality standards, and collaboration with stakeholders to create a sustainable agribusiness ecosystem.

c. Anchor Borrowers Programme (ABP) 2015

[18] http://fmard.gov.ng/publications/downloads/green-alternative/

Launched in November 2015, the ABP was aimed at providing farmers with agricultural inputs in cash and kind and linking them with off-takers for their products. Despite some successes, particularly in rice production, the program faced challenges such as high default rates in loan repayments and limited impact on wheat production. The program registered about 4.2 million farmers, but its focus on increasing the number of smallholder farmers rather than expanding farm sizes led to limited growth and income generation in rural economies. The ABP, designed to provide agricultural inputs to farmers and link them with off-takers, aligns with Just Transition principles by aiming to enhance rural economies and livelihoods. However, its focus on smallholder farmers and the challenges it faced, such as high default rates, indicate a need for more comprehensive strategies to ensure equitable and sustainable agricultural development.

d. Presidential Fertilizer Initiative

This initiative aimed to make NPK fertilizer accessible and affordable by resuscitating fertilizer blending plants and producing one million metric tons annually. Despite initial successes, disruptions in the global supply chain, particularly due to the Russia-Ukraine war, impacted its effectiveness. This initiative's goal of making NPK fertilizer accessible and affordable aligns with sustainable agriculture practices. However, the disruptions due to global supply chain issues highlight the need for resilience and sustainability in agricultural supply chains, a key aspect of Just Transition.

e. National Agricultural Technology and Innovation Policy (NATIP) 2021-2025:

Following the expiration of the APP, the Federal Government introduced NATIP, focusing on an integrated approach to agricultural development. This policy aims to improve access and application of improved inputs, enhance linkage between agricultural research and training institutions, and address issues like mechanization, extension services, rural infrastructure, climate change management, and sustainable agriculture. NATIP's integrated approach to agricultural development, focusing on improved inputs, mechanization, and sustainable practices, reflects Just Transition principles. It addresses climate change management and sustainable agriculture, crucial aspects of an equitable transition.

f. National Livestock Transformation Plan (NLTP)

Developed to address conflicts between farmers and herders, NLTP focuses on improving livestock farming through ranching, educating pastoralists, and supporting livestock management. The NLTP's focus on improving livestock farming through sustainable practices like ranching and supporting livestock management also aligns with the Just Transition's emphasis on sustainable and equitable development.

g. National Policy on the Environment (Revised 2016)[19]

[19] http://www.environment.gov.ng/publications/REVISED-NATIONAL-POLICY-ON-THE-ENVIRONMENT-FINAL-DRAFT.pdf

The goal of this policy was to "*ensure environmental protection and the conservation of natural resources for sustainable development"*. The strategic target of the policy is to coordinate environmental protection and natural resource conservation for sustainable development.

h. National Economic Empowerment and Development Strategy (NEEDS).

This policy was initiated in 1999 by former President Olusegun Obasanjo. The key elements of this development strategy included poverty eradication, employment generation, wealth creation and value reorientation. The policy offered farmers improved irrigation, machinery, and crop varieties (smart Agriculture) with the aim to boost agricultural productivity and tackle poverty.

i. **National Forest Policy**[20]

Nigeria has taken significant steps in developing and implementing forestry policies, particularly in recent years, to address the challenges of deforestation and promote sustainable forest management. The National Forest Policy of 2006 was a key document in this regard. Its primary objective was to achieve sustainable forest management, ensuring sustainable increases in the economic, social, and environmental benefits from forests and trees for both present and future generations, including the poor and vulnerable groups. The policy included a comprehensive set of objectives and strategies, covering areas such as increasing the national forest estate, promoting private sector involvement in forestry development, biodiversity conservation, and addressing issues like rural poverty, land and tree tenure, and conflict resolution.

In 2022, Nigeria launched a revised National Forest Policy to address contemporary environmental issues like climate change and increased population pressure on forests and their resources. The revised policy focused on strategies for growing the forestry sector and addressing emerging environmental issues. It emphasized sustainable management of forest ecosystems, socio-economic growth, environmental sustainability, and provision of goods and services for both domestic purposes and export. The policy also reiterated the commitment to sustainable forest management, poverty eradication, food security, and climate change mitigation and adaptation.

The policy targets to achieve sustainable forest management that would ensure sustainable increases in the economic, social, and environmental benefits from forests and trees for the present and future generations including the poor and the vulnerable groups.

j. National Conservation Strategy (NCS)[21]

The NCS was introduced to ensure a strategic approach to address environmental and natural resources issues to guarantee sustainable benefits to the larger populace. The policy was introduced to manage the ecosystems in a sustainable manner. The strategy focused on the main biological resources such as vegetation and forage, water, marine and fisheries, wild animals, and soil.

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[20] http://www.fao.org/forestry/15148-0c4acebeb8e7e45af360ec63fcc4c1678.pdf

[21] Federal Department of Forestry (1986) *National Conservation Strategy*.

k. National Biodiversity Strategy and Action Plan (NBSAP)[22]

This policy is intended to conserve and enhance the sustainable use of the nation's biodiversity resources and to integrate biodiversity-planning considerations into national policy and decision making and the Green Agenda of Nigeria's Vision 2010.

2.2 Identification of Policies to be tracked

This section serves as a critical foundation for the overall assessment process. In this part, we methodically pinpoint the specific agricultural policies that warrant close monitoring and evaluation. This process involves a detailed examination of various policy frameworks, directives, and initiatives that have been implemented or are in the pipeline. The focus is on identifying those policies that have significant potential impacts on the environmental, economic, and social landscapes of the agricultural sector. The chosen policies are those which, based on preliminary analysis, are likely to influence key areas such as climate change mitigation, air quality, water usage, land use, waste management, energy consumption, an socio-economic factors including labor, poverty, gender equality, and economic growth. This identification process is not only crucial for setting the scope of our assessment but also for ensuring that the subsequent tracking and evaluation are targeted, relevant, and impactful.

[22] https://www.cbd.int/doc/world/ng/ng-nbsap-01-en.doc

Table 1: preliminary analysis of policies to be tracked

Agriculture & Forestry policies	Environmental Impacts:	Social Impacts:	Economic Impacts:
National Forest Policy 2020. **Policy Summary** The National Forest Policy is a crucial framework implemented by the Nigerian government to address the sustainable management of its forest resources. This policy is designed to strike a balance between the conservation of the country's diverse forest ecosystems and the utilization of forest resources for economic development and livelihood improvement. It provides a strategic roadmap for guiding forest-related activities and ensuring that Nigeria's valuable forests are protected, regenerated, and utilized in a manner that is both environmentally and socially responsible. Objective Extreme poverty for all forest-dependent people is eradicated Increase the access of small-scale forest enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets The contribution of forests and trees to food security is significantly increased The contribution of forest industry, other forest-based enterprises and forest ecosystem services to social, economic and environmental development, among other things, is significantly increased The contribution of all types of forests to biodiversity conservation and climate change mitigation and adaptation is enhanced, taking into account the mandates and ongoing work of relevant conventions and instruments	Biodiversity Conservation: Sustainable forest management helps protect and conserve biodiversity, preserving rare and endangered species and their habitats. Climate Change Mitigation: Forests act as carbon sinks, and their conservation and sustainable management contribute to climate change mitigation by reducing greenhouse gas emissions. Erosion Control: Forests provide critical erosion control, preventing soil degradation and maintaining water quality. Illegal Logging: Despite the policy, illegal logging remains a challenge, contributing to deforestation and environmental degradation.	Community Livelihoods: Sustainable forest management recognizes the rights and contributions of local communities to forest conservation and utilization. It can improve their livelihoods by providing income opportunities from forest products and community-based forest management. Cultural Preservation: Protecting forests helps safeguard the cultural heritage and traditions of indigenous and local communities that rely on forests for their way of life. Health Benefits: Forests play a crucial role in maintaining clean air and water, contributing to improved public health and well-being. Land Use Conflicts: Striking a balance between conservation and utilization can lead to conflicts, especially when communities have competing interests in forest resources.	The main challenge of this policy is its inability to balance sustainable forest management and economic development, especially as a number of economic development activities – agriculture, infrastructure etc – are major drivers of deforestation. The imperative for focusing on trade-offs that would guarantee a win-win for both sustainable forest management and economic development is paramount. Sustainable Resource Harvesting: The policy promotes sustainable logging practices, ensuring that the timber and non-timber forest products are harvested at a rate that allows for regeneration. This supports a continuous supply of forest resources for industries like timber, furniture, and crafts, contributing to economic growth. Employment Generation: Sustainable forest management practices create job opportunities in both the formal and informal sectors, particularly in rural areas where forests are located. This can reduce unemployment rates and improve livelihoods. Eco-tourism Potential: Preserving forests as natural habitats can attract

			eco-tourism, bringing in revenue from tourists interested in experiencing the country's rich biodiversity and contributing to the tourism industry. Short-Term Economic Loss: Implementing sustainable practices may initially reduce the rate of resource extraction, potentially leading to short-term economic losses for the timber industry and associated sectors.
National Agricultural Technology and Innovation Policy (NATIP) 2022-2027 **Policy Summary** The National Agricultural Technology and Innovation Policy (NATIP 2022-2027) is a crucial framework aimed at driving advancements and improvements in the agricultural sector of a country. This policy is designed to promote technological innovation and sustainable practices within the agricultural industry, with the overarching goal of enhancing food security, increasing agricultural productivity, and improving the livelihoods of farmers.	Sustainable Practices: NATIP emphasizes sustainable agricultural practices, reducing soil erosion, pollution, and resource depletion. Climate Resilience: Adoption of eco-friendly technologies and practices to increase crop resilience to climate change. Biodiversity Conservation: Promoting sustainable practices contributing to the conservation of biodiversity in agricultural landscapes. Unintended Consequences: Rapid technology adoption leading to unforeseen environmental risks, such as overuse of pesticides and monoculture practices. Dependency on Technology: An overreliance on technology may make agriculture vulnerable to	Rural Employment: NATIP can generate employment opportunities in rural areas through the promotion of advanced farming techniques and value addition in the agricultural supply chain. Improved Living Standards: Increased agricultural income can lead to improved living standards and reduced poverty in rural communities. Skill Development: The policy encourages skill development among farmers, empowering them with knowledge and training. Social Disruption: The transition to modern agriculture may disrupt traditional farming communities, potentially causing social challenges.	Increased Productivity: NATIP promotes the adoption of advanced agricultural technologies, leading to higher crop yields and enhanced agricultural output. Economic Growth: Improved productivity can stimulate economic growth by increasing the agricultural sector's contribution to the GDP. Trade Balance: Reduced food imports due to increased domestic production can improve the trade balance, potentially saving foreign exchange reserves. Income Inequality: There's a risk of exacerbating income inequality as access to modern technology may be limited to larger, wealthier farmers. Job Displacement: The shift towards mechanized farming may lead to job

