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Construction and Validation of Photovoltaic Powered Fan Supported Solar Drier Prototypes in Asella, Ethiopia

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Abstract

The food industry is responsible for supplying the food demand of the ever-increasing global population. The food chain is one of the major contributors to greenhouse gas (GHG) emissions, and global food waste accounts for one-third of produced food. A solution to this problem is preserving crops, vegetables, and fruits with the help of an ancient method of sun drying. For drying agricultural products, several types of dryers are also being developed. However, they require a large amount of energy supplied conventionally from pollutant energy sources. The environmental concerns and depletion risks of fossil fuels persuade researchers and developers to seek alternative solutions. In order to perform drying applications, sustainable solar power may be effective because it is highly accessible in most regions of the world. Solar dryers are simple facilities that can provide large capacities for drying agricultural products. This study project objective is to construct and validate indirect solar dryers' prototypes (Icaro1.5 model and Tunnel driers) with solar technologies, photovoltaic (PV). To investigate the effectiveness of the prototypes different vegetables will be dried in the driers. Additionally, the effectiveness of the prototypes will be assessed by taking into consideration different parameter which will determine the performance of the dryers. In this regard, this study if it is implemented will contribute in the reduction of postharvest loss of agricultural produce and allow usage of renewable energy sources in the food processing. Additionally, the introduction of these simple drying technologies will have economic benefit for producers, processors as well as end consumers.

Keywords: Agricultural products, economic benefit, postharvest loss reduction, solar drying