

Design and Development of a Corn Sheller Device

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Abstract: *This study presents the design, fabrication, and evaluation of a modified corn sheller to improve post-harvest operations for small-scale farmers in Surigao City, Philippines. The prototype integrates a rotating drum driven by a 1.5-HP single-phase electric motor, a perforated separation platform, a belt-and-pulley transmission, and an enclosed frame built from locally available mild steel and hardwood. Development followed iterative stages: needs assessment via farmer interviews and field observation, conceptual design, materials selection for cost and durability, fabrication, and performance testing. Trials measured shelling efficiency, throughput (kg/hr), kernel damage (%), and power consumption across cobs with varying moisture. Results showed shelling efficiencies above 90% in most runs, throughput markedly higher than manual shelling, and kernel damage generally under 5% — comparable to other low-cost designs while optimized for local parts and maintenance. User evaluation (n=25) indicated very high acceptability across technical, economic, environmental, and social criteria, highlighting safety features, replaceable parts availability, and affordability. The study discusses critical design variables (roller diameter, spike arrangement, drum speed, and feed clearance), moisture's effect on performance, and operational recommendations to minimize kernel breakage. Finally, it situates the device within smallholder mechanization initiatives in the Philippines and advocates scalable dissemination approaches such as machinery pooling and local fabrication hubs to broaden access and socioeconomic impact. Findings indicate that well-designed, locally fabricated shellers can reduce drudgery, increase throughput, and improve rural livelihoods when accompanied by training, after-sales support, and context-sensitive dissemination. Future work should include field scaling, cost-benefit analysis, and training program evaluation for sustainable adoption.*

Keywords: Corn Sheller, Post-Harvest Mechanization, Small-Scale Farmers, Agricultural Engineering, Prototype Development.

