Industrialising India's Food Flows: An analysis of the food waste argument

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In May 2011, the Food and Agriculture Organization (FAO) released a short study on 'Global Food Losses and Food Waste'. Rather against the run of conventional wisdom on the matter, FAO said that "in developing countries 40% of losses occur at post-harvest and processing levels while in industrialised countries more than 40% of losses happen at retail and consumer levels." Until now, India's Ministry of Food Processing Industry, Ministry of Commerce (Department of Industrial Policy and Promotion), Ministry of Agriculture and our National Agricultural Research System have asserted that it is encouraging investment in the retail 'back end' (collection, cold storage, logistics, warehousing, modern markets, etc), which will substantially reduce post-harvest food waste/loss, help farmers earn more and help control food inflation.

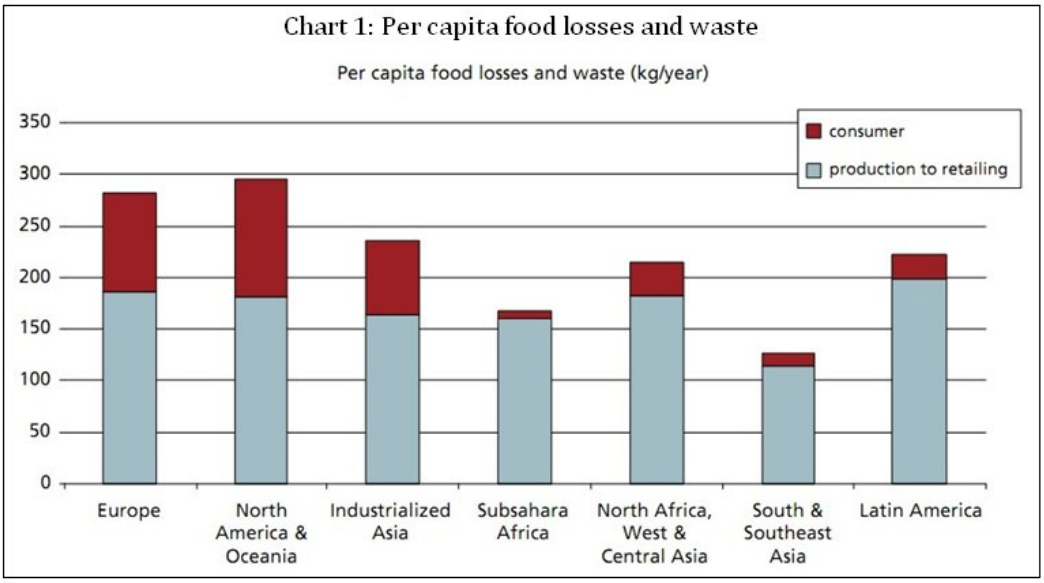
The FAO study has provided some useful data to illustrate the global nature of food loss and waste. The study has shown that the per capita food loss in Europe and North-America is 280-300 kg per year. In Sub-Saharan Africa and South and Southeast Asia it is 120-170 kg per year. The total per capita production of edible parts of food for human consumption is, in Europe and North-America, about 900 kg per year and, in sub-Saharan Africa and South and Southeast Asia, 460 kg per year. Per capita food wasted by consumers in Europe and North-America is 95-115 kg per year, while this figure in sub-Saharan Africa and South and Southeast Asia is 6-11 kg per year. Food waste at consumer level in industrialised countries (222 million tons) is almost as high as the total net food production in sub-Saharan Africa (230 million tons). The difference between food waste in the North and in the South, if taken as averages and mapped to populations and their food wasting habits, then for Bangladesh in 2011 we have a total wastage of 1.275 million tons! To place that amount in perspective, FAOStat (the organisation's statistics resource) places the total harvest of vegetables in Bangladesh in 2008 at 1.1 million tons.