	technological failures or cybersecurity threats.	Technology Access Gap: Smaller, resource-poor farmers may face challenges accessing and affording modern technology.	displacement among traditional agricultural laborers.
National Dairy Policy **Policy Summary** Provides incentives for backward integration in the milk collection, aggregation and processing (Dairy) through investment in cold chain services, efficient transportation and access to finance.	Resource Efficiency: Efficient transportation and cold chain services to reduce spoilage and waste, optimizing resource use and reducing environmental impact. Sustainability: The policy will promote sustainable dairy farming practices that minimize the environmental footprint of the sector. Energy Consumption: Increased mechanization and cooling systems in dairy processing will lead to higher energy consumption, potentially contributing to greenhouse gas emissions if not managed sustainably. Land Use: Expanding dairy operations may result in land use changes, potentially affecting local ecosystems and biodiversity.	Rural Development: Increased dairy production and processing stimulating rural development, as dairy farming is often a source of livelihood in rural areas. Empowerment of Dairy Farmers: Small-scale dairy farmers to benefit from improved milk collection systems and access to finance, which can empower them economically. Nutrition: Increased dairy production can have positive effects on nutrition, providing a reliable source of essential nutrients to the population. Inclusivity: Ensuring that the benefits reach smallholder farmers and marginalized communities is essential to avoid exacerbating existing social inequalities.	Increased Dairy Production: Encouraging backward integration leading to higher milk production, benefiting both small-scale and commercial dairy farmers. Job Creation: Investment in cold chain services and transportation to create employment opportunities in logistics, dairy processing, and related sectors. Value Addition: Efficient collection and processing leading to the development of a wider range of dairy products, increasing their value and profitability. Access to Finance: Improved access to finance to facilitate investment in modern dairy infrastructure and technology, boosting the sector's competitiveness. Initial Costs: While the policy aims to enhance efficiency, the initial investments in cold chain infrastructure and transportation may be costly and require financial support.
National Livestock Transformation Plan	Sustainable Practices: The plan promotes sustainable livestock	Rural Development: The plan can stimulate rural development	Increased Livestock Production: The plan aims to boost livestock

Policy Summary The National Livestock Transformation Plan (2019-2028) is a comprehensive agricultural initiative implemented by the government of a country, aimed at transforming and modernizing the livestock sector. This ambitious plan seeks to address various challenges within the livestock industry while harnessing its potential for economic growth, social development, and environmental sustainability. The primary objectives of the National Livestock Transformation Plan are to: Enhance Livestock Productivity: Increase livestock production and productivity through the adoption of advanced farming practices and technologies, ultimately boosting income for livestock farmers. Improve Livestock Value Chains: Strengthen the entire livestock value chain, from production and processing to marketing and distribution, to create more opportunities for employment and income generation. Ensure Food Security: Contribute to food security by providing a stable source of animal protein and other livestock-derived products for the country's population. Promote Sustainable Practices: Encourage sustainable livestock farming practices that minimize the environmental footprint of the sector, including efficient resource use and waste management. Foster Rural Development: Stimulate rural development by providing livelihood opportunities in livestock farming and related industries, reducing rural-urban migration.	farming practices, including pasture management and waste disposal, which can reduce environmental degradation. Biodiversity Conservation: Properly managed livestock operations can coexist with and support biodiversity conservation efforts. Carbon Sequestration: Sustainable livestock farming can contribute to carbon sequestration through improved land management practices. Resource Degradation: Unsustainable livestock farming practices can lead to soil erosion, water pollution, and habitat destruction. Greenhouse Gas Emissions: The livestock sector significantly contributes to greenhouse gas emissions, primarily through methane production from enteric fermentation.	by providing livelihood opportunities for communities involved in livestock farming. Skill Development: It encourages skill development among livestock farmers, improving their ability to manage livestock effectively. Food Security: Increased livestock production can contribute to food security by providing a stable source of animal protein. Land Use Conflicts: Competition for land between livestock farming and other land uses can lead to conflicts, especially in densely populated regions. Environmental Displacement: Expansion of livestock farming may displace local communities, affecting their traditional way of life.	production, which can contribute to higher agricultural GDP and increased income for livestock farmers. Export Potential: Improved livestock farming practices can enhance the export potential of livestock and related products, leading to foreign exchange earnings. Job Creation: The plan can generate employment opportunities in the livestock sector, including meat processing, dairy production, and veterinary services. Resource Competition: Intensified livestock farming may compete with other agricultural sectors for resources like land and water, potentially leading to resource scarcity. Market Access: Access to international markets may be challenging due to strict regulations and sanitary standards for livestock products.

Build Capacity and Skills: Invest in the training and capacity building of livestock farmers and professionals to improve their management practices and efficiency. Enhance Export Potential: Enable livestock products to meet international quality standards, opening up opportunities for export and increasing foreign exchange earnings.			

2.2 Identifying Effects and Mapping the Casual Chain

2.2.1 Stakeholders' Main Concerns

In the development of indicators to monitor Nigeria's transition towards a just and gender-inclusive society, as outlined in policies like the NDC, National Forestry Policy and NATIP, a wide range of stakeholders were engaged. This diverse group included government bodies, NGOs, private sector players, community representatives, and advocates for gender equity and marginalized groups (57 stakeholder was engaged). The aim of these consultations was to gather a variety of perspectives to ensure the indicators accurately reflect critical concerns, particularly those revolving around environmental sustainability, social equity, economic viability, and inclusion of marginalized groups like women and rural communities. Questions about policy objectives, operationalization (economic, social and environmental), full impact on the sector based on the set objectives, what could go wrong if the policies were poorly implemented etc.

The process of stakeholder mapping and engaging vulnerable groups in the assessment was a key component of our approach. We identified and categorized various groups that were either directly or indirectly impacted by these policies. This included farmers, women, youth, indigenous communities, and other marginalized groups. The mapping process involved understanding their unique roles, interests, and the potential impacts of policies on their livelihoods and well-being.

Several tailored strategies were employed to ensure meaningful engagement of these vulnerable groups. Firstly, we facilitated inclusive and accessible consultation sessions, ensuring that these were held in locations and languages accessible to the stakeholders. Special attention was given to creating a safe and welcoming environment where participants felt comfortable voicing their opinions.

Secondly, we employed participatory approaches in these sessions, where stakeholders were not just passive recipients of information but actively contributed to the discussions. This approach allowed them to express their concerns, aspirations, and suggestions regarding agricultural policies. Furthermore, we used a variety of communication channels and tools to ensure that all groups, irrespective of their literacy level or access to technology, could participate effectively.

We also ensured that the assessment report genuinely reflected the feedback and insights gathered from these engagements. This involved not just listing their concerns but also incorporating their perspectives into the formulation of recommendations.

These stakeholders contributed a wealth of concerns and insights, emphasizing the need for indicators that are comprehensive, covering environmental, social, economic, and gender aspects, and sensitive to the realities of measurability, relevance, and local context. The core focus was on ensuring that these metrics authentically represent the diverse experiences and voices, especially of marginalized groups. Through active engagement, which included

one-on-one meetings, a collaborative process unfolded. This process led to the initial drafting of indicators using the ICAT Sustainable Development Assessment Guide, which were then continually refined and shaped by the collective input of the stakeholders. The result is a set of indicators that effectively represent the diverse interests and priorities within Nigeria's agricultural sector and align with its broader climate action goals.

Table 2: Impact Categories to be Assessed: Environmental, Economic, Social, and Gender

Dimension	Group of impacts	Impact categories
Environmental impact	Air	• Climate change mitigation (SDG 13) • Air quality and health impacts of air pollution
	Land	• Biodiversity of terrestrial ecosystems (SDG 15) • Land-use change, including deforestation, forest degradation and desertification (SDG 15) • Soil quality (SDG 2)
	Other/crosscutting	• Resilience of ecosystems to climate change (SDG 13) • Adverse effects of climate change (SDG 13) • Energy (SDG 7) • Depletion of non-renewable resources (SDG 12) • Genetic diversity and fair use of genetic resources (SDGs 2, 15) • Loss of ecosystem services from air pollution • Aesthetic impacts
Social impacts	Health and well-being	• Hunger, nutrition and food security (SDG 2) • Access to safe drinking water (SDG 6) • Access to adequate sanitation (SDG 6) • Access to clean, reliable and affordable energy (SDG 7) • Access to land (SDG 2) • Standard of living • Quality of life and well-being (SDG 3)
	Education and culture	• Accessibility and quality of education (SDG 4) • Capacity, skills and knowledge development (SDGs 4, 12) • Climate change education, public awareness, capacity-building and research • Preservation of local and indigenous culture and heritage (SDG 11)

