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Guest Editorial

Alleviating Hunger: Work Smarter, Not Harder

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Response to AJFAND editorial
EDITOR'S NOTE - Vol 24, No. 8, August 2024

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Response to AJFAND editorial **EDITOR'S NOTE - Vol 24, No. 8, August 2024**

The Editorial " Zero Hunger by 2030 - SDG 2 - We are off target, AGAIN" states that a report claims that we are still off target towards hunger reduction goals. It states "only 25% of Overseas Development Assistance goes towards financing food and nutrition programs. With absolute agreement that political will is lacking and priorities would serve the world better if we rose quality of life of everyone, there is more that we can do even with limited funding". Perhaps this is a time to apply two common expressions, "**Think outside the box**" and "**Work Smarter, Not Harder**" to advantage. Efforts to reduce hunger have concentrated on increasing agricultural productivity, with the "Green Revolution" that represented a period of increases in food production for much of the 20th century a most notable example. The Consultative Group for International Agricultural Research (CGIAR) was founded in 1971 to promote international cooperation among 15 institutions engaged in research in food security. CGIAR's emphasis was agricultural production. Food losses were considered, but not a priority.

In 2011, FAO presented two significant reports at the 1st Save Food Congress with estimates for food losses worldwide around 33% of production. This was a huge amount of food - about 1.3 billion tons per year. Prior to this congress, virtually all international programs to reduce hunger were based on agricultural production. However, countries around the globe have formed institutes of post-harvest technology (various names) that have investigated food losses and found remedies to reduce those losses in their countries. Many of these institutes do not publish in UN languages nor participate in international conferences, but that does not take away from the valuable work that they do to reduce food losses in their countries. These institutes have been doing multiple projects to reduce losses with many technologies that would be helpful for other countries. But with local funding and limited participation in international journals and conferences, much of this work remains within the country-of-origin's borders. If we now add the reality that the cost to recover food is typically a fraction of the production costs, perhaps a program to promote international cooperation and exchange of post-harvest technologies could be extremely cost effective towards meeting

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hunger goals. Readers of this journal and delegates at International Union of Food Science and Technology (IUFoST) World Food Congresses have skills that could assist.

It deserves mentioning a distinction between appropriate and high tech. High tech is the exciting developments that make exciting publications and presentations, but may or may not be applicable in many situations. Appropriate technologies are those that fit situations and locations in which they will be used. They include applications of common knowledge (sometimes in new applications) and may not have that novelty that is expected for journal publications. An example of a high technology approach was a specialized system that showed that careful control of inputs (oxygen and food) and outputs (CO_2 and waste products) could increase density of fish in a given fish farm and increase yield by as much as 300%. This is obviously a tremendous increase. But a 15- minute brown-out would kill the entire stock as the control balance is critical. So, this technology is inappropriate for any location that could experience any lack of consistency or interruption in electrical service. An example of appropriate technology is a pallet study in which paddy rice was dried to four different moisture levels. Pallets were then stored with a control pallet of rice in woven polypropylene sacks for each moisture level and the test pallets with similar sacks that were covered with a LDPE sheet that was secured to the warehouse floor with weights. The rice that was not sufficiently dried was much worse in test samples as the LDPE maintained an unhealthy moisture content, but the rice dried to 10% moisture improved viability from 28.6% to 93.3% after 1 year storage. These results suggest means to increase viability of rice seeds where controlled storage is absent or limited, but also provides a means for farmers themselves to extend viability of their own stock.

The existence of a wide array of technologies to recover or save food for human consumption leads us back to readers of this journal and IUFoST, a union of food science institutes around the globe and sponsors of the World Food Congresses. IUFoST was early in recognizing the role that food science and technology could have in reducing or even eliminating world hunger. Dr. Joseph Hulse led the effort at the 9th World Food Congress in 1995 that concluded with the Budapest Declaration that stated “We declare our determination to

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work for the elimination of hunger and reduction of all forms of malnutrition throughout the world." The following year the World Food Summit in Rome pledged to reduce world hunger by 50% by 2015, and this goal was re-specified as the 1st Millennium goal (2000) and reiterated in World Food Summit: five years later (2002). The 10th World Food Congress in 1999 included the first full session on food security at a World Food Congress.

Food losses (food prepared for, but not consumed by humans) occur throughout the entire food chain. Food products get attacked by pests, missed in harvest, spilled, crushed, and spoilt (senescence or microbial). In countries with less infrastructure development, losses occur during food distribution. Food waste is discard of edible food. Interesting - the amount of food losses in developed and less developed countries is approximately 33% of production, as FAO reported, but in developing countries it is primarily due to deficiencies in distribution and in developed countries it is primarily waste. So post-harvest food losses are complicated and significant. Agricultural production is sufficient to supply everyone on earth with adequate food. Problems are uneven distribution; the fact that 1/3 of production is lost or wasted, and political will to end hunger, unfortunately, is lacking.