Industrial food retail and its effect on food losses

Food waste is "more a problem in industrialised countries, most often caused by both retailers and consumers throwing perfectly edible foodstuffs into the trash", the study has said. This is true, but does not explain adequately behaviours in the new Asian urban centres. It is in fact a problem for all societies that have industrialised their food handling, processing and retailing systems to the average level that is seen in the OECD economies, and this problem is therefore as much visible in the consolidation of urban food consumer markets of say Sao Paulo and Mumbai and Jakarta as it is in the North American or west European cities and towns.

It is with the help of two charts that the "post-harvest losses" argument for increased investment in processing-related infrastructure can be shown as being much too weak on both data and analysis to aid policy. In contrast to the

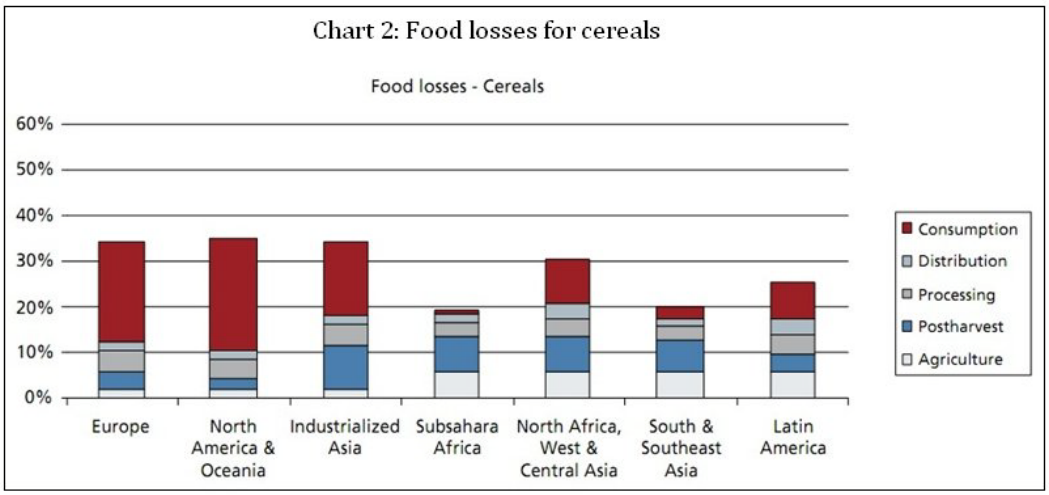
reasoning of those advocating FDI in the retail sector, this is what the FAO study shows: in South and South-East Asia, the 'production to retailing' stage loss/waste is around 120 kg per capita, the lowest among the 7 regions measured in the study [*Chart 1: per capita food losses and waste*]. In Europe and North America, post-harvest losses are the smallest [*Chart 2: food losses for cereals*]. However in the processing and distribution stages, South and Southeast Asia and sub-Saharan Africa lose distinctly less than the amounts of loss recorded in Europe and North America.



It is however more than a statistical coincidence that this FAO study uses 40% to describe the portion of losses, whether in industrialised societies or whether in Asia/Africa. It is also 40% that has been used ad infinitum in India to support the push towards industrialising our crop production from harvest to '*thali*'. In 2010 the Department of Industrial Policy and Promotion (DIPP) used the figure in its discussion paper on 'Foreign Direct Investment (FDI) in Multi-Brand Retail Trading' (which drew a number of responses from small traders, *kisan* associations and business lobbies). In their submissions to the Ministry of Commerce, proponents of FDI in retail have used the figure often: "Studies reveal that the wastage levels are between 24% to 40% in the food supply" stated global food retailer Carrefour, and quoted a 2008 Price Waterhouse Coopers study ('Benefits of Modern Trade to Transitional Economies'); "India's current supply chains do not permit the smooth and reliable functioning of a state-of-the-art retailing practice," stated Bharti Wal-Mart; "Additionally, high demand/supply fluctuations, lack of back-end infrastructure also lead to high wastages of 30-40% in fruits and vegetables".