	Institutions and laws	• Quality of institutions (SDG 10) • Corruption, bribery and rule of law (SDG 16) • Public participation in policymaking processes • Access to information and public awareness (SDG 12) • Compensation for victims of pollution • Access to administrative and judicial remedies (SDG 16) • Protection of environmental defenders • Freedom of expression
	Welfare and equality	• Poverty reduction (SDG 1) • Economic inequality (SDGs 8, 10) • Equality of opportunities and equality of outcomes (SDG 10) • Protection of poor and negatively affected communities (SDG 12) • Removal of social disparities • Climate justice and distribution of climate impacts on different groups • Gender equality and empowerment of women (SDG 5) • Racial equality • Indigenous rights • Youth participation and intergenerational equity • Income of small-scale food producers (SDG 2) • Migration and mobility of people (SDG 10)
	Labour conditions	• Labour rights (SDG 8) • Quality of jobs (SDG 8) • Fairness of wages (SDG 8) • Quality and safety of working conditions (SDG 8) • Freedom of association (SDG 8) • Just transition of the workforce (SDG 8) • Prevention of child exploitation and child labour (SDGs 8, 16) • Prevention of forced labour and human trafficking (SDG 8)
	Communities	• City and community climate resilience (SDG 11) • Community/rural development
	Peace and security	• Resilience to dangerous climate change and extreme weather events (SDG 13) • Security (SDG 16) • Maintaining global peace (resource conflict mitigation) (SDG 16)

Economic impacts	Overall economic activity	• Economic activity (SDG 8) • Economic productivity (SDGs 2, 8) • Economic diversification (SDG 8) • Decoupling economic growth from environmental degradation (SDG 8)
	Employment	• Jobs (SDG 8) • Wages (SDG 8) • Worker productivity
	Business and technology	• New business opportunities (SDG 8) • Growth of new sustainable industries (SDGs 7, 17) • Innovation (SDGs 8, 9) • Competitiveness of domestic industry in global markets • Agricultural productivity and sustainability (SDG 2) • Economic development from tourism and ecotourism (SDG 8) • Transportation supply chains
	Income, prices and costs	• Income (SDG 10) • Prices of goods and services • Costs and cost savings • Loss and damage associated with environmental impacts (SDG 11) • Cost of policy implementation and cost-effectiveness of policies
	Trade and balance of payments	• Balance of trade (imports and exports) • Foreign exchange • Government budget surplus/deficit • Energy independence, security or sovereignty • Global economic partnership

2.1.3 Selected impact categories from policy assessed

The section highlights the selected measurable indicators that effectively capture the progress and impact of Nigeria's agricultural policies. These indicators are chosen to provide clear insights based on relevance and significance into the environmental, social, and economic outcomes of the policies under review. Each category has been evaluated for its importance in reflecting the effects of these policies, ensuring that they are encompassed within the assessment boundary.

Table 3: Selected impact categories from policy assessed (NATIP and Forestry Policy)

Dimension	Impact category	Relevant?	Significant?	Included in the assessment boundary	Brief description
Environmental	Climate change mitigation	Yes	Yes	Yes	The policy is expected to reduce GHG emissions by adopting climate smart agricultural practices, and improved technology
	Air quality, health impacts of air pollution	Yes	Yes	Yes	The policy is expected to reduced practices like open burning, bush burning, increased renewable energy adoption
	Waste generation and disposal	Yes	Yes	Yes	The policy is expected to increase agricultural production leading to increased biomass waste
	Energy	Yes	Yes	Yes	The policy is expected to deliver small renewable energy solutions to power farm operation across the priority value chains
	Availability of fresh water	Yes	Yes	Yes	The policy is expected to increase all year-round production via provision of

					irrigation facilities. This is a priority for stakeholders
	Land-use change	Yes	Yes	Yes	Large scale agricultural production will trigger land use change, desertification, and deforestation.
	Genetic diversity and fair use of genetic resources	Yes	Yes	Yes	The policy is expected to introduce climate resilient crop varieties. Introduction of GMO's, focus on healthy local food sources stakeholder concerns
	Resilience of ecosystems to climate	Yes	Yes	Yes	Rural household that depends on this systems will be affected by the large
Social	Access to clean, affordable and reliable energy	Yes	Yes	Yes	The policy is expected to deliver small renewable energy solutions to power farm operation across the priority value chains.
	Quality and safety of working conditions	Yes	Yes	Yes	The policy is expected to improve working conditions by increasing the number of workers in the agricultural sector via strengthened value chains and reducing

					the number in the fossil fuel sector.
	Access to land	Yes	Yes	Yes	Increased access to productive agricultural lands
	Capacity, skills and knowledge development	Yes	Yes	Yes	The policy is expected to significantly improve training for both skilled and unskilled workers in in the sector.
	Access to safe drinking water	Yes	No	No	The focus is water for irrigation and not water for drinking
	Poverty	Yes	Yes	Yes	Increased agricultural income is expected lead to improved living standards and reduced poverty in rural communities.
	Gender equality	Yes	Yes	Yes	The policy is expected to lead to increased inclusion of women and youth, access and participation in the sector value chains
	Hunger, nutrition and food security	Yes	Yes	Yes	The policy is expected to significantly impact hunger, nutrition, and food security in the country. Diversify the economy through development in crop

					production, livestock, and fisheries sectors.
	Climate change education, public awareness, capacity-building and research	Yes	Yes	Yes	Expected to strengthen agricultural research and training systems critical for increasing productivity.
	Equality of opportunities and equality of outcomes	Yes	Yes	Yes	Expected to increase gender inclusion and equal opportunities for all stakeholders
	Mobility	Yes	Yes	No	This impact category is relevant to the assessment but not clear as one of the policy objectives but was expressed as a priority of stakeholders. Access infrastructures like roads, rails to make viable market.
Economic	Jobs	Yes	Yes	Yes	The policy is expected to create a significant number of new jobs in the subsectors.
	Income	Yes	Yes	Yes	The policy is expected to lead to significant increased income for households through improved livelihood, increased yield, and

					value chain development.
	Wages	Yes	Yes	No	The policy is expected to increase wages for skilled workers in the sector as demand for such skills will increase, but assessing wages is not relevant to the objectives and was not expressed as a priority by stakeholders
	New business opportunities	Yes	Yes	Yes	The policy is expected to create a significant number of new business opportunities in the agric value chains for production mechanization services, irrigation services, factory setup and maintenance service, marketing and export.
	Economic activity	No	No	No	The policy may affect these impact categories, but the impact is not expected to be significant. They are also not relevant to the assessment or policy objectives and
	Economic productivity	No	No	No	

					were not expressed as a priority of stakeholders.
	Prices of goods and services	Yes	Yes	Yes	Reduced food inflation
	Balance of payments	Yes	Yes	Yes	Increased export potential of the sector

2.1.4 Identified Relevant Indicators for Tracking Impacts

Table 4: Identified relevant indicators for tracking impacts

Impact category	Indicators
Environmental impacts	
Climate change mitigation (SDG 13)	• Net emissions of greenhouse gases (CO_2 , CH_4 , N_2 O, (t/year) and in carbon dioxide equivalent (CO_2e) using global warming potential • Net emissions of short-lived climate pollutants (SLCPs): black carbon, organic carbon, CO, NMVOCs, sulfates
Air quality and health impacts of air pollution (SDGs 3, 11, 12)	• Emissions of air pollutants such as particulate matter ($PM_{2.5}$, PM_{10}), ammonia, CO, SO_2 , NO_2 , fly ash and other toxic pollutants (t/year) • Concentration of air pollutants (mg/m^3) • Mortality (avoided premature deaths per year) • Number of people affected (by gender, age and region)
Availability of fresh water	• Water consumption (m^3) or total amount of water removed from freshwater sources for irrigation • Water-use efficiency or intensity • Household access to clean water

Land-use change, including deforestation, forest degradation and desertification (SDG 15)	• Annual change in degraded or desertified arable land (% or hectares) • Area of forested land as a percentage of original or potential forest cover • Proportion of land area covered by forests • Area of forest under sustainable forest management • Arable and permanent cropland area • Area under organic farming • Number of women with access to agricultural lands
Waste generation and disposal (SDG 12)	• Solid waste generated (t/year) • Recycling rate (percentage of waste recycled) • Proportion of materials reused • Proportion of waste composted • Waste generation per household
Energy (SDG 7)	• Energy consumption • Energy efficiency • Energy generated by source • Renewable energy generation for agricultural activities • Renewable energy share of total final energy consumption • Energy access (by gender, age and region)
Genetic diversity and fair use of genetic resources (SDGs 2, 15)	• Genetic diversity of seeds, plants and animals
Resilience of ecosystems to climate change and extreme weather events	• Number of LGA's, Farmer Organizations that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030 • Creation and maintenance of climate-resilient infrastructure • Reduction of natural disaster risks • Number of women affected/exposed
Social impacts	
Hunger, nutrition and food security (SDG 2)	• Prevalence rate of undernourished people • Average share of food expenditures in total household expenditures • Per capita total amount of net calories available in a given country • Level of nutrition or malnutrition

	• Agricultural crop diversity
Access to land (SDG 2)	• Percentage of population with access to land • Women with access to land
Standard of living	• Gross national income per capita by gender, age and region
Access to clean, reliable and affordable energy (SDG 7	• Percentage of population in the sector with access to clean, reliable and affordable energy for agricultural activities • Price of energy • Emissions per unit of energy in the sector • Number and length of service interruptions
Quality and safety of working conditions	• Number of fatal and non-fatal occupational injuries per 100,000 workers in the sector, by sex and age status • Number of person compliant with safety working recommendations relevant to the sector workers • Level of national and subnational compliance with labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation by sex and age status
Capacity, skills and knowledge development	• • Proportion of youth and adults with scientific, technological or other skills, by type of skill • Number of people who have received skill-based training. • Extent to which climate change education is mainstreamed in national education policies, curricula, teacher education and student assessment • Proportion of population aware of climate change • Number of people who have received climate change-related training
Poverty (SDG1)	• Poverty rate (proportion of the population living below the national poverty line in the sector) • Proportion of people living on less than $1.25 (SDGs), $1.90 (World Bank) or other amounts per day in the sector • Number of people living in poverty • Multidimensional poverty index
Gender equality and empowerment of women (SDG 5)	• Average income for women and men • Gender wage gap • Proportion or number of girls and women in schools

