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"Solidarity in a competing world — fair use of resources"

Solar Powered Milk Cooling System for Small Dairy Farmers in Kenya

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Abstract

Dairy industry in Kenya is relatively well developed compared with other countries in sub-Saharan Africa. Milk production in Kenya covers 70 % of the total milk production in the country, despite poor handling of milk at the farm and longer distances to the market. Moreover, under warm climatic conditions, the maximum bacterial count in raw milk usually exceeds the threshold established by food safety regulations. Therefore, milk management needs to be better addressed in milk production chain to guarantee high quality and minimise losses. As a response an innovative milk cooling system, developed and tested by the University of Hohenheim, was transferred to Kenya by the Program of Accompanying Research for Agricultural Innovation (PARI) and it is currently tested. The system is based on commercially DC-refrigerator powered by photovoltaic modules which has a control unit to customize the availability of solar energy. The freezer has a volume of 166 l and is capable of producing 8–13 kg of ice per day. The system comes with 25 reusable ice tins of 2 kg capacity and two isolated milk cans with removable ice compartment. Every isolated milk-can is able to cool down 30 l milk from 36°C to 15°C with help of 6 kg ice. At this temperature, good milk quality is assured for 4 h after milking. By adding 4 kg ice, the temperature of the milk decreases to around 8 °C assuring good milk quality for at least 12 h more. The system is able to run autonomously for up to 5 days during periods of extreme low solar radiation and high ambient temperatures due to the ice storage (50 kg) inside the freezer. The introduction of this promising technology gives access to a business opportunities based on higher milk quality and farm productivity. An on-field assessment will provide value information of the potential social and economic costs and benefits which might flow from the implementation of the small-scale solar milk cooling system.

Keywords: Cooling efficiency, dairy farm, milk quality, solar energy

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