The DIPP paper had itself offered the following opening: "Losses of perishable farm produce are estimated to be over Rs. 1 trillion (Rs 100,000 crore) per annum, 57% of which is due to avoidable wastage and the rest due to avoidable costs of storage and commissions". Where did this assessment come from? How were waste and post-harvest losses for major cereals, coarse cereals, small millets and pulses, fruits and vegetables calculated over two growing seasons in

28 agro-ecological regions? In how many of the over 7,000 *mandi*s in India were surveys conducted to poll farmers and taluka level traders for their views on food loss/waste? How did post-harvest loss and waste become a significant input for the justification of industrial retail and FDI rather than becoming an input for the district agricultural management plans that are said to be central to the Ministry of Agriculture's flagship programmes?



There are few answers from government, fewer still from industry. Whether as a notional national average for perishable farm produce or as an average for certain states/agro-ecological regions, the 40% justification ought not to have reached such an oracular status. At all levels of estimating – common global crops, national cereal crops, state or province – there are substantial data gaps and a vast variety of variables to take into account. Moving from global regions to small administrative zones does not, contrary to what industry suggests, reduce the factors.

Loss and waste, viewed from two perspectives

These crippling limitations have been discussed directly by assessment efforts such as Britain's Foresight Project on Global Food and Farming Futures. Its expert forum on the reduction of food waste had asked: "How can waste reduction help to healthily and sustainably feed a future global population of nine billion people?" All attempts to answer were prefaced with the proviso that as a result of the diverse loss estimates made for different crops across different regions, growing and harvesting conditions, no consensus emerged on what proportion of global crops are lost at the post-harvest stage. "There was general agreement that data describing post-harvest losses across the global food supply systems is inadequate and dated," said the expert forum report.

Here too however, the idea that there are "significantly higher losses associated with smaller farms at the grower stage" has taken hold, and this idea separates "losses" from the ecologies that small integrated farms practice in Asia and Africa, moulded as they are by the cultural landscapes of old rural settlements. That is why even a study as ambitious as the Foresight Project lumps together

the BRIC countries and assigns them estimates "quoted in the region of 20 to 40% of all produce". Still, they have been circumspect, and have asked: where to set the systems boundary between issues linked to agricultural yield and growing conditions and those more directly linked to post-harvest issues?

The gap between two perceptions of cultivation activity – the one from the government-industry viewpoint, the other from within the agro-ecological niche – can be seen clearly in these two references.

"Against a production of 180 million mt a year of fruits, vegetables and perishables, India has a capacity of storing only 23.6 million mt in 5,386 cold storages across the country, of which, 80 per cent is used only for potatoes, according to the latest DIPP paper on Foreign Direct Investment (FDI) in retail. According to industry estimates, 25 to 30 per cent of fruits and vegetables and five to seven per cent of food grains in India get wasted. According to some reports, Indian farmers realise only one-third of the total price paid by the final consumer, as against two-third by farmers in nations with a higher share of organised retail, according to the DIPP paper." This is from a news report, 'Cold chain industry yet to attract FDI', published in the Business Line, on December 23, 2010. It shows the durability of statistics and positions held jointly by government and industry, and how these are used in relay to reinforce short-term policy routes that will bring destruction to India's integrated small farm traditions.

The other reference is from the Leisa India journal. Leisa is the short form for Low External Input and Sustainable Agriculture and the journal discusses the technical and social options open to farmers who seek to improve productivity and income in an ecologically sound way. Its March 2009 issue featured diversified farming systems and a commentary noted how rice (referred to one-dimensionally by Ministry of Agriculture bulletins in terms of hectares sown and yield, and by the Ministry of Food and Consumer Affairs as offtake per month in thousand tons) has adapted to deep water, saline soil, late rain and how, even now, around 150 varieties of rice are known about and used by small farmers of the Sunderban delta and coastal East Midnapore districts of Bengal.