	• Proportion or number of women in tertiary education • Proportion or number of women in the labour force • Proportion or number of women in senior management positions • Proportion or number of women in senior government positions • Women's decision-making power within family/community • Women's ability to spend income earned
Mobility (SDG 11)	• Number of people or proportion of population with convenient access to employment, schools, health care or recreation, by gender, age and persons with disabilities
Economic impacts	
Jobs (SDG 8)	• Number of people employed • Number of people unemployed • Employment rate • Unemployment rate • Number of jobs in the sector, including short-term jobs and long-term jobs, across the value chains • Number of new jobs created across the value chain
Wages (SDG 8)	• Average hourly wage (in the agriculture sector and subsectors) • Average hourly wage for different groups (by gender, income, etc.)
New business opportunities (SDG 8)	• Number of new companies • Revenue and profit • Amount of new investment • Number of active long-term partnerships
Income (SDG 10)	• • Income per capita • Median household income • Annual growth in household income in the sector
Balance of trade	• Total exports from the sector
Economic activity (SDG 8)	• GDP, State/LGA GDP • Gross national income, Annual growth rate of real GDP per capita

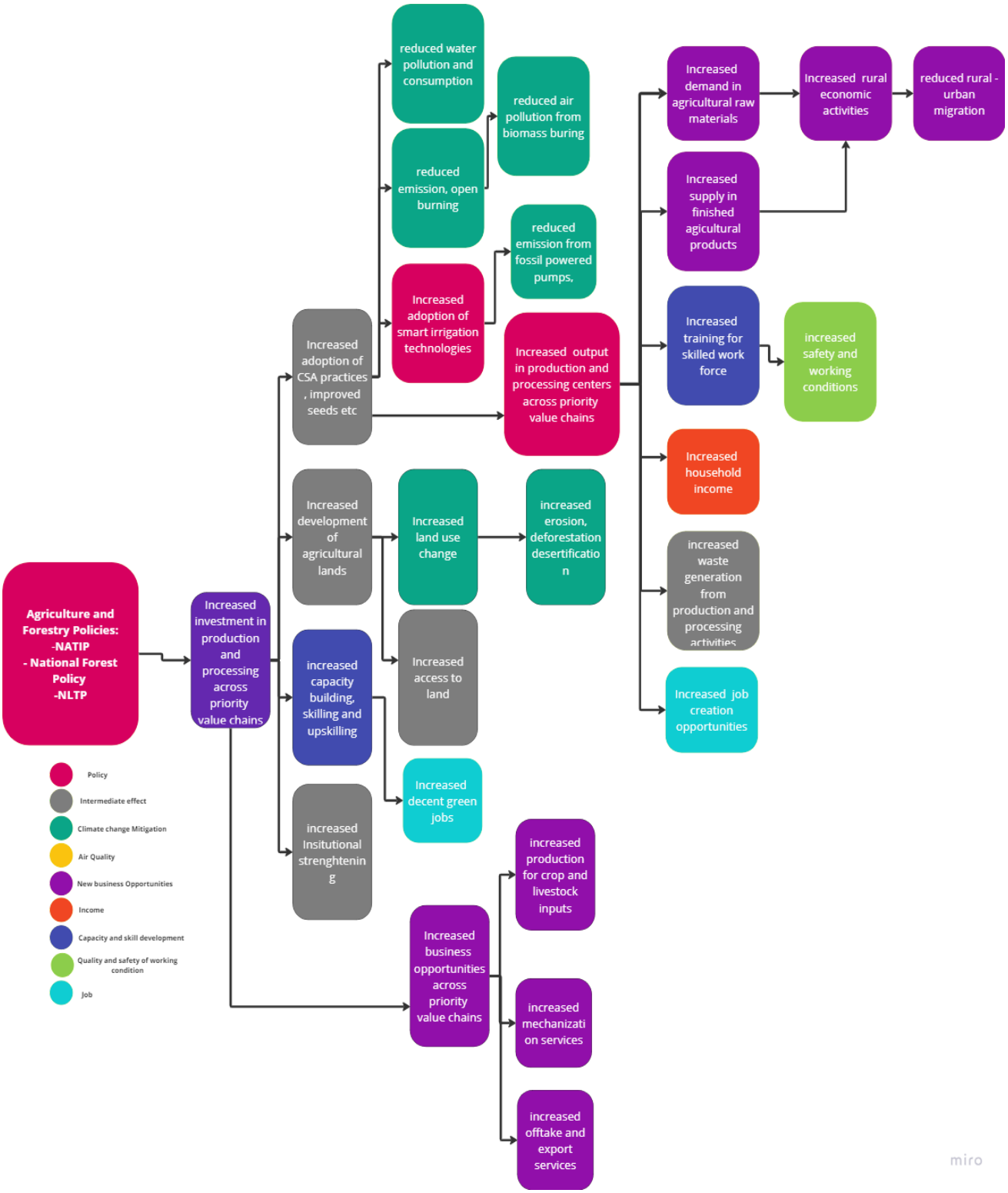

Figure 1: Chain Analysis (Source: Field Research, 2023)

Note: This casual chain includes all impact categories included in the assessment but does not include all identified specific impacts within each impact category.

2.2 Evaluation of Impact Assessment Approaches and Selection of Best Approach

2.2.1 Brief description of historic and or possible models, methods, analyses and projections for Nigeria

In Nigeria's journey towards a sustainable and equitable future, several models and methodologies are pivotal in guiding Just Gender Inclusive Transition (JGIT) planning and implementation. These models, developed both internationally and tailored to Nigeria's specific context, offer comprehensive insights into the interplay between green policies, employment, energy systems, and socio-economic dynamics.

The International Labour Organization (ILO) has contributed two significant contributions. Firstly, the Green Jobs Assessment Model (GJAM) stands out for its integrated approach, combining environmental and socio-economic factors. It examines the effects of green policies on various sectors, including energy, agriculture, industry, and transportation. It delves into their impacts on economic output, employment, income distribution, poverty, and environmental outcomes like carbon emissions and natural resource use. This model is essential for understanding green policies' direct and indirect effects on Nigeria's economy and labour market.

Secondly, the ILO's Just Transition Finance Tool is designed to navigate the financial aspects of transitioning to a sustainable economy. This tool focuses on the social impact of investments, evaluating aspects like job security, wages, health and safety, and workers' rights. It aids in aligning financial decisions with the principles of a just transition, ensuring that the transition is both environmentally sustainable and socially responsible.

The Place-based Climate Action Network (PCAN) has developed the Just Transition Jobs Tracker. This innovative tool estimates future job landscape changes due to the green transition. It's grounded in the philosophy of 'just transition' and provides a detailed, location-specific understanding of the impact of green jobs, identifying regions where opportunities and challenges are most pronounced. This approach is crucial for ensuring the equitable distribution of green job benefits and mitigating potential downsides like job losses in carbon-intensive sectors.

Nigeria's specific tools include the Nigeria Energy Calculator 2050 (NECAL 2050) and the Nigeria Energy Transition Plan (NETP). NECAL 2050, adapted from the UK's model, allows exploration of different low-carbon pathways for Nigeria's energy future. It integrates various variables like energy demand and supply, technology costs, and socio-economic factors, proving invaluable for evidence-based energy planning and policymaking.

The NETP, underpinned by a blend of models such as the LEAP, MESSAGE, GAINS, MACRO, and EPPA models, creates a detailed analysis of Nigeria's energy landscape and potential sustainable pathways. These models collectively evaluate energy systems, environmental impacts, and macroeconomic implications, including job dynamics and welfare changes, essential for a just and inclusive transition.

In essence, these models and methodologies are not just tools for analysis; they are guides for action, enabling Nigeria to navigate its transition to a green economy thoughtfully, inclusively, and sustainably. They provide a multi-dimensional understanding necessary for policy decisions, ensuring that Nigeria's journey towards a green future is aligned with global sustainability goals and the principles of social justice.

2.2.2 Selection and elaboration of why the selected approach is preferred

The assessment approach/methodology adopted for this phase was primarily qualitative, offering an in-depth exploration of nuanced impacts and stakeholder perspectives. However, the subsequent integration of a quantitative approach was strongly recommended by our team to complement and substantiate the qualitative findings with empirical data.

A causal chain analysis was also adopted because its efficacy to untangle and articulate the intricate web of factors that constitute agricultural systems. This methodology excels in breaking down complex interactions and dependencies prevalent in agriculture, a sector characterized by a diverse interplay of environmental, economic, and social elements. A key strength of the causal chain approach lies in its capacity to differentiate and evaluate both the direct and indirect effects of agricultural policies. This distinction is crucial, as it acknowledges the immediate, observable changes in agricultural practices (direct effects), as well as the more subtle, long-term socioeconomic shifts that policies can instigate in rural communities (indirect effects). The approach also served as a platform for engaging a broad spectrum of stakeholders. The engagement process was multi-faceted, incorporating consultative short meeting, interviews, and focus groups to gather diverse insights. Special emphasis was placed on making these engagements accessible and meaningful, especially for marginalized participants. This inclusivity was vital, ensuring that every contribution was valued and reflected in the analysis.

Continuous feedback and transparent communication was key, allowing stakeholders to see the impact of their input and to remain engaged throughout the process. Efforts to balance representation and be mindful of power dynamics ensured that no voice was overshadowed. As the analysis culminates, it lead to actionable insights, with a clear accountability mechanism for stakeholders to follow through on the findings. It was observed that by visualizing the potential impacts of policies, it fostered a dialogical space where farmers, consumers, environmental advocates, and other stakeholders contributed their perspectives, ensuring a more holistic and inclusive policymaking process.

3.0 Development and implementation of impact assessment methodology

In the comprehensive assessment spanning from 2020 to 2030, the scope of our qualitative evaluation extended nationally, focusing specifically on the sectors of agriculture and forestry. This period was chosen for its significance in capturing the evolving impacts of relevant policies over a crucial decade for environmental and socio-economic change.

