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OBD-Biofertilizer Impact on Crop Yield and Soil Quality in Lowland Rice Production, Badeggi, Niger State, Nigeria

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Abstract : Purpose: Nigeria has become the largest importer of rice in Africa and second in the world, 2015. Investigate interactions of organic rice farming on soil quality and health from bio-waste converted to biofertilizer and its environmental impact on rice crop. Methodology: Bio-wastes, poultry waste, organic agriculture wastes, wood ash mixed with microbial inoculant organisms called OBD-Plus microbes (broad spectrum) composted in anaerobic digester to OBD-biofertilizer (2010 - 2012) uses microbes to build humus and other stable carbons. Two field experiments were carried out at Badeggi, Niger state in 2011 and 2012 to evaluate the response of lowland rice production using biofertilizer. The experimental field was laid out in a strip-plot design with five treatments and three replications and at twenty-one day old seedlings of FARO 44 and FARO 52 rice varieties were transplanted. Plots without fertiliser application served as control. Findings: The highest rice grain yield increase of 4.4 t/ha over the control in 2012 against the Nigeria average of lowland rice grain yields of 1.5 t/ha. The utilization of OBD-Biofertilizer can decrease the use of chemical nitrogen fertilizer, prevent the depletion of soil organic matter and reduce environmental pollution. Increasing the floodwater productivity and optimizing the recycling of nutrients cum grazer populations and disease by biocontrols microbes present in the OBD-Biofertilizer. Organic matter in the soil improves by 58% and C/N 15 (2011) and 13.35 (2012). Implications: OBD- Biofertilizer produce plant growth hormones such as indole acetic acid (IAA), glomalin related soil protein and extracellular enzymes as phosphatases that promote soil health and quality. Conclusion: Microorganisms can enhance nutrients use efficiency by increasing root surface area e.g., mycorrhizal, fungi, promoting other beneficial symbioses of the host plant and microbial interactions resulting to increase in soil organic matter. By 2030, climate change is projected to depress cereal production in Africa by 2 to 3 percent. Improved seeds and increased fertilizer use should more than compensate, but this factor will still weigh heavily on efforts to make progress.

Keywords : OBD-plus microbial consortia, OBD-biofertilizer, rice production, soil quality, sustainable agriculture
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