This view has provided the merest glimpse of the agro-ecological approach to crops. "Every part of rice plant has many uses or the by-products too are valuables as food or fodder. Rice straw is used as roofing material, to make ropes and paddy storage bins, as winter bedding material for cattle, as substrate for mushroom cultivation, as cattle fodder, as packaging material, as construction material etc. The rice hull is used as fuel, as incubation / insulation material for hatching eggs, as mulch or soil amendment material (especially in charcoal form), as colouring agent in pottery etc. Broken rice and rice bran is used as feed for fish, duck, chicken, pig. Various food items are made from rice powder; puffed rice, popped rice, flattened rice etc are still popular snacks in Bengal. Rice beer is liked by farmers." Where, in this wondrously varied universe of uses small and apt, is there the mention of waste or loss?

Biomass in every form is valued highly by our cultivating communities and rural residents. Despite the late revival of official interest in organic farming and the inclusion of the study of biomass resources, Ministry of Agriculture administrators and planners tend to see 'waste' as being that material which is neither bought at '*mandi*s' nor otherwise consumed and which escapes the robotic acres-production-yield accounting system. From within the planned agriculture and food procurement circles, this is a safe and established position. [*Table: estimated/assumed waste percentages for each agricultural commodity group*] The reality is otherwise. Just as stalks are collected after harvesting (wheat, rice, coarse grain) so too are vegetable and fruit leftovers, as these are fed to farm animals, small ruminants, poultry or are otherwise returned to the organic soil layer either via composting or mulch.

Estimated/assumed waste percentages for each commodity group in each step of the food supply chain for South and South-East Asia

	Agricultural production	Post-harvest handling and storage	Processing and packaging	Distribution: Supermarket retail	Consumption
Cereals	6%	7%	3.50%	2%	3%
Roots & Tubers	6%	19%	10%	11%	3%
Oilseeds & Pulses	7%	12%	8%	2%	1%
Fruit & Vegetables	15%	9%	25%	10%	7%
Meat	5.10%	0.30%	5%	7%	4%
Fish & Seafood	8.20%	6%	9%	15%	2%
Milk	3.50%	6%	2%	10%	1%

Source: 'Global Food Losses and Food Waste: Extent, Causes and Prevention', FAO, 2011.

"In the sixties, when the use of chemical fertiliser was being promoted in a big way, agricultural scientists justified this by claiming that they were only helping the plants through providing them nutrients in the inorganic form that they needed," Bhaskar Save explained in 'The Great Agricultural Challenge' (2008). "It was overlooked that the natural processes of humus formation in the soil are far more efficient in recycling plant nutrients from organic matter into inorganic mineral form, as witnessed in our rich forest and traditional mixed farms, whose fertility has remained undiminished over millennia."

How food waste begat an industrial response

The advice of an inspirational organic farmer with 60 years of natural farming experience is lost on the biotech and market-driven administration. For the central government, it is instead 'Vision 2015', a document drawn up by the Ministry of Food Processing Industries, which is credible. This 'vision' has as its aim the raising of the "level of processing of perishables to 20%, enhancing value addition to 35%" in order to achieve "faster growth of the food processing sector". The rest of this document uses the idiom of crores, investment, technology and infrastructure to make its point. It does however quote a study done by the Central Institute for Post Harvest Engineering and Technology (Ludhiana) to state that post-harvest losses in 2009 were estimated to be Rs. 44,530 crore.[ii]

Behind the 'Vision 2015' document is an objective that has tended to be obscured by the more pressing concerns of food production, distribution and its price. This is the first factor vital for an understanding of the emerging new industrial food model in India. This objective is the doubling of India's share in global food trade, from 1.5% to 3% by 2015. It is in this more worrisome context that the arguments concerning food waste/loss may be placed. "An integrated strategy for promotion of agribusiness vision, strategy and action plan for the Food Processing Sector has also been approved by the Government," the Minister of State for Food Processing Industries, Harish Rawat, told the Rajya Sabha in a written reply in March 2011. The keyword here is 'agribusiness' and both the central government and the Ministry of Food Processing Industries appear to consider it a matter of pride – in the face of continuing malnutrition in 17 major states – that the average annual growth rate of the food processing sector has doubled in six years: from 7% in 2004 to over 14% in 2010.