The methodology adopted for this phase was primarily qualitative, offering an in-depth exploration of nuanced impacts and stakeholder perspectives. However, our team strongly recommended integrating a quantitative approach to complement and substantiate the qualitative findings with empirical data.

3.1 Implementation of selected tracking methodology for Agriculture and LULUCF sector of identified policies

In the assessment, a wide array of impact categories was carefully chosen, encompassing environmental, social, and economic dimensions crucial for the agriculture and forestry sectors.

From an environmental perspective, the assessment delved into the efficacy of the selected policies in climate change mitigation, particularly their role in reducing greenhouse gas emissions. It also examined the effects of agricultural practices on air quality and the consequent health impacts of air pollution. The generation and disposal of waste within these sectors were analyzed to understand patterns and impacts. Energy use was scrutinized to comprehend the energy footprint of the agricultural and forestry practices. Moreover, the assessment encompassed the availability of fresh water and land-use change, essential in understanding the sustainability of these sectors. The preservation of genetic diversity and the resilience of ecosystems to climate variability were also key areas of focus.

The social impacts of policies were equally scrutinized. This included an exploration of equitable access to essential resources like land and safe drinking water, as well as clean energy and safe work environments. The enhancement of educational and skill-building opportunities was assessed, focusing on capacity, skills, and knowledge development. Critical socio-economic factors like poverty, gender equality, hunger, nutrition, and food security were evaluated to understand the broader social implications of these policies. The effectiveness of educational initiatives in raising awareness and building capacity in climate change education and public awareness was another vital area of inquiry.

On the economic front, the assessment investigated the effects of policies on employment, income levels, wages, and the emergence of new business opportunities. It evaluated how these policies influenced overall economic health, productivity, and consumer prices. Additionally, the impact on the national economic balance, particularly the balance of payments, was considered to understand the broader economic implications of the agricultural and forestry policies.

While the comprehensive approach in selecting impact categories allowed for a holistic understanding of the implications of agriculture and forestry policies, a significant limitation in the assessment process was the lack of data availability and established methodologies for some categories. For intricate aspects like genetic diversity, resilience of ecosystems, and certain socio-economic impacts like poverty and gender equality, obtaining reliable and up-to-date data was challenging. The complexity and breadth of these categories often required specialized data collection methods and analysis tools, which were not always readily accessible or standardized. This limitation in data availability and methodology posed constraints on the depth and accuracy of the assessment in these specific areas, impacting the overall ability to draw conclusive insights.

3.1.1 Define Assessment and Boundary

Table 5: Define Assessment and Boundary

Impact category	Assessment boundary			
	Specific impact identified	**Feasible to quantify?**	**Included in the quantitative assessment boundary**	**Justification for exclusions or other comments**
Climate change mitigation	Reduced emission from rice fields	Yes	Yes	Included
	Reduced emission from improved soil management	No	No	No reliable data available
	Reduced emission from improved fertilizer management	Yes	Yes	No reliable data available
	Reduced emission from improved feed and manure management	Yes	No	No reliable data available
	Increased emission from deforestation and land development	Yes	Yes	Included
	Increased soil erosion	Yes	Yes	Included
	Increased biodiversity loss	Yes	Yes	Included
Air quality, health impacts of air pollution	Reduced pollution from open burning and biomass burning	Yes	Yes	Included
	Reduced pollution from water contamination	Yes	Yes	Included
	Reduced air pollution from fossil fuel generators (water pumps and mills)	Yes	No	Impact not significant
	Increased air pollution from increased production of goods	-	No	Impact not significant

	and services due to increased income and economic activities			
Waste generation and disposal	Increased waste generation from increased production and processing activities	Yes	No	No reliable data/methods available
Access to clean, affordable and reliable energy	Increase access to smart renewable irrigation solution	Yes	No	No reliable data/methods available
Quality and safety of working conditions	Increased safety and working conditions in production and processing activities	Yes	Yes	to be tracked be Institute of safety Professional of Nigeria
Capacity, skills and knowledge development	Increase in training for skilled workers in both production and processing activities	Yes	Yes	Included
Gender equality	Increased number of women and youth participation in decision making	Yes	Yes	Included
Climate change education, public awareness, capacity-buildin g and research	Increased number of people with climate change education	Yes	Yes	Included
Jobs	Increased job agriculture field production sector	Yes	Yes	Included
	Increased job processing value chain	Yes	Yes	included
	Increased job in input manufacturing (chemicals, tools, seed etc.)	Yes	Yes	Included
Income	Increased income of households, institutions and other organizations due to increased productivity in the sector	Yes	Yes	Included
Increased business opportunities	Increased business opportunities for farm mechanization services	-	No	Impact not significant
	Increased business opportunities for farm input manufacturing	No	No	Impact not significant

	Increased business opportunities in product transportation	No	No	Impact no significant

3.1.2 Identification of Data Collection Needs

In addressing the data collection needs for the assessment report, a multifaceted approach is proposed to overcome the challenges encountered. The first step involves enhancing the data infrastructure. This includes improving internet connectivity and access to technological tools in rural and remote areas, which are crucial for efficient data gathering. Additionally, allocating adequate resources, including funding and skilled personnel, is essential to bolster the data collection and analysis process. This approach will help bridge the resource gap that often leads to inconsistencies in data quality and availability. It is vital to establish standardized protocols for data collection across different regions in the sector. This standardization will ensure consistency and reliability in the data gathered, making it easier to aggregate at a national level and compare over time. To address the issue of data accessibility, streamlined and transparent data platforms should be established to facilitate easier access to existing data. This will require cooperation and coordination among various governmental and non-governmental entities.

Also, considering the significant role of the informal sector in Nigeria's agricultural activities, efforts should be made to integrate this sector into the official data landscape . This informality, coupled with the prevalence of small-scale operations and varying levels of education among stakeholders, posed significant obstacles to collecting reliable data. The lack of commercial-scale operators who could respond effectively to data collection efforts further complicated the process. This integration can be achieved through targeted surveys and studies that capture the nuances of informal agricultural practices. Overcoming cultural and linguistic barriers in stakeholder engagement is crucial. This can be accomplished by employing localized approaches to data collection, which involve working closely with community leaders and utilizing local languages and cultural practices.

3.1.2 Estimation of Baseline Values

This segment is dedicated to establishing the initial conditions against which any changes or impacts resulting from the implementation of these policies can be measured. The process of estimating baseline values involves a detailed analysis of current data and trends in key areas affected by the policies.

Table 6: Description of Baseline and Policy Scenarios for agriculture and forestry policies (2020-2030)

Impact categories	Specific impacts identified	Indicators	Baseline National	Policy scenario 2020-2030
Environmental Dimension				
Climate change mitigation	Reduced emission from rice fields	Net emissions of greenhouse gases (CO_2 , CH_4 , N_2 O, (t/year) and in carbon dioxide equivalent (CO_2e) using global warming potential	Emission for agriculture and forestry sector 87 MtCO2e in 2018 105 kha of natural forest lost in 2022 69.7 Mt of CO_2 emissions[23], 3.7% of the forest lost every year.[24] Low adoption rate of climate smart practices in both crop and livestock sector[25], CSA adoption can increase where education, subsidy, credit, are available[26]	estimated that the NDC unconditional target equates to an emissions level of 304-331 MtCO2e (excl. LULUCF) in 2030 (17-27% above 2010 levels) and the conditional target equates to 201-264 MtCO2e (excl. LULUCF) in 2030 (1% above to 23% below 2010 levels)[27] Reduction in country wide GHG emissions by adopting climate smart agricultural practices, and improved technology by small and medium scale farmers
	Reduced emission from improved soil management			
	Reduced emission from improved fertilizer management			

[23] https://www.globalforestwatch.org/dashboards/country/NGA/?category=undefined

[24] https://www.green.earth/blog/deforestation-in-nigeria-causes-effects-and-solutions#:~:text=According%20to%20the%20United%20Nations,its%20forest%20lost%20every%20year.

[25] https://www.researchgate.net/publication/323319957_ANALYSIS_OF_FARMERS_ADOPTION_OF_CLIMATE_SMART_AGRICULTURAL_PRACTICES_IN_NORTHERN_NIGERIA

[26] https://cabiagbio.biomedcentral.com/articles/10.1186/s43170-023-00156-4

[27] https://climateactiontracker.org/countries/nigeria/targets/

	Reduced emission from improved feed and manure management	Number of livestock per category Net emissions of greenhouse gases (CO_2 , CH_4, (t/year) and in carbon dioxide equivalent (CO_2e) using global warming potential	Increased land clearing for commercial agriculture Increased wood logging Increased managed forest areas Increased biodiversity loss Over exploitation of natural resources 80 percent of Nigeria's biodiversity has been lost	Increased reduction practices like open burning, bush burning, increased renewable energy adoption for irrigation and postharvest practices Increased agricultural biomass waste Increased farmer herder crisis Reforestation plan that includes planting 25 million trees.[28] This will increase soil quality, decrease erosion and provide an important carbon sink, as tropical trees can sequester up to 22.6 kg carbon per year.
	Increased emission from deforestation and land development	Annual change in degraded or desertified arable land (% or hectares) Area of forested land as a percentage of original or potential forest cover Proportion of land area covered by forests Area of forest under sustainable forest management Arable and permanent cropland area		
	Increased soil erosion	Proportion of land that is degraded over total land area	soil erosion accounts for about 77% of land degradation and	Sustainable land management practices increased

