

## Evaluating Agriculture Growth in India

At its Independence and for a few decades thereafter, India was dependent on foreign aid to secure food for its citizens. In 1947 our population was about 335 million and many doubted if India could ever be self-sufficient to feed its masses. Today, with a population about four times in size, we do not speak of lack of production but are worried about wasted surplus and effective food distribution. Our focus now, is more on avoiding food loss and waste in our supply chain. We stand more concerned about price of food and access to food than merely the production of food.

India's success with agriculture manifests so - our grain production today stands close to 260 million tons, we underwent a white revolution where milk production is almost 140 million litres per annum. In high value crops, today our production in horticulture stands at 281 million tons. In fruits and vegetables alone, we produced 84 million tons and 170 million tons in 2013-14. In all food items, we have scaled production multi-fold in the last 5 decades.

Production figures (annual)			
Horticulture	(million MT)	Livestock	(million MT)
Potato	46.4	Meat & Poultry	5.9
Onion	19.3	Fish	9.6
Tomato	19.1	Inland Fish	6.1
Mango	18.7	Marine Fish	3.5
Citrus	9.9	Butter	4.9
Banana	27.6	Milk	137.0 (million litres)
Brinjal	13.9	Egg	69731 million pcs
Aromatics, Cashew, Flowers, etc.	20.2	Field Crops	(million MT)
Vegetables	170.2	Pulses	19.8
Spices	5.8	Rice	106.2
Fruits	84.4	Wheat	95.6
<b>Total Horticulture</b>	<b>280.7</b>	Coarse Cereals	41.6

Various - Annual Reports on Agriculture

Compared with what we produced at start of the 1960s, we now produce 40 times as much tomato, 14 times more potato, 8 times more wheat, thrice as much in poultry and meat, 13 times more in fish, 8 times more milk and almost 40 times more eggs. The scaling up of our food production far surpassed the growth in population (which grew about 2.8 times from about 460 million in 1961).

Producing food in sufficient quantity is not our immediate concern; instead, apprehensions are more about securing easy and cheap access to the food, of minimising post-harvest losses and in improving resource use and input management. With almost 155 million hectares under agriculture, India's concerns today, are about enhancing productivity and to make agriculture more 'green', resource friendly, environmentally sustainable and to **bring our production to more gainful end-use.**

It is also notable that horticulture uses only 24 million hectares (approx. 15% of total area under agriculture) and contributes almost 30% of agricultural GDP. Combined with livestock produce, almost 60% of agriculture's contribution to GDP is covered, leaving the remaining to field crops, grains, pulses, cotton, etc. The prime drivers for rural wealth and economic productivity has changed.

India stands tall indeed, for having achieved a high level of food security in production terms as it safely accounts for almost 18% of global population. The focus has moved towards planning for the future (Indian population is estimated to touch 1.7 billion by 2050, against 1.28 billion today).

However, a major learning arises, that no matter how much food we harvest, the waste incurred enroute to consumers nullifies the benefits that ought to accrue. The supply chain mechanism has been unable to cope with the flood of farm produce. This inefficiency in our supply systems is a constraint, which in turn has direct impact on inflationary pressures and degradation in the produces' nutritional quality. In effect, production alone is not sufficient to ensure reach of food to our dispersed sub-continental footprint. The missing piece for achieving food security is a good distribution mechanism.

