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INSIGHTS FROM THE FIELD

Agroecological Impacts of Urban Demand for Fresh Vegetables: Preliminary Insights from Exploratory Surveys in Bengaluru

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1. BENGALURU AS A MARKET FOR FRESH PRODUCE

A historical trading hub in South India during the reign of the Madras Presidency and the princely state of Mysore, Bengaluru continued to grow into a metropolitan city in independent India. State-driven industrialization during the 1960s and 70s made it a popular destination for diverse socioeconomic classes. The establishment and growth of the information and communication and biotechnology industries from the early 1990s onwards extended its popularity further (Nair 2005).

The middle-income classes—important constituents of these urbanization waves—drove the demand for a year-round supply of various fresh farm produces, aided by salubrious weather that had made Bengaluru well known for vineyards. This convergence of the demand and supply of fresh farm produce triggered investment in private and public horticultural initiatives in and around Bengaluru (Ravi *et al.* 1995), including research institutions. The emergence of corporate players and international supply chains

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augmented the diversity of choices, price ranges, and buying ambience for fruit and vegetable commerce in Bengaluru (Ramachandra and Rani 2013; Vishnu and Kumar 2019).

Bengaluru's appetite for fresh farm produce is reflected in the existence of old and well-known markets, such as KR market, established in the early twentieth century; the Agricultural Produces Marketing Committee yards dedicated to fresh produce, such as Yeshwantpur and Singena Agrahara; weekly farmers' markets across the city, and Raithara Santhe in Yelahanka. In these markets, fresh produce—except for fruits like oranges and apples—is supplied mainly by farming communities in the city peripheries within the state of Karnataka—such as Anekal, Magadi, Hoskote, and Doddballapura taluks—and the neighbouring states of Tamil Nadu, Kerala, and Andhra Pradesh. In response to the increasing demand for farm produce, intensive production techniques, such as polyhouse vertical farming, hydroponics, and polymer farming are emerging in the peripheries of this metropolis.

Different modes of urbanization and expansion around the city of Bengaluru are known to have differential impacts on the agroecology of its peripheries (Patil *et al.* 2018; Purushothaman and Patil 2019). The increasing clamour for processed food and a boom in food joints (Karanth 2017) have obvious links to the dynamism in the city's food system. Just as the quantity and diversity of the agricultural produce consumed by Bengaluru have made the city a horticultural hub, the agricultural land around it has started to shrink. Studies reveal the repercussions of cities usurping farmlands and polluting water bodies on the lives and livelihoods of peri-urban small farmers (Purushothaman *et al.* 2021a, Purushothaman *et al.* 2021c). Even the demand for ornamental plants for urban landscaping is known to impact peri-urban production systems (Jaganmohan *et al.* 2012; Purushothaman *et al.* 2021