

Category	: International Rice Research Conference
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Keyword 1	: Improved post harvest technologies
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Keyword 3	: Rice supply, demand, and trade
Title of Entry	: Inflatable solar dryer optimization for greater drying performance
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Select only one type of presentation	: 15 minute oral presentation
Abstract	<p>: Drying paddy rice is not an easy process as this crop has hygroscopic characteristics and reacts to the environments, which it is exposed to. Drying and storage of paddy are two key stages along the rice value chain. For rice, grain moisture content is kept around 14% wet basis for safe storage and a reduced microbial activity. Thus, proper drying technology is needed for ensuring further processing. Computer science and the increasing computing power make it feasible to evaluate drying technologies with detailed optimization scenarios by using computational fluid dynamics (CFD). Many authors indicated that extensive simulation of airflow could result in better product quality. This research discusses the improvement of the inflatable solar dryer – ISD design. This solar dryer was developed based on adaptations of the Hohenheim-type solar tunnel dryer in collaboration with the International Rice Research Institute and Grainpro. The new design does not need a substructure as it is stabilized from pressure created by the axial ventilators powered by a photovoltaic system and is made of a transparent polyethylene (PE) film attached by zipper to a reinforced black polyvinyl chloride (PVC) film. In this study, the capability of CFD has been explored by examining different ISD designs based on the complexity of the air flow distribution throughout the dryer. The optimized design can contribute to reduce drying times as the distribution of local temperature gradients obtained in CFD calculations can be used to develop models for predicting drying processes and therefore represents a viable approach to improve dryer performance.</p>

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