An estimate of the amount of food required to feed everyone was presented at the 19th World Food Congress in 2018. The estimate was based on chronically hungry people surviving on 1200 kcal/day and bringing them to 2000 kcal/day. Recovering 16.2% of food currently lost would be sufficient (not including distribution) to raise 821 million people eating 1200 calories/day to 2000 calories/day. Offering a slight buffer gave a rounded up value of 16.5% - a value that is well within the capabilities of existing technologies. Substantial food could be recovered by identifying technologies that have saved food in one location (especially unpublished technologies), and helping to bring that technology to another location. There are many resources around the globe to assist technology transfer, including members of academia as well as food, packaging and distribution experts. By applying the concept of an extension service through which scientists at agricultural experimental stations are required to share their knowledge with farmers, a model can be developed that offers help at multiple levels while rewarding the scientists who

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volunteer. The idea is to ask experts to volunteer what they know via telephone, zoom or mail. For technologies that require adaptation, consulting should be offered from the country seeking help. For food losses that have no ready solution, I propose that the country seeking that solution sponsor a graduate student from their country to an expert in the appropriate discipline and write the contract as a grant if the student returns to implement the solution, or a loan if not. Publication and presentation of successes would spread the word.

A key to the movement of goods, including food, is infrastructure. Shipping food from the US plains to central Africa could require 1/3 of the cost to the African shore and 2/3 to bring it to the final destination. Roads are critical and road construction is justified on a cost/benefit analysis that considers things like broken axles. The World Bank uses a program "Highway Development Management" (now HDM-4) for evaluation, but food loss from impact of potholes is not a consideration in the program. Considering food losses would justify more roads under the same investment. Village Level Processing & Packaging of Food is a program developed with and presented by Dr. Alastair Hicks (FAO) at World Food Congresses. The concept is to teach villagers basic food sanitation and processing, and means to convert short shelf life food (for example ripe fruits and vegetables) into value added products with a longer shelf life. Sale of these products promotes economic development while saving the raw materials promotes food security. The sanitation and processing equipment is about $100 US and available to villagers upon training 10 other trainers. A related development is manufacturers of packaging materials and equipment that use mobile units to do demonstrations, limited production and training in packaging.

Global Harmonization Initiative (GHI) was started by Huub Lelieveld and consists primarily of food technologists and scientists. Food laws exist to protect the public, but many food laws are based on other reasoning. For example, curved cucumbers were banned in the EU because they did not stack well in supermarkets. The ban was repealed, but farmers still do not harvest curved cucumbers because supermarkets do not want them. Other examples are regulations based on shape, size or color. The idea behind GHI is to eliminate food regulations based on anything other than food safety and

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thereby eliminate regulations that lead to destruction of food for non-safety reasons. Political will is essential, and lacking as the editorial states. As scientists I am afraid we will have to leave that discussion to others.

The previous discussion concerns food losses during food distribution. The developed world has adequate food but wastes approximately 1/3 of it. If you go to a supermarket just before closing, you may see produce and baked goods discarded in large quantity. Many restaurants in the US market themselves on large portions (super-size). A German minister offered a challenge to reduce Waste at the 2011 Save Food Congress, and one author here accepted the challenge with a paper published in Food Technology. His favorite restaurant is Cafe du Paris in Geneva Switzerland that has virtually zero waste. They have a good wine list, a salad, one-entree, steak and chips, and all the fries (chips) you can eat - delivered in small portions one at a time, right out of the fryer while they are the tastiest. The model is satiety, not gluttony.

Waste can be reduced. One way is a 'Pay-as-you-throw' system through which a municipality requires by law that all food and organic waste be discarded in biodegradable bags they sell. This is essentially a tax that supports purchase of a commercial composting facility that makes sterile (safe) compost that can be used by the city and residents. The advantages are many: waste becomes noticeable that would lead to people discarding less; nutrients are recycled rather than be landfilled, it facilitates local gardening (decorative and food) and ultimately saves money and resources. Landfills will last longer as organic materials are deflected, so landfills will be cleaner with reduced methane (a powerful greenhouse gas) development.

In conclusion,

- Food production is sufficient for total Global Food Security
- Food loss can be reduced through known & not-yet-known means
- Experts exist around the world that can enhance efforts by offering food science & technology & packaging expertise to reduce food loss and waste
- Village processing offers food and economic development by converting short shelf-life foods into value-added products

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- Regulatory reform through GHI can recover food lost for reasons other than safety.
- Food loss reduction can justify infrastructure improvements
- Building political will requires other than scientific skills
- Waste can be reduced by improving awareness + targeted action

Let's apply our collective knowledge of food & packaging to better protect, transport and deliver our current food production and reduce the impact of food loss on our environment. This is an effective, immediate and cost-effective way to reduce hunger and a route to finally meet hunger reduction goals with available funding.

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