RSIS S. RAJARATNAM SCHOOL OF INTERNATIONAL STUDIES
Nanyang Technological University

RSIS COMMENTARY

www.rsis.edu.sg No. 016 – 18 January 2017

Science, Technology and Human Security

Fighting Food Wastage: New Ideas From The Past

By Tamara Nair and Christopher Lim

Synopsis

Food wastage amounts to US$ 310 billion annually in developing countries, the bulk of it from fruits and vegetables. Could a 4,000-year old idea for food storage help in reducing such wastage?

Commentary

FOOD STORAGE, from 'farm to fork', requires infrastructure, energy and suitable space, among other factors. The Food and Agriculture Organisation (FAO) has identified, unsurprisingly, the bulk of the food wasted as fruits, vegetables, roots and tubers. All are highly perishable but all necessary elements for micro-nutrient provision for many who now suffer from undernourishment and malnutrition in the Asia-Pacific.

The use of an ancient cooling technology that uses the effects of evaporative cooling is proposed to address such food wastage.

Issues in Food Wastage

One-third of all food produced is wasted. But, according to the FAO, we need to increase our food production by around 60 per cent from 2007 levels if we are to feed the nine billion people estimated to inhabit the planet by 2050. Food waste is not only about actual food being wasted. We also waste water and land when

producing this wasted food and increase unwanted emissions of greenhouse gases such as methane from the production of meats like beef.

In addition, we compromise the economic security of millions who are either directly or indirectly involved in food production. Reduction in food wastage translates to a reduction in waste in all areas in agriculture and helps to reduce hunger, when food reaches where it is most needed.

Asia accounts for more than half of all food wasted and yet it is also the region that houses the world's hungriest. Some of the causes for wastage include out-dated or bad agricultural practices, poor roads and infrastructure including the lack of cold storage and refrigerated trucks. In India, up to 40 per cent of fruit and vegetable output is lost because of the lack of proper refrigeration. Setting up proper infrastructure requires financial capital, something not easily available to most farmers in developing countries.

Evaporative Cooling As A Solution

The Global Opportunity Report of 2016 outlines recent advances in mobile refrigeration, for example the use of solar power, which is creating a revolution 'that harnesses renewable energy to fix the broken cold chains'. By using solar energy we attempt to 'green' cold chains. But there is a high cost involved in this set up, which might not be accessible to millions of small-scale farmers, who produce 80 per cent of Asia's food.

We propose another 'greening' mechanism that is low-cost and can be adapted to fit the needs of these farmers. Evaporative cooling is a process that occurs when water evaporates off a surface cooling it in the process. This is the same process that maintains our core body temperatures as we perspire. The Ancient Egyptians, Romans, and early Persian societies have used evaporative cooling not only to cool themselves and their homes but also to store food to prevent it from rotting and going to waste; essential to maintaining household food stocks in scarce times or in regions where food is not readily available.

These societies have used the technology to store food by very simply resting two terracotta pots, one over the other, and filling the space in-between with sand and water. As water evaporates from the sand it removes the heat thus keeping the pot above (where food is kept) at cooler temperatures.

This simple method has been replicated by the creators of the *Evaptainer*, a storage device that uses evaporative cooling to store food, without the use of electricity. The company ran its first prototype field tests in Morocco involving small-scale farmers. *CNN Money* describes it as a 'lightweight, efficient cooling system that can be used in a wide variety of applications'; the model is also low cost and is made from highly durable and easily available materials.

New Mechanism to Prevent Food Wastage?

We propose that a mechanism similar to the *Evaptainer* be created to prevent food wastage in rural Southeast Asia. Given the challenges in food production, including

extreme climate change, it would be timely to set up a strategic regional fund that works towards negotiating for the rights to reproduce the technology in food storage facilities. This fund could also help in supplying rural farmers with *Evaptainer*-like storage vessels for minimum cost. *Evaptainers* are currently commercially available at less than US$30 a piece.

In addition, we also suggest the development of cottage industries in rural Southeast Asia to mass-produce these containers, bringing in jobs to supplement agricultural work. If focussed specifically on rural women, this would also help empower them by offering them much needed income as a means of establishing some form of economic security.

The direct benefit of these actions would be the ability to potentially move wasted food to where it is most needed to help reduce hunger. The now non-urgent need to extend electricity supply for food storage in rural areas alleviates political pressure and allows policy makers to secure a sustainable source of energy, while at the same time focussing on rural development and capacity building.

The usage of *Evaptainers* could be extended in natural disaster situations that regularly inflict the region. In addition to food storage, in post-disaster settings the vessels might also be used to store medical supplies at cooler temperatures without the use of electricity that will most likely be disrupted under such circumstances.

Much of the region's food supply is dependent on the small-scale farmers of Southeast Asia. Although there has been development in rural areas, much remains to be done especially in terms of setting up good infrastructure for food storage and transport. This is not to say there is no wastage at the consumption end. This is an increasing cause for concern. However, the bulk of food wasted is at post-harvest, storage and transport. The measures proposed will not only positively impact the region but will also have significant global implications *vis-à-vis* climate change. This is a cost effective and 'green' way to help the hungry and help the planet.

Tamara Nair is Research Fellow at the Centre for Non-Traditional Security (NTS) Studies and Christopher Lim is Senior Fellow at the Office of the Executive Deputy Chairman, both in the S. Rajaratnam School of International Studies, Nanyang Technological University, Singapore. This is part of a series.

Nanyang Technological University
Block S4, Level B3, 50 Nanyang Avenue, Singapore 639798
Tel: +65 6790 6982 | Fax: +65 6794 0617 | www.rsis.edu.sg