In its conclusion, the FAO study on food losses and food waste has cautioned that while increasing primary food production is paramount to meet the future increase in final demand, "tensions between production and access to food can also be reduced by tapping into the potential to reduce food losses". The study has recommended that "actions should not only be directed towards isolated parts of the chain, since what is done (or not done) in one part has effects in others".

While the Ministry of Food Processing Industries (MoFPI), working with the Department of Industrial Policy and Promotion, is engineering a much larger role for private sector control of food flows in (and from) India, there is one small component of one small programme amongst the Ministry of Agriculture's raft of schemes that deals directly with food waste. This is the National Project on Organic Farming (NPOF) and, within it, the provision of a capital investment subsidy to set up what the NPOF calls "fruits and vegetables waste/agro-waste compost production units".

Typically however, the NPOF will run only till the end of the Eleventh Plan Period. And the funds available for this capital investment subsidy are Rs 21.4 crore, about a fifth of the NPOF budget (half the budget is allocated to construction of centres and staff – but we can only hope that the six Regional Centres of Organic Farming will continue their work beyond March 2012).

The persistence of the food waste argument (and its 40% cipher) and its proffered technological answer takes on a new importance when the central government's 'mega food parks' plan is brought into the scene. The government has approved 50 such mega food parks for assistance across the country. This is the second factor vital for an understanding of the emerging new industrial food model in India. These mega food parks are designed to cluster food processing units – each will have around 30-35 such units with a collective investment of Rs 250 crore "that would eventually lead to annual turnover of about Rs 450-500 crore and creation of direct and indirect employment to the extent of about 30,000" according to the MoFPI's Mega Food Parks Scheme (MFPS) Guidelines.

This scheme too is to run with the Eleventh Plan period – which is why the number of approvals is rising sharply in this last Plan year – but "projects which have received the final approval under the scheme shall continue to receive the grant support and benefits of the scheme", the Guidelines have said.

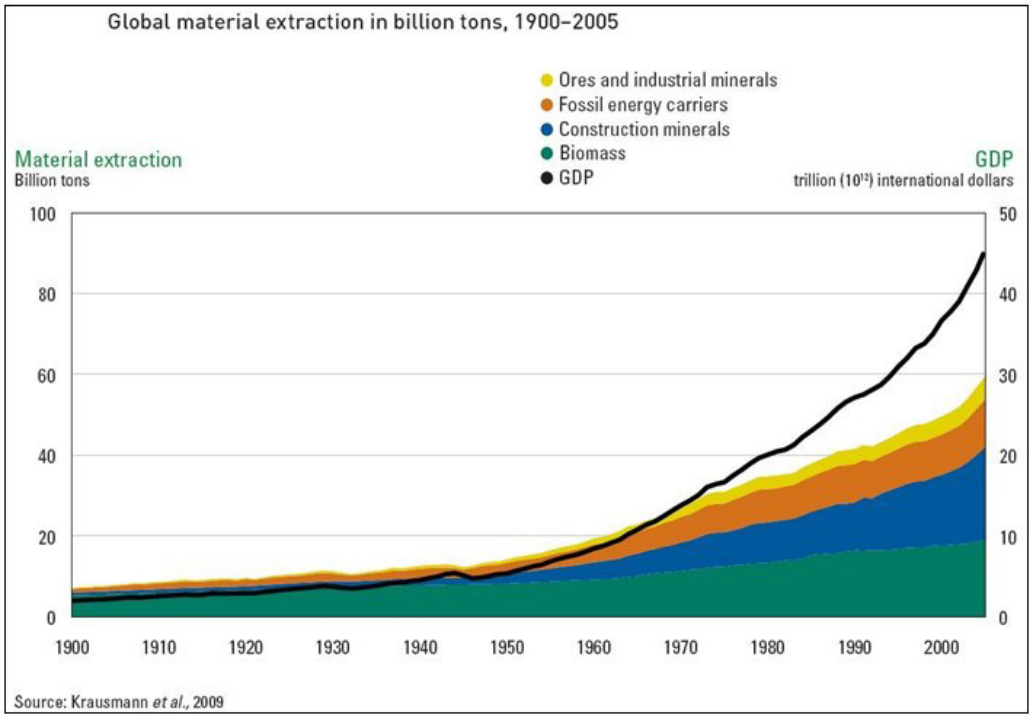
These mega food parks are in addition to the establishment of 60 fully equipped agri-export zones (quite naturally called AEZs by industry and their opponents alike). Together, the two formats are expected to bring FDI into all aspects of the food sector in India. Critical to the success and profitability of this complex enterprise is the expectation that India will have a large marketable surplus in crops – the India Brand Equity Foundation (IBEF), described as a public-private partnership between the Ministry of Commerce, Government of India and the Confederation of Indian Industry (CII) has estimated that "by 2012, India's marketable surplus will increase to 870 million tons per year, 40% of which is likely to be accounted for by perishable foods, creating opportunities for the development of storage infrastructure". The expectation of a marketable surplus of this scale, and the concomitant expectation that it will be readily available for commercial use and merchant profit, is the third factor vital for an understanding of the emerging new industrial food model in India.