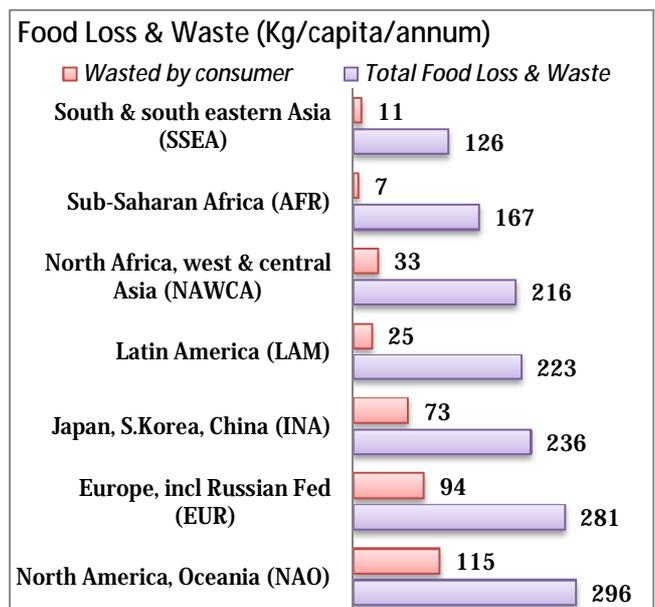
The Public Distribution System, though primarily for hardy crops like grains and pulses, fulfilled the distribution need to some extent. The PDS is also supplemented with other mechanisms such as mid-day meal for schools, and with special entitlements to pregnant and lactating mothers. Of late, the country also enacted a rights based approach to Food Security through legislation. The aim is not merely at making food available, but to make nutrition **available at an affordable cost**. This was a response to counter the rising cost of food and to assure nutrition at right cost to the underprivileged.

With efficient logistics-supply-chains, maybe such an Act need not have been required. A revamped PDS, with intelligent cold-chains are clear options. Long-term price stability is best achieved through developing dynamic supply chains, designed to constantly feed demand and offset episodic sourcing.

At the cost of being repetitive and to reinforce, the primary concern for India today, is to bring its immense farm produce to gainful and effective end use - to reach the hands of consumers, regularly and efficiently. Every kilogram wasted due to poor post-harvest handling & logistics capabilities is also a loss multiplied in terms of resource wasted. Any loss on the supply side has immediate ramifications on price and inflation.

**Food Loss: pre-consumer, post-harvest, in-transit | Food waste: post-retail, consumer-end, post-monetisation**

The recent HLPE (High Level Panel of Experts) report by FAO reports that South and Southeastern areas incur a per capita annual Food Loss & Waste (FLW) of 126 kgs, which is the lowest globally. In comparison Europe (EUR) and North American (NAO) regions, suffer an annual per capita food loss and wastage in tune of 281 and 296 kgs respectively. Even if we ignore the waste, that occurs in the hand of consumers, the post-harvest loss is 181 kgs per capita in NAO, still higher (>57%) when compared with the 115 kgs per capita lost in SSEA. Nevertheless, given our population, the sum total quantity that is lost translates to two and a half times that in NAO and 30% more than that in EUR.

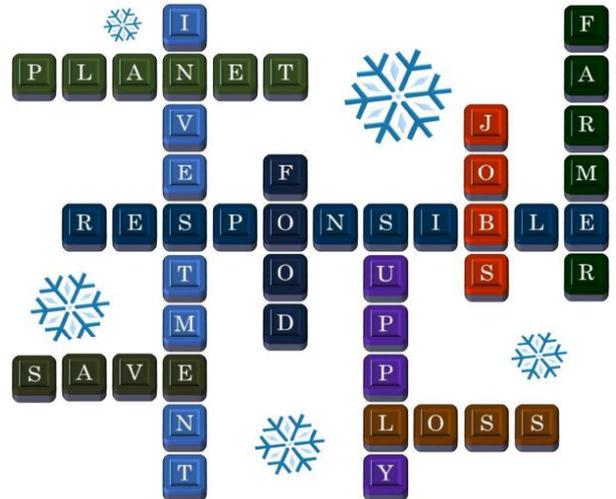


It remains obvious why improving post-harvest delivery systems of agricultural produce is a thrust area for India. Both in supplying fresh to market as well in semi-processed or processed formats, each being a productive end-use.

An assessment on the losses incurred in our agriculture supply systems was published in 2010 by CIPHET of ICAR. The study indicated that food losses ranged from an enviable 2.8% to a maximum of 18%, across the 46 food items studies, which included fruits, vegetables, livestock and grains. In comparing with assessments made by other agencies worldwide, the assessed losses are surprisingly low. A fresh study is being repeated with the same commodities to revalidate the status, and learnings from procedures and measures undertaken in conducting the first study would be incorporated.