[28] https://northafricapost.com/34224-nigeria-to-plant-25-million-trees-to-absorb-co%C2%B2-buhari-to-un.html

			threatens about 22% of arable land[29]	
	Increased biodiversity loss	Forest area as a proportion of total land area Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type Progress towards sustainable forest management		National Forest Policy was reviewed in 2019, with a new target to increase forest cover from 6% to 25% by 2030. Additionally, a focus towards nature-based solutions for mitigation, resilience and livelihoods.
Air quality, health impacts of air pollution	Reduced pollution from open burning and biomass burning	Net emissions of short-lived climate pollutants (SLCPs): black carbon, organic carbon, CO, NMVOCs, sulfates	Ambient air pollution attributable death rate per 1,000 population per year. Over 140,000 people die each year in Nigeria, predominantly in rural areas, as a result of outdoor air pollution, due to stroke, heart disease, lung cancer and chronic respiratory diseases. Significant use of traditional energy sources such as fuelwood, charcoal, agriculture residue and animal dung, and	83% reduction in black carbon emissions by 2030 compared to a business-as-usual scenario and reduce national methane emissions by 61%.[31]

[29] https://www.climatechangenews.com/2020/01/20/erosion-crisis-swallows-homes-livelihoods-nigeria/

[31] https://www.ccacoalition.org/projects/nigeria-national-planning-short-lived-climate-pollutants#:~:text=The%20full%20implementation%20of%20the,national%20methane%20emissions%20by%2061%25.

			exposure to high sulphur content from black carbon pollutants[30]	
	Reduced pollution from water contamination	Emissions of air pollutants such as particulate matter ($PM_{2.5}$, PM_{10}), ammonia, CO, SO_2 , NO_2 , fly ash and other toxic pollutants (t/year) Concentration of air pollutants (mg/m^3) Mortality (avoided premature deaths per year)		
	Reduced air pollution from fossil fuel generators (water pumps and mills)			
	Increased air pollution from increased production of goods and services due to increased income and economic activities			83% reduction in black carbon emissions by 2030 compared to a business-as-usual scenario and reduce national methane emissions by 61%.[32]
Waste generation and disposal	Increased waste generation from increased production and	Solid waste generated (t/year) Recycling rate (percentage of waste recycled)		increase agricultural production leading to increased biomass waste increase in number of waste to wealth programmes and

[30] https://www.climate-transparency.org/wp-content/uploads/2021/01/Nigeria-CT-2020.pdf

[32] https://www.ccacoalition.org/projects/nigeria-national-planning-short-lived-climate-pollutants#:~:text=The%20full%20implementation%20of%20the,national%20methane%20emissions%20by%2061%25.

	processing activities	Proportion of materials reused Proportion of waste composted		enterprises (waste to energy, animal feed, soil amendments, building material etc)
Access to clean, affordable and reliable energy	Increase access to smart renewable irrigation solution	Percentage of population in the sector with access to clean, reliable and affordable energy for agricultural activities Price of energy Emissions per unit of energy in the sector Number and length of service interruptions	over 85 million Nigerians lacked access to electricity	Achieve universal energy access by 2030,[33] Increase access to renewable energy alternative for agricultural activities
Social Dimension				
Quality and safety of working conditions	Increased safety and working conditions in production and processing activities	Number of fatal and non-fatal occupational injuries per 100,000 workers in the sector, by sex and age status Number of person compliant with safety working recommendations relevant to the sector workers		Increased training for skilled and unskilled workforce in the sector in production, processing, marketing and logistics

[33] https://www.weforum.org/agenda/2023/05/how-nigeria-is-tackling-barriers-to-its-green-energy-transition/

		Level of national and subnational compliance with labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and age status		
Capacity, skills and knowledge development	Increase in training for skilled workers in both production and processing activities	Proportion of youth and adults with scientific, technological or other skills, by type of skill Number of people who have received skill based training Extent to which climate change education is mainstreamed in national education policies, curricula, teacher education and student assessment Proportion of population aware of climate change		The policy has increased awareness, capacity building and training as part of its activities
Climate change education, public awareness, capacity-building and research	Increased number of people with climate change education			Climate education and climate smart agriculture training.

		Number of people who have received climate change related training		
Gender equality	Increased number of women and youth participation in decision making	Average income for women and men Gender wage gap Proportion or number of girls and women in schools Proportion or number of women in tertiary education Proportion or number of women in the labour force Proportion or number of women in senior management positions Proportion or number of women in senior government positions Women's decision-making power within family/community	Around 32 percent of women in Nigeria were employed in agriculture, forestry, and fishing.[34] Women account for over 75% of the farming population in rural communities	Integration of women and youth in decision making positions. Reduce the bar of entry for various intervention projects for women and youth.

[34] https://www.statista.com/statistics/1356856/share-of-women-employed-in-agriculture-in-nigeria/

		Women's ability to spend income earned		
Economic Dimension				
Jobs	Increased job agriculture field production sector	Number of people employed Number of people unemployed		While the sector currently employs over 35 million people, the estimates from research suggest that the industry can create an additional 12.5 million jobs in 15 years across five sub-sectors, including Crops, Livestock, Fishery, Forestry and Horticulture triggered by increased adoption of renewable energy resources[35] An estimated 20,000 jobs are created due to the overall slightly higher level of economic activity in the forestry industry generated by the original investment impulse
	Increased job processing value chain	Employment rate Unemployment rate		
	Increased job in input manufacturing (chemicals, tools, seed etc.)	Number of jobs in the sector, including short-term jobs and long-term jobs, across the value chains Number of new jobs created across the value chain		
Income	Increased income of households, institutions, and other organizations due to	Income per capita Median household income Annual growth in household income in the sector		Reduced food inflation Increased income of households, institutions, and other organizations due to increased productivity in the sector

[35] https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_818466.pdf

	increased productivity in the sector	Average daily/hourly wage (in the agriculture sector and subsectors) Average daily/hourly wage for different groups (by gender, income, etc.)		
Increased business opportunities	Increased business opportunities for farm mechanizatio n services	Number of new companies Revenue and profit Amount of new investment		Improvement of registration new agric based business and startups, and, is expected an increase in agriculture sector revenue by 10% a year, from the policy implementation
	Increased business opportunities for farm input manufacturin g	Number of active long-term partnerships Total exports from the sector GDP		Increased economic activities across the sector value chain.
	Increased business opportunities in product transportation	Gross national income State/LGA GDP Annual growth rate of real GDP per capita		

3.1.3 Assess JGIT impacts against selected policy targets/goals

Once the specific impacts are delineated, they were subjected to qualitative analysis and characterized by evaluating the likelihood of their occurrence, the extent of their impact, and whether the impact is beneficial or detrimental (positive or negative). For assessing the likelihood, a predefined interval table is utilized to categorize the probability range.

Table 7: Assessing significance of impacts[36]

Likelihood	Description	Approximate Likelihood (rule of thumb)
Very likely	Reason to believe the impact will happen due to the policy or action.	≥ 90%
Likely	Reason to believe the impact will probably happen (or probably happened) due to the policy.	< 90% e ≥ 66%
Possible	Reason to believe the impact may or may not happen (or may or may not have happened) due to the policy. It's about as likely as not. Cases where the likelihood is unknown or cannot be determined should be considered possible.	< 66% e ≥33%
Unlikely	Reason to believe the impact probably will not happen (or probably did not happen) due to the policy.	< 33% e ≥ 10%
Very unlikely	Reason to believe the impact will not happen (or did not happen) as a result of the policy.	<10%

Magnitude represents the degree of change from the result or expected of the policy or action. According to the ICAT guidance, if there is no data or evidence to estimate the relative magnitude, experience and consultation with interested and affected parties can be used to rate the impact as major, moderate or minor. This impact should be classified as "uncertain" or "cannot be determined" if this is impossible. For this assessment, the magnitude of the impact was assessed together with stakeholders during the workshop and also with some results from questionnaires in the field. The table below presents estimates of the relative magnitude of sustainable development impacts (SDGs)

Table 8: Estimating the relative magnitude of policy impacts.

Relative Magnitude	Description
Major	The change in the impact category is expected to be substantial in size (either positive or negative). The impact significantly influences the effectiveness of the policy or action with respect to that impact category.

[36] https://climateactiontransparency.org/wp-content/uploads/2020/08/Sustainable-Development-Assessment-Guide-1.pd

Moderate	The change in the impact category is expected to be moderate in size (either positive or negative). The impact somewhat influences the effectiveness of the policy or action with respect to that impact category
Minor	The change in the impact category is expected to be insignificant in size (either positive or negative). The impact is inconsequential to the effectiveness of the policy or action with respect to that impact category.

3.1.4 Qualitative Impact Assessment Results

The table provided offers a comprehensive overview of the results from the qualitative assessment of specific impacts. It categorizes these impacts into different dimensions: environmental, economic, and social, while also linking them to corresponding Sustainable Development Goals (SDGs) and Nationally Determined Contribution (NDC) objectives. Furthermore, the table lists the data sources used in the assessment and explains the rationale behind excluding specific impacts from quantitative analysis. One of the primary reasons for excluding specific impacts from quantitative assessment is data limitations that currently impede the quantification of these impacts. Another significant challenge in quantification is the difficulty in attributing specific impacts directly to policy activities. This is particularly true for outcomes like reduced increased economic activities or reduced water pollution from fertilizer management, where the impacts could result from various measures.

