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Germplasm Enhancement for Increasing Groundnut Productivity and Production in West and Central Africa

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West and Central Africa (WCA) account for almost 70% of groundnut production in Africa playing an important role to farmers' livelihood and significantly contributes to the export sector of the countries in the region. However, the productivity in the region is limited due to many factors including biotic and abiotic constraints. The gap between potential and realized yield is large in subsistence farming. To address these issues, ICRISAT has been working with national partners in the region to improve productivity of groundnut with the Tropical Legumes project support. ICRISAT has supplied more than 2,500 trait-specific advanced breeding lines (resistance to foliar diseases, rosette, aflatoxin contamination, early and medium maturing, confectionery types and tolerant to drought) to the national programs in WCA for genetic enhancement of groundnut. Based on the NPT and PVS trials, the national programs in Niger released four varieties (RRB, ICG 9346, J11 and Fleur 11). In Nigeria, three short-duration, rosette resistant varieties (Samnut-24, Samnut-25 and Samnut-26) were released. In Mali, eight varieties including ICGV 86015 and ICGV 86124 were selected by farmers. While six and four varieties were released in Senegal and Ghana respectively. Most of these varieties were preferred by farmers for their high yield, disease resistance, drought tolerance, short duration, seed size, suitability for home consumption, seed color and market demand and had yield advantage of up to 42% over the local varieties grown by farmers. The current efforts to deploy modern breeding approaches and tools to enhance genetic gains are discussed.

Keywords: Genetic Enhancement, Groundnut, Productivity, Trait specific breeding lines, West and Central Africa

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Increasing Resilience to Climate Change in Rural Livelihoods: to Diversify or Not?

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Climate change causes unpredictable weather patterns in tropical rural landscapes that may lead to harvest failure which can threaten food security, farmers' income loss, and livelihood vulnerability. High agrobiodiversity in agroforestry (AF) systems provides functional diversity (product variety) that may increase the resilience of farmers. AF system practices also help conserving land sustainability and maintaining diverse habitat to counter climate change. This study aims to determine whether farmers' decision over land allocations are made to maximize their resilience to climate change. We conducted household interviews with 30 random households in Bantaeng, South Sulawesi. On the 133 land parcels owned by those households, we used nested plot method for vegetation analysis with every woody and other utilized species enumerated, and the origins of every individual documented. We grouped the land use management into: (1) complex AF; (2) simple AF; and (3) annual cropland. Household plant functional diversity index are also calculated. The study shows that 67 (50%) land parcels are complex AF, 51 (41%) are simple AF, and 15 (9%) are annual cropland. 63% of species in annual cropland are commodities, while in simple AF and complex AF commodities represent 54% and 50%, respectively. In annual cropland systems, 13% of species are used as wood, while in simple AF and complex AF 17% and 19%, respectively. Other plants are grouped as staple food, medicinal, fodder, and fibre. Although farmers' decisions over land allocations vary, most of them practice the system which maximizes resilience to climate change. Policy guide approaches can be used to enhance integration between agrobiodiversity, resilience, and economy.

Keywords: Resilience, Agroforestry, Agrobiodiversity, Functional Diversity