The new shape of food control and concentration

The IBEF (representing government-plus-industry) is sanguine about its prospects in this sector. "Considerable investment is required in rural infrastructure and components of the supply chain, which is undertaken with the involvement of all stakeholders on a PPP basis," an IBEF briefing advised in late 2010. "This is likely to add value and help producers obtain better prices and income. The central government envisages an investment of US$ 21.89 billion (Rs 105,072 crore) by the private sector in the food processing industry by 2015."

Three years ago, the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) study, in its East and South Asia and the Pacific volume had foreseen that agriculture would be at "the receiving end of most of the negative consequences of globalisation and trade liberalisation with elimination of tariffs in the ESAP region, marking a wider rural-urban disparity", It was not an especially difficult prognosis to make at the time, given the trends visible then, but it was remarkable for a major international study group to face down their governments and speak agricultural truth to power.

The Asia and Pacific volume warned of the "increasing concentration of food markets/retail and grain trade in the hands of a few global players, varying levels of investment (public and private), improved transport and communication facilities, along with increasing restrictions on economic activity due to IPRs or other trade policies, increasing disillusionment, political instability, intra and inter-regional tensions (over water, trade, subsidies, environmental compliance, oceans and fishing rights, etc.), and increasing marginalisation of indigenous and tribal people within these countries". [*Chart 3: global material extraction*]



These trends and movements have indeed become stronger and more visible over the last four years; the IAASTD had at the time also advised governments in Asia to ensure that social safety nets and "adequate investments and benefits flow to the agriculture sector and into poorer regions and communities". This advice, like the bulk of the main study, has been ignored by the planners and administrators to whom it was directed, unless of course the recent enthusiasm about direct cash transfers indicates that they are considered the ultimate silver bullet.

That measure, refined by the electronic exclusion/inclusion system of the Unique Identification Authority of India-Aadhar and supplemented by the 2011 BPL census, may be applied as much to rural smallholders as to the urban poor. It is for this reason that the CII and the Ministry of Commerce have advocated greatly increased investment in supply chain infrastructure. "There is a considerable scope to use sophisticated techniques and applications in areas such as demand forecasting, data integration, fund-flow management and information sharing to improve supply chain management," the IBEF briefing has said. These are developments that fit well with the terms of retail reference spelt out to the DIPP by the retail majors, both Indian and foreign.

The response of the US-India Business Council to the discussion on FDI in retail indicated the direction required quite bluntly in July 2010: "Restricting retail chains to cities of greater than 10 lakh [one million] will greatly degrade the benefits that investments in this sector can generate. Should a phased approach to a full scale retail presence in India be preferable, then retail should be initially allowed in cities of 1 lakh (100,000) or more." For the food retailers and their integrated businesses of agri-logistics, contract farming and food processing,

these are the markets demanded at the outset which they say will “enable truly efficient supply chains” that will “ultimately benefit consumers, SME suppliers and small retailers served by wholesale stores”. The circle of beneficiaries in these models, and for these terms of reference, does not include the *kisan* household.

