

Affordable milk chilling technology at point of harvest can benefit cattle farmers

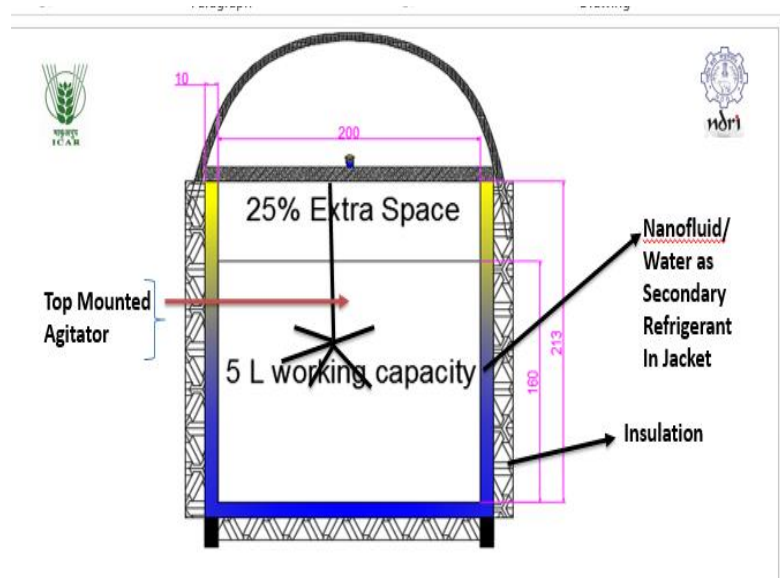
Indian PhD scholar from ICAR-National Dairy Research Institute (NDRI), Bangalore Mr. Ravi Prakash, received the BRICS Young Innovator Prize for inventing a nano-particle based affordable unit for chilling milk while harvesting for small and marginal dairy farmers.

The young scientist received the first prize worth \$25,000 at the 4 th BRICS- Young Scientist Forum (YSF) - 2019 held on 6-8 November, 2019 in Rio de Janeiro, Brazil.

Hailing from West Champaran District in Bihar, Prakash's interest in addressing the rural issues of farmers stems from being born and raised in a farmer's family.

He realized early that preserving quality and maintaining safety of milk from the point of harvest is of paramount importance as far as consumer's health, food-security, domestic or international trade and finally income of farmers, food-processors or entrepreneur are concerned.

In order to address the issue, Prakash initiated devising indigenous cold chain devices, on the basis of nano-particle enhanced phase change material (PCM) which can store cooling energy and is suitable for small to marginal and scattered raw food producers.



Re-Chargeable Milking Cum Cooling Pail

The system he has developed cools fresh raw milk instantly after it is milked by a farmer from ambient to below the critical limit. It is also suitable to cool small volumes of milk at the on-farm level, while milking to minimize the time gap between milk production and milk cooling, below critical limit.

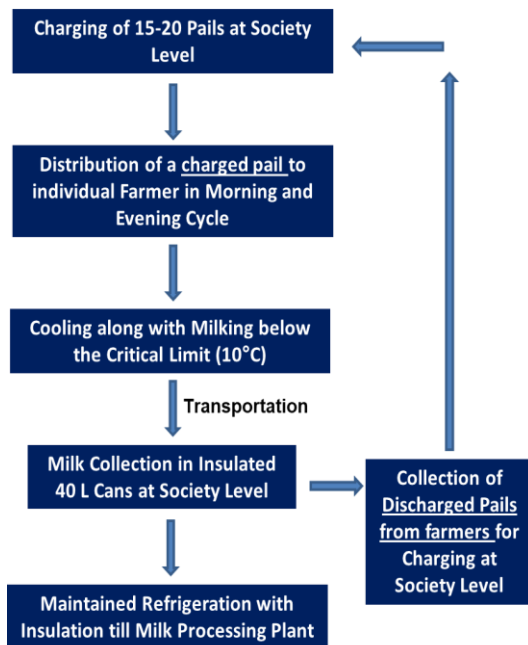
Considering the gap between demand and supply of electricity in rural areas, the nanoparticle enhanced fluid based phase change materials with enhanced cooling energy storage capacity were designed, evaluated and integrated into the insulated milking cum cooling pail. The pail is

accompanied with a charger to facilitate charging (storing of cooling energy) of the pail when there is availability of power supply. The charged pails are used for milking along with cooling.

The operation, handling and maintenance of the pail is farmer-friendly, sealed and resembles daily used milking pail. The estimated cost of a milking cum cooling pail is around 20-25 USD (1500-2000 INR), which is affordable for small to medium dairy farmers. Moreover, the pail is robust and durable, therefore it could be one time investment by dairy farmers for many years.

The cooling performance of the module in terms of quality preservation and time required to cool milk below critical limit is superior as compared to the exiting milk cooling systems. Therefore, this technology is envisaged to have very high socio-economic utility by helping millions of small scale milk producers and dairy farmers in developing countries like India and other BRICS countries in maintaining quality of milk and milk products, and contributing to the overall economy of the country.

The Indian Council of Agricultural Research-National Dairy Research Institute (ICAR-NDRI) is incubating the technology of milking cum cooling pail developed from the PhD work of the innovator. ICAR-NDRI and National Dairy Development Board, India is collaborating to translate this technology to the grass root level. The multiple milking cum cooling pail units will be charged at society level to store cooling energy. The charged pails will be distributed among farmers in rotation and return basis during morning and evening cycle for milking and simultaneously cooling milk even during transporting to the milk collecting society also.



Implementation plan for product