Entry No. IRRC-0183

Category	: International Rice Research Conference
Select Theme	: Social inclusion and gender equality
Endorsement email	:
Keyword 1	: Scaling up and out
Keyword 2	: Impact acceleration
Keyword 3	: Women entrepreneurship
Title of Entry	: Reducing Injuries and Increasing Yields for Smallholder Women Rice Farmers through Additive Manufacturing and the Design, Modification and Testing of Rotors for use with SRI Weeders
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Select only one type of presentation	: 3-5 minute flash talk
Abstract	: Over 10 Million smallholder farmers currently use the System of Rice Intensification, SRI, as growing techniques tha can produce higher yields, decreased water use and other benefits. These farmers are often women and many of the weeders available to them are rotary weeders which were designed for and by men. Use of these weeders can result in injuries and inefficient working conditions for women as well as a reduction in possible yields, incomes, and food security. A rotor design modification and testing program using additive manufacturing, may decrease injuries as well as improve weeder performance and yields. Our research focuses on creation and testing of new rotor designs and modification of existing rotor designs. This research targets rotors that can be improved through processes that use high strength, low weight materials and additive manufacturing, commonly called with 3D printing. Developing printed designs specifically for women, can produce benefits from equipment that is smaller, lighter, needs less force in use and is more ergonomic. Design improvements can be extended to rotors constructed in steel or steel/plastic combinations. Review of SRI research identifies designs that improved women's weeding performance and will inform new designs in a series of comparative tests. Existing literature suggests opportunities for reduction in various injuries, more effective weed removal, decreased root damage, increased yields and incomes. Rotors selected for testing and modification will incorporate this existing SRI research, collaborations with women farmers, field visits and NGOs experiences scaling up SRI with women. 3D printing allows for rapid production and testing of rotor variations and multiple modifications to approach optimum designs for a given soil type and other conditions. Testing will also identify costs for additional design work required for modifications in the printed rotors to insure their strength and durability. Successful designs will then be assessed for future injection molding with low cost printed molds created from CAD designs, and moving to metal molds with the UV protected, high strength materials. At a future date this research will contribute to a database of SRI rice equipment available to farmers and researchers.

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