

The Green Illusion Behind Greens

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The “Sustainable” Vegetable Markets

In a city like Bengaluru, vegetable markets are woven intricately into everyday life. Unlike supermarkets lathered in layers of plastic and industrial branding, local vendors appear far more environmentally conscious and hence, for many urban consumers, buying vegetables from local vendors feels like one of the simplest sustainable choices they can make.

This perception is increasingly common in urban India. Yet research into how these supply chains actually function tells a strikingly different story. Most vendors are not directly connected to farms. They source from wholesale mandis (a large, often government-regulated marketplace), where produce from multiple regions is aggregated, transported, stored, and redistributed before finally reaching consumers. If those vegetables are grown using chemical-intensive methods and transported via resource-intensive logistics systems, how sustainable is the system really?

The Myth: Vegetables sold by local vendors are naturally grown, environmentally friendly, and sustainable.

The Reality: Much of the produce sold still depends on chemical-intensive farming, inefficient distribution systems, and high volumes of wastage.

The Mainstay Farming

One of the most visible shifts in Indian agriculture is the widespread move towards chemical-intensive production. To meet the demands of rapidly growing population, farmers increasingly rely on pesticides, synthetic fertilisers, and growth-enhancing chemicals to maximise yields.

According to the Food and Agriculture Organisation (FAO), global pesticide use has doubled since 1990, reaching approximately **3.7 million tonnes** in 2022. India alone used over **61,000 tonnes** of pesticides in agriculture in 2020. At first glance, this appears economically rational. Chemical farming enables higher yields within shorter timeframes, helping stabilise food supplies for expanding cities. Without these methods, vegetable prices could rise significantly, making nutritious food less accessible for lower-income households.

However, the environmental costs are severe. Excessive pesticide and fertiliser use contributes to soil degradation, water contamination, and biodiversity loss. Several widely used pesticides have been identified as endocrine-disrupting chemicals, with implications for wildlife and human health alike. Organic farming may be environmentally safer, but it produces lower yields and demands greater labour investment, making chemical methods less of a choice for many small farmers and more of an economic necessity. The sustainability debate, therefore, cannot simply blame farmers. It is deeply tied to consumer demand for cheap vegetables and the pressure to produce food at scale.

The Supply Chain

The biggest misconception surrounding vegetable vendors is that they source directly from nearby farms. In reality, traditional Indian supply chains pass through farmers, commission agents, wholesalers, retailers, and finally consumers, meaning vegetables may have travelled across districts or entire states before reaching a roadside basket. While this system enables year-round urban food availability, its environmental costs are largely invisible to consumers.

Transportation relies heavily on diesel-powered vehicles. Post-harvest losses compound at every stage. Research estimates that around **33.1% of India's total vegetable production** is wasted annually due to ineffective post-harvest management, with retailer-level losses for tomatoes reaching as high as **30%**. Every kilogram lost represents wasted water, fertilisers, fuel, electricity, and labour, all of which now produce zero nutritional value.

The Cold Chain

The problem is further exacerbated by India's underdeveloped cold-chain infrastructure, referring to temperature-controlled storage and transport systems used to preserve perishable produce. According to government and agricultural infrastructure studies, India loses between **30% and 40% of its fruits and vegetables** annually due to inadequate cold storage and refrigerated transport facilities. In many regions, vegetables travel long distances in unrefrigerated trucks under extreme temperatures, accelerating spoilage before produce even reaches wholesale markets or retailers. As a result, perishable crops such as leafy greens experience disproportionately high wastage rates, turning what could have been nutritional value into an avoidable environmental burden through wasted water, fertilisers, fuel, and electricity.

Comparative Data Analysis: Post-Harvest Production Losses in India

The table below, drawn from the CIPHET national assessment (2015) and corroborated by Kumar et al. (2022), illustrates post-harvest production losses across each stage of the Indian vegetable supply chain for four key crops.

Supply Chain Stage	Tomato (%)	Potato (%)	Onion (%)	Leafy Greens (%)
Harvest	2.1	1.4	1.0	2.5
Farm Storage	2.8	2.3	3.5	3.0
Transport	2.4	1.1	1.5	2.8
Wholesale Market	2.3	1.2	2.1	2.4
Retail Vendor	3.8	1.0	2.3	4.1
Total Loss	12.4	7.0	10.4	15.0

Table 1: Stage-wise post-harvest losses (% of production). Source: CIPHET (2015); Kumar et al. (2022).

What this data makes clear is that losses are not concentrated at a single careless point. They compound systematically across every layer, from harvest and farm storage through transport,

wholesale, and finally the retail vendor. Leafy vegetables, which are the most perishable, incur the highest cumulative losses, at approximately 15%, precisely because they travel the farthest through systems designed for volume and affordability rather than for food integrity. The environmental impact is stark: each lost kilogram carries the full upstream cost of the water, pesticides, diesel, and electricity that went into producing it, with none of the nutritional and economic return. By the time a bunch of spinach reaches a Bengaluru vendor's stall, the environmental burden has already been carried across several kilometres and multiple handling points. Freshness is real. Sustainability is not.

Consumer Behaviour & The Disposal Crisis

Sustainability is not determined solely by farmers or distributors. Consumers themselves drive significant portions of the problem. Vendors across urban Indian markets routinely supply single-use plastic bags because customers expect them, and refusing risks losing business. More subtly, consumer preference for cosmetically perfect, uniformly shaped vegetables directly incentivises farmers to apply chemicals that improve appearance rather than nutritional quality. The system's unsustainable practices are therefore not imposed from the top down. They are reinforced from the bottom up, through the accumulated purchasing decisions of millions of ordinary consumers.

The final, most overlooked stage is disposal. Unsold and spoiled vegetables discarded into landfills decompose anaerobically, releasing methane, a greenhouse gas significantly more potent than CO₂. Globally, food waste contributes between **8% and 10%** of all greenhouse gas emissions. In India, estimates suggest nearly **40% of food produced** is wasted annually due to fragmented supply chains and poor storage infrastructure. Yet this stage also holds the greatest reform potential. Composting, redistribution networks, and cold storage investment could dramatically reduce these losses, but require coordinated action across governments, distributors, and consumers alike.

Conclusion

Buying vegetables from a local vendor is not inherently unsustainable. These markets remain essential for affordable urban food access and support millions of livelihoods across India. However, the data tells us that "local" does not automatically mean "sustainable." True sustainability depends on every stage of the supply chain, not just the final transaction.

When Local Vegetable Markets Are Sustainable:

- When farmers use organic or reduced-chemical methods, protecting soil fertility and groundwater quality.
- When supply chains are short and direct, reducing transport emissions and post-harvest losses.
- When consumers bring reusable bags and actively choose imperfect produce, reducing plastic waste and cosmetic-chemical demand.
- When unsold produce is composted or redistributed rather than landfilled, closing the resource loop.

When They're Not:

- When chemical farming maximises visual yield at the cost of soil health and ecological integrity.
- When produce travels through multi-layered wholesale systems with inadequate cold storage, generating compounding losses at every stage.
- When consumer demand for cheap, cosmetically perfect vegetables locks the entire chain into environmentally harmful incentive structures.
- When food waste is mismanaged into landfills, converting an agricultural problem into a methane emissions crisis.

Ultimately, sustainability is not a single action or a choice of shop. It is the collective responsibility of farmers, distributors, vendors, consumers, and governments, working together across every stage of the chain.

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