On the other hand, readers may take note that even the report on Food Loss & Waste (FLW) by the FAO, in June 2014, highlights that there are myriad approaches to defining FLW globally, with “no agreed method to evaluate the quality of data, method and numbers”. An approach to define the FLW parameters is the key and a welcome step towards globally harmonising important yardsticks.

I have frequently spoken on harmonising definitions and measures, as true standards of reference – a glossary of terms carried in our NCCD newsletters, is an extension of such attempts across segments.



#### USDA Study on Food Loss in United States *(on Losses occurring at Retail and Consumer level)*

A study conducted by the United States Department of Agriculture (USDA) threw up some astonishing findings. As per the study, 31% of the available food supply in the United States, at the retail and consumer levels is wasted. The estimated loss is after removing inedible portions, not considering bones, pits, stems, stalks etc. The loss incurred at farm level and between farm & retailer were not reported due to data limitations.

The study also found that food loss is economically efficient in certain cases. The report states there is a practical limit to how much food loss the United States or any other country could realistically prevent, reduce, or recover for human consumption given: (i) technical factors (*e.g., the perishable nature of most foods, food safety, storage, and temperature considerations*); (ii) temporal and spatial factors (*e.g., the time needed to deliver food to a new destination, and the dispersion of food loss among millions of households, food processing plants, and food service locations*); (iii) individual consumers' tastes, preferences, and food habits (*e.g., throwing out milk left over in a bowl of cereal*); and (iv) economic factors (*e.g., costs to recover and redirect uneaten food to another use*).

This reported loss was quantified as 133 billion pounds (60.3 million tons); of 430 billion pounds (195 million tons) that reached retailers and consumers in US (this study was based on data collated in 2010). The top three food groups by their share in the total food loss were meat, poultry, and fish (30%); vegetables (19%); and dairy products (17%). In total economic value, based on retail prices, translated into \$ 161.6 billion in 2010. This food waste contributed towards 34 million tons of the 250 million tons of municipal solid waste in USA that year.

When we look at Food Loss & Waste with clarity, one unambiguous rationale stands out – we farm food with one aim, to consume what is harvested; and deficit occurs when gainful-end-use is not achieved. When food does not reach the consumers; or reaches in degraded condition, a

loss of all associated inputs is suffered. When we quantify such inputs, we consign value to the water, labour, transport, etc., and the sum total of these values is the total loss incurred, in input costs. This is further multiplied, when factoring in the sustainability, both environmental and economic.

Then, there is an opportunity loss, in terms of the end value attained *viz* what could have been realised. This aspect would require factoring in certain qualitative measures, extant market demand and price, and this track can get confounding as qualitative measures are subjective and defining markets is notional and dependent on other capabilities. Yet, this could truly define the total economic opportunity wasted.

It is worth noting that the loss that happens immediately post-harvest, though offensive and senseless, is far less destructive than that which takes place further down each produce life cycle. Any loss that occurs further along the activity chain, which initiates at harvest, or the waste that occurs in the hands of consumers, is subject to a phenomenal multiplier effect. This, because the loss has occurred after undergoing cost & energy intensive activities in logistics, inventory and risk management; like cross regional transport, domestic distribution, packaging, branding, shelf presence, etc. The closer the loss occurs, to the targeted end-use, the more outrageous is the cost to the environment & to economic sustainability of the food chain.

Scientific and better-practised application of technology in the logistics network, is key to overall food & nutritional security as well for assuring availability – in turn reflecting in the price stability. Technology is used for two key aspects – to extend reach to consumers beyond the limits of perishability and to ensure steady-state supply. Such an intervention should result in more markets, more transactions, and in turn the scope to produce more. Where technology is availed for hoarding, largely to deny or delay a ready transaction, it clearly has detrimental effects on supply with unwanted repercussions on demand side. Cold-chain is the sole technology, in case of perishables, that can help meet these aims, provided it is correctly targeted for use as uninterrupted farm-to-fork logistics.

**“Without recourse to cold-chain, farm productivity is lost; with cold-chain there is market access & room for gainful realisation.**

**Productivity needs to be redefined and measured on basis of gainful end-use.”**

-PAWANEXH KOHLI