PRODUCTION OF PROPROPYLENE BASED COMPOSITES REINFORCED WITH RICE HUSK AND MAHOGANY SAWDUST FOR SEDI-ENUGU DISPOSABLE PLASTIC SPOONS

EXECUTIVE SUMMARY

This innovation seeks support from NASENI to develop and commercialize eco-friendly disposable plastic spoons made from polypropylene composites reinforced with rice husk and mahogany sawdust. The initiative will be carried out at the **Scientific Equipment Development Institute (SEDI) Enugu**, leveraging local agro-waste materials to reduce plastic dependency, minimize environmental pollution and promote sustainable manufacturing. By integrating agricultural and wood residues into polymer composites, this innovation aligns with NASENI's 3Cs of **Creation Collaboration and Commercialization** and supports Nigeria's drive toward green industrialization and import substitution.

PROBLEM STATEMENT

The excessive use of non-biodegradable plastics in disposable cutlery has caused significant environmental pollution. Nigeria also faces waste management challenges from agricultural by-products such as rice husk and sawdust, which are often discarded or burnt. There is a pressing need for sustainable materials that combine strength, affordability and environmental friendliness for mass market applications.

PROJECT OBJECTIVES

1. To design and produce a polypropylene-based bio-composite reinforced with rice husk and mahogany sawdust
2. To fabricate environmentally sustainable disposable spoons at SEDI-Enugu
3. To commercialize the product through local manufacturing and distribution networks.
4. To reduce plastic waste and promote circular economy initiatives in Nigeria.

INNOVATION AND TECHNICAL APPROACH

The innovation lies in **chemical surface modification** of rice husk and sawdust to enhance their bonding with polypropylene, improving mechanical and thermal properties. Using **injection molding technology** at SEDI-Enugu, the treated composite will be processed into disposable

spoons with improved stiffness, lightweight, and partial bio-degradability, and an affordable alternative to traditional plastics.

EXPECTED IMPACT

- **Environmental Impact:** Reduction in plastic waste and open-air burning of agricultural residues.
- **Economic Impact:** Job creation in material processing, production and distribution
- **Technological Impact:** Advancement of local polymer composite technology at SEDI-Enugu
- **Social Impact:** Promotion of sustainable consumption and cleaner environment.

SUSTAINABILITY PLAN

Post-grant the project will be sustained through local sourcing of agro-wastes, reinvestment of profits from sales and partnership with food servicing companies. Continuous R&D will ensure product improvement and scalability to other disposable plastic products.

ALIGNMENT WITH SDGs

- **SDG 9:** Industrial, innovation and infrastructure
- **SDG12:** Responsible consumption and production
- **SDG 13:** Climate action
- **SDG 8:** Decent work and economic growth