This is the fourth factor vital for an understanding of the emerging new industrial food model in India – the impetus given to and the economic biases being created for rapid and sustained urbanisation. In April 2010 the McKinsey Global Institute (which is McKinsey & Company's business and economics research arm) issued a study titled ‘India's Urban Awakening: Building inclusive cities, sustaining economic growth'. The study explained in detail why urbanisation is imperative for India’s continuing economic growth. It described how in 2008, an estimated 340 million people already lived in urban India, representing nearly 30% of the population. “Over the next 20 years, urban India will create 70% of all new jobs in India and these urban jobs will be twice as productive as equivalent jobs in the rural sector," said the McKinsey study. “In 2025 the largest markets in India will be transportation and communication, food, and health care, followed by housing and utilities, and recreation and education.”

These well-dressed conclusions have suited the Government of India admirably. In 2001 the urban population was 285 million and thereby constituted 27.8% of the total population. This was, after China, the second largest urban population in the world. In 2026 according to an estimate of the Census of India Organisation, the urban population will rise to around 535 million or 38.2% of the total population. Apparently discounting the ruinous depletion of resources – such as water, mineral and biomass – and ignoring the looming questions of energy alternatives and sustainable consumption, the Ministry of Urban Development has emphasised that cities and towns contribute around 62-63% of GDP which is likely to increase to 75 % by 2021. “Over 70 % of new jobs in future shall be largely created in cities,” the ‘Strategic Plan of Ministry of Urban Development for 2011-2016’ has said, copying the McKinsey forecast, which it then names as a primary source. Nowhere in this ‘strategic plan’ and nowhere in this GDP-dominated discourse is there even a cursory mention of how the givers and takers of all these new urban jobs will feed themselves.

In ‘The Great Agricultural Challenge’ Bhaskar Save has spoken of visiting a farmer, over 50 years ago, in the dry Surendranagar district of Gujarat. "I was fascinated by his field. There were six different crops that had been sowed together.” From a 65-70 day crop to a 330-350 day crop, the farm Save visited had been sown with '*tuvar*' (pigeon-pea), '*jowar*' (sorghum), '*gavar*' (cluster bean), '*bajri*' (pearl millet) and '*moong*' (green gram). "Every alternate row of crops in this poly-culture is a legume that provides nitrogen in the soil, helping the growth of the adjoining crops on either side,” Save wrote. “Complete ground cover of vegetation is established within a few weeks of the rains, which then continues round the year till the farmer replants for the next monsoon."

The veteran natural farmer's description, now over half a century old, simply and aptly describes the interdependence between biological resources, from the genetic to the landscape level, and long-standing traditions, practices and knowledge for adaptation to environmental change and sustainable use of biodiversity. Interdependence gives no place to waste or loss, and that principle governs India's most resilient and adaptive farming systems, At a time when the growing store of earth systems knowledge concludes that we must reduce our per capita use of resources (biomass, water, arable land) and decouple from fossil fuel dependency, India's major ministries continue to spin out elaborate growth-oriented policies that promise the opposite, and threaten to irreparably harm our bio-cultural heritage.

Key references:

'Global Food Losses and Food Waste: Extent, Causes and Prevention', Rural Infrastructure and Agro-Industries Division (AGS), Food and Agriculture Organization (FAO) of the United Nations, 2011

International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), East and South Asia and the Pacific (ESAP) report, 2008

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[ii] The author wrote to the director of CIPHET asking for a copy of the study. The reply, from a 'coordinator', was: "AICRP on PHT has conducted an estimation of harvest and post harvest losses in India. The report has been submitted to the Parliamentary Standing Committee on Agriculture. The report will be available in public domain as soon as it is published by ICAR." There is no explanation from either CIPHET or ICAR on why a study central to a major policy of a major ministry is not in the public domain.