Table 9: Qualitative Impact Assessment of Agriculture policies

Impact categories included in the assessment	Specific impact identified	Likelihood	Magnitude	Positive or negative impact	Significant?	Summary of qualitative assessment results for each impact category	Methods/ sources used
Climate change mitigation	Reduced emission from rice fields	Very likely	Major	Positive	Yes	Major positive impact from increased CSA adoption in rice production. While negative impacts exists, they insignificant	Stakeholder consultation, updated NDC, IPCC (2019) guidance
	Reduced emission from improved soil management	Likely	Moderate	Positive	No	Emissions from soil can be reduced due to increased adoption of CSA practices, will have a moderate positive impact but not significant	Stakeholder consultation, updated NDC, IPCC (2019) guidance
	Reduced emission from improved fertilizer management	Likely	Moderate	Positive	Yes	Increased fertilizer use triggered by increased production activities will see reduced in emission if CSA is adopted but can lead to significant underground water pollution if not managed	Stakeholder consultation, updated NDC, IPCC (2019) guidance
	Reduced emission from improved feed and manure management	Likely	Moderate	Positive	Yes	Improved livestock management will see reduction in emission from the sector, moderate	Stakeholder consultation, updated NDC, IPCC (2019) guidance

						positive and significant impact	
	Increased emission from deforestation and land development	Very likely	Moderate	Negative	Yes	Moderate negative significant impact triggered by increased arable crop production, opening of new virgin lands, mechanization	Stakeholder consultation, updated NDC, IPCC (2019) guidance
	Increased soil erosion	Likely	Moderate	Negative	Yes	Moderate negative significant impact triggered by increased arable crop production, opening of new virgin lands, mechanization	Stakeholder consultation, updated NDC, IPCC (2019) guidance
	Increased biodiversity loss	Likely	Moderate	Negative	Yes	Moderate negative significant impact triggered by increased arable crop production, opening of new virgin lands, mechanization	Stakeholder consultation, updated NDC, IPCC (2019) guidance
Air quality, health impacts of air pollution	Reduced pollution from open burning and biomass burning	Very likely	Major	Positive	Yes	Major positive significant impact from reduction in open burning among farming communities,	CCAC, NCCC, SLCP Action Plan 2019
	Reduced air pollution from fossil fuel generators (water pumps and mills)	Likely	moderate	Positive	Yes	Moderate positive significant reduction as increased adopted of clean and efficient energy alternatives	CCAC, NCCC, SLCP Action Plan 2019, NDC
	Increased air pollution from increased production of goods and services due to increased income	Possible	Moderate	Negative	Not	The increased investment in the sector is expected to stimulate economic activities. Though negative the impact is not significant	CCAC, NCCC, SLCP Action Plan 2019, NDC

	and economic activities						
Waste generation and disposal	Increased waste generation from increased production and processing activities	Very likely	Major	Negative	Yes	Major negative impact from increased production activities. While negative impacts do exist, they are insignificant	CCAC, NCCC, SLCP Action Plan 2019, NDC
Access to clean, affordable and reliable energy	Increase access to smart renewable irrigation solution	Likely	Moderate	Positive	Yes	Moderate positive impact from increased adoption of clean energy alternatives. While negative impact do exist, they are insignificant	Min. of Labour, NCCC, FMEV, FMAFS, NDC
Quality and safety of working conditions	Increased safety and working conditions in production and processing activities	Possible	Moderate	Positive	No	Moderate positive impact from increased training of skilled workers in the sector, reduction in occupational hazards as more safety protocols are adopted	Min. of Labour, FMAFS, Stakeholder consultation
Capacity, skills and knowledge development	Increase in training for skilled workers in both production and processing activities	Likely	Moderate	Positive	Yes	Increased training and capacity building will have moderate, positive and significant impact.	Min. of Labour, FMAFS, NDC
Gender equality	Increased number of women and youth participation in decision making	Likely	Moderate	Positive	Yes	Increased opportunities, fair and equitable sharing of benefits	
Climate change education,	Increased number of people	Likely	Moderate	Positive	Yes	Increased income is expected drive positive	Stakeholder consultation,

public awareness, capacity-building and research	with climate change education					moderate significant interest in climate change education. While negative impacts do exist, they are insignificant	updated NDC, IPCC (2019) guidance, NCCC, FMAFS
Jobs	Increased job agriculture field production sector	Very likely	Major	Positive	Yes	Increased economic activities, strengthening and promotion of growth in the sector value chain will see increased demand for both skilled and unskilled labour. Major positive significant impact. While negative impacts do exist, they are insignificant.	Stakeholder consultation, FMAFS, Min. of Labour, NLC, TUC, NBS
	Increased job processing value chain						
	Increased job in input manufacturing (chemicals, tools, seed etc.)						Stakeholder consultation, FMAFS, Min. of Labour, NLC, TUC, NBS
Income	Increased income of households, institutions and other organizations due to increased productivity in the sector	Likely	Major	Positive	Yes	Increased income of different actors involved in the agriculture sector value chain and formalization of the sector.	Stakeholder consultation, Min. of Finance, FMAFS, Min. of Labour, NLC, TUC, NBS
Increased business opportunities	Increased business opportunities for farm mechanization services	Likely	Moderate	Positive	Yes	New economic activities, diversification, strengthening and promoting growth of new industries. Moderate positive significant impact.	Stakeholder consultation, Min. of Finance, FMAFS, Min. of Labour, NLC, TUC, NBS

	Increased business opportunities for farm input manufacturing	Likely	Moderate	Positive	Yes	While negative impacts do exist, they are not significant
	Increased business opportunities in product transportation	Likely	Moderate	Positive	Yes	

3.1.5 Identification of methodology, data, and results limitations

The methodology employed in this assessment was designed to provide a comprehensive understanding of the impacts of agricultural policies. It involved a combination of both qualitative and quantitative approaches to ensure a holistic view of the policy implications. Qualitative methods were utilized to capture nuanced, non-numeric data such as stakeholder opinions and experiences, while the baseline was established for the quantitative analysis aimed at providing a more objective view of the impacts. This mixed-method approach allowed for a more thorough understanding of both the tangible and intangible effects of the policies. The assessment incorporated a variety of data sources, including government reports, scientific studies, and stakeholder consultations, to ensure a diverse and comprehensive data collection.

However, the assessment faced certain limitations in data and methodology. One of the primary challenges was data availability and quality. In some instances, relevant data was either unavailable or not sufficiently detailed to allow for a comprehensive analysis. This was particularly evident in aspects of the assessment that required highly specialized data, such as the impacts on genetic diversity or specific socioeconomic outcomes. This issue was particularly pronounced in the quantitative aspects of the assessment, where differing data collection methods and metrics made it challenging to aggregate or compare data sets effectively.

The limitations in data and methodology inevitably impacted the results of the assessment. While the mixed-method approach provided a broad overview of the policy impacts, the gaps in data availability and inconsistencies in data quality and methodology may have led to an incomplete understanding of certain impacts. These limitations highlight the need for improved data collection and standardization in agricultural policy assessments. Future assessments would benefit from a more coordinated approach to data collection and a standardized methodology to ensure more reliable and comprehensive results.

4.0 Conclusion and Recommendations

4.1 Summary of Recommended Approach to Track Just and Gender-Inclusive Impacts in the Agriculture and LULUCF Sectors

A comprehensive set of indicators should be identified to effectively track the impacts of agricultural policies using both quantitative and qualitative approaches. These indicators will help monitor and evaluate the policies' environmental, social, and economic impacts.

Environmental Impacts: For climate change mitigation, metrics like net emissions of greenhouse gases and short-lived climate pollutants are crucial. Air quality can be tracked through specific air pollutants' emissions, their concentrations, and the associated mortality rates. Indicators such as water consumption and efficiency are vital for freshwater availability. Land-use change, mainly deforestation and desertification, can be monitored through changes in arable land, forest cover, and sustainable forest management practices. In waste generation and disposal, solid waste quantities, recycling rates, and proportions of materials reused or composted are key metrics.

Social Impacts: Hunger, nutrition, and food security can be tracked through the prevalence of undernourishment, food expenditure share, and nutritional levels. Access to land can be monitored through the percentage of the population with land access. Gross national income per capita is a significant indicator for the standard of living. Tracking access to clean, reliable, and affordable energy could involve measuring the population percentage with such access alongside energy prices and emissions per energy unit. The quality and safety of working conditions can be gauged using occupational injury statistics and compliance levels with labour rights. Capacity, skills, and knowledge development can be assessed through the proportion of trained individuals and the extent of climate change education integration. Poverty rates, multidimensional poverty indices, and income levels are critical for assessing poverty impacts. Gender equality can be evaluated using average incomes by gender, the gender wage gap, and women’s representation in education, labour force, and leadership positions. Mobility can be assessed by measuring access to essential services and facilities.

Economic Impacts: Employment trends can be tracked through the number of jobs created, employment rates, and unemployment rates. Wages can be monitored through average hourly wages across different demographics. New business opportunities can be evaluated by counting new companies, their revenues, investments, and partnerships. Income metrics should include per capita income and household income growth. The balance of trade can be assessed through sector-specific export data. Economic activity can be gauged through GDP and gross national income, along with their growth rates.

To implement this tracking effectively, it is recommended to develop a standardized framework for data collection and analysis, ensuring consistency and reliability. Continuous stakeholder

engagement and institutional capacity building are also essential to support the data collection process and enhance the understanding of these indicators. This comprehensive tracking approach should become an integral part of the policy development process, enabling easier post-policy assessment, and ensuring that indicators are mainstreamed into policy design.

4.2 Summary of JGIT impact assessment of selected policies on Agriculture and LULUCF sector

The qualitative impact assessment of agriculture policies revealed a landscape of changes with significant policy and economic implications. A notable shift was observed in climate change mitigation efforts, particularly in reduced emissions from rice fields and better soil and fertilizer management. This underscores the need for continued support of Climate-Smart Agriculture practices, hinting at long-term environmental and economic benefits, including cost savings and alignment with global carbon reduction goals.

Improvements in air quality, primarily due to reduced open burning practices, highlighted the success of initiatives targeting better biomass management. This improvement calls for stronger regulations against harmful practices and the promotion of cleaner alternatives, which can have economic benefits like reduced healthcare costs due to pollution-related illnesses. A challenge presented itself in the increase in waste generation, correlating with heightened production activities. This situation calls for the development of more efficient waste management and recycling policies, potentially opening new economic avenues in the recycling sector.

The assessment also pointed to a positive shift towards sustainable energy use in agriculture, particularly in irrigation, indicating the sector's move towards renewable energy. This shift suggests the need for policies that encourage renewable technologies, promising reduced energy costs and increased energy security for farmers. In terms of labour, there were notable improvements in safety and working conditions, advocating for continuous investment in worker training and safety protocols. Economically, better working conditions are likely to lead to higher productivity and lower accident-related costs.

The significant impact of increased training and skill development highlights the importance of ongoing education in the sector. Continued investment in these areas is crucial, with the potential to drive innovation and efficiency, leading to a more skilled and dynamic workforce. Social progress was evident in the increased participation of women and youth in decision-making and the rise in job opportunities, reflecting both social progress and economic expansion. Policies focusing on inclusive growth and gender equality are vital, as greater inclusion can lead to a more diverse and resilient agricultural sector.

Also, the rise in public awareness and education on climate change shows a positive trend in environmental consciousness. Sustaining and expanding these education initiatives is crucial, as an informed population can lead to more sustainable consumer and business practices. The growth in income levels and business opportunities, particularly in areas like farm mechanization, input manufacturing, and transportation, reflect economic growth and

diversification in the agricultural sector. Supporting entrepreneurship and innovation in agriculture could lead to broader economic growth and diversification, strengthening the sector's overall economy.

4.3 Lessons Learned on impact assessment process

The assessment process offered significant insights, particularly emphasizing the crucial role of robust institutional frameworks. It became evident that institutions equipped with appropriate tools and capabilities greatly enhance data collection, analysis, and interpretation for policy assessments. This process underscored the necessity for continuous institutional capacity building, especially in areas like data management, analytical skills, and methodological applications. These capabilities are fundamental to achieving accurate, comprehensive, and reliable assessments.

A key lesson from the assessment was the importance of collaboration between various institutions. Collaborative efforts between government bodies, research organizations, and communities can provide a more comprehensive understanding of policy impacts. Sharing resources, expertise, and best practices among these entities proved invaluable in enriching the assessment process. This collaboration fosters a more integrated approach, enabling a holistic view of policy impacts across various sectors. The adaptability and responsiveness of institutions emerged as vital qualities in the dynamic field of policy assessment. The ability to quickly incorporate new information or methodologies and adapt to changing scenarios is critical. This flexibility ensures institutions remain relevant and effective in their assessment roles, allowing for timely and accurate policy evaluations.

Tracking Just transitions in agriculture must incorporate planning on a broad enough scale to be practical. Ideally, these processes should take place at regional and national levels to enable more comprehensive coverage of impact and fully account for the diversity of stakeholders, sectors, services, infrastructure, gaps and opportunities. The International Labour Organization (ILO) Guidelines on a Just Transition[37] recommends that impact assessments are undertaken at regional and national levels to understand the impacts of climate change and policies on respective sectors, looking at various factors, including jobs lost, potential created, and skills needed. These impact assessments must be gender sensitive.

Inclusive policies and strategies must avoid exacerbating inequalities in a just transition. A fundamental principle underpinning just transitions must be for gender-responsive and gender-transformative policies that recognize and address women's barriers in farming. For example, ensuring that women have secure land tenure, have access to finance, and benefit from extension services oriented to women farmers' needs. Policies should also consider strategies to support young people to get into and stay in farming and the potential for strategies

[37] . International Labour Office. “Guidelines for a just transition towards environmentally sustainable economies and societies for all.” 2015. ISBN: 978-92-2-130628-3.
https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_432859.pdf

to facilitate community collaboration, for example, by supporting complementary specialisms or machinery sharing.

This transition in the sector will require significant changes in practice, requiring new knowledge and skills, whether it is for converting to agroecology or agroforestry, cultivating different types of produce or livestock, reaching into to new markets, or shifting into new and different sectors altogether. The farmers, farmworkers and communities who are expected to deliver the new vision for the sector, should not have to carry the cost of their own training and reskilling, or risk being left behind if they cannot afford it. For a just transition to effectively protect and the reshape regional or national economies, it must incorporate planning and budget for training, education and reskilling as well as extension support. To deliver on this strategy, collaborations with ministry of agriculture, labour and employment, training institutes should be explored. This approach should also align with strategies to address the research gap into agroecology, which is still largely neglected by science and innovation research.

Farmers, workers and communities will face deep concerns and uncertainties about what the future will hold in a changing sector. For example, many livestock farmers are well aware that the growing conversation about the climate impact of meat consumption could mean that major shifts are on the horizon. If not handled carefully, climate transitions might mean loss of jobs and income and widespread change across communities. Farmers will likely resist change if they foresee that they will lose out. To be convinced of the value of joining a just transition, farmers need to know that there is a social protection safety net to help them survive the changes ahead. They must feel that they can trust the FGN to protect them, and that they will not be abandoned or sacrificed amid rushed climate policy responses.

Ensuring social protection for farmers, workers, and communities must, therefore, be a fundamental component as we approach just transition in agriculture. Social protection may be needed to, for example, support farmers suffering temporary yield and income losses in the first years of transitioning to agroecology or provide job guarantees, wage and benefit parity guarantees, income support, input subsidy or pensions if older workers would find switching to new approaches too challenging. Ensuring social protection is, therefore, critical for ensuring that the transition is both just and prosperous. Just transition discussions in the energy sector also provide helpful learning for agriculture. Workers need to hear certainties, not vague promises. Otherwise, they will remain highly sceptical.

Social protection guarantees are therefore crucial to unlocking resistance to a just transition. Just transitions in the sector must seek to achieve multiple objectives of solving the climate, ensuring justice, rewarding good practice and providing social protection to the farmers and workers who must shift their practices. However, in some instances, complex situations may also arise, for which the answers are not accessible.

Finally, public procurement can be useful in accelerating the transition to climate-friendly food systems. Public health, social care, energy and education institutions provide and consume huge amounts of food to their users and staff. They can form a significant component of the food finished in a country every week. These institutions can be leveraged to direct the demand of

the economy. By putting in place criteria on food procurement in the public sector, for example, requiring that a percentage of food is organic, or that meat consumption is reduced, the government can aggregate demand, ensure stable market prospects for farmers, accelerate improvements in standards and best practice at national level, and significantly reduce GHG emissions from the sector.

Annex II Stakeholder mapping list and description of method and frequency of engagement.

1. National Cashew Association of Nigeria
2. National Cotton Association of Nigeria (NACOTAN)
3. Wheat Farmers Association of Nigeria (WFAN)
4. Rice Farmers Association of Nigeria (RIFAN)
5. Sorghum/Millet Farmers Association of Nigeria
6. Soybean Commodity Association
7. Cocoa Farmers Association of Nigeria (CFAN)
8. Oil Palm Growers Association of Nigeria (OPGAN)
9. National Coconut Producers, Processors and Marketers Association of Nigeria
10. National Shea Products Association of Nigeria
11. National Cassava Growers Association (NCGA)
12. Nigeria Association of Yam Farmers, Processors, Marketers and Exporters
13. Potato Farmers Association of Nigeria (POFAN)
14. National Sesame Seeds Association of Nigeria
15. National Ginger Association of Nigeria
16. National Groundnut Producers, Processors and Marketers Association of Nigeria
17. National Tomato Growers, Processors and Marketers Association of Nigeria (NATPAN)
18. National Onion Producers, Processors and Marketers Association of Nigeria
19. National Association of Maize Farmers

20. Cowpea and Beans Commodity Association
21. Nigeria Environmental Society
22. Nigeria Labour Congress
23. National Horticultural Research Institute (NIHORT)
23. Federal Ministry of Environment
24. Federal College of Animal Health and Production Technology, Ibadan (FCAHPT)
25. National Productivity Centre (NPC)
26. Plateau State Ministry of Labour
27. Federal Ministry of Women Affairs
28. FMARD (DALCCMS)
29. Agricultural Research Council of Nigeria (ARCN)
30. FCAH&PT, NVRI, VOM-PLATEAU STATE
31. Bauchi State Ministry of Labour
32. Cocoa Research institute of Nigeria Ibadan
33. Federal College of Agriculture Akure, Ondo
34. Federal College of Agriculture, Isiagu Enugu State
35. Federal College of Agricultural Produce Technology Kano
36. Federal Cooperative College (FCC) Ibadan
37. Federal College of Freshwater Fisheries Technology New Bussa, Niger State
38. Federal College of Veterinary and Medical Laboratory Technology, VOM, Plateau State.
39. FMENV DCC
40. African Centre for Climate Actions and Rural Development (ACCARD)
41. Institute of Agricultural Research and Training (IAR&T)
42. Institute of Agricultural Research (IAR) Zaria.
43. Natural Eco Capital Ltd.
44. National Cereals Research Institute, Badeggi Niger State.
45. National Directorate of Employment
46. Nigeria’s Employer’s Consultative Association
47. Mega Impact Foundation
48. Nigerian Institute for Oil Palm Research (NIFOR)

49. Nigerian Institute for Oceanography and Marine Research
50. Trade Union Center (TUC)
51. National Root Crops Research Institute (NRCRI)
52. Nigerian Stored Products Research Institute (NSPRI)
53. Rubber Research Institute of Nigeria (RRIN)
54. Federal Ministry of Labour and Employment Zamfara State Office.
55. NLC
56. NECA
57. United Young Farmers Forum

Specification of How Vulnerable Groups Were Meaningfully Engaged

The process of stakeholder mapping and engaging vulnerable groups in the assessment was a key component of our approach. We identified and categorized various groups that were either directly or indirectly impacted by these policies. This included farmers, women, youth, indigenous communities, and other marginalized groups. The mapping process involved understanding their unique roles, interests, and the potential impacts of policies on their livelihoods and well-being.

To ensure meaningful engagement of these vulnerable groups, several tailored strategies were employed. Firstly, we facilitated inclusive and accessible consultation sessions, ensuring that these were held in locations and languages that were accessible to the stakeholders. Special attention was given to creating a safe and welcoming environment where participants felt comfortable voicing their opinions.

Secondly, we employed participatory approaches in these sessions, where stakeholders were not just passive recipients of information but actively contributed to the discussions. This approach allowed them to express their concerns, aspirations, and suggestions regarding the agricultural policies. Furthermore, we used a variety of communication channels and tools to ensure that all groups, irrespective of their literacy level or access to technology, could participate effectively.

We also ensured that the feedback and insights gathered from these engagements were genuinely reflected in the assessment report. This involved listing their concerns and incorporating their perspectives into the formulation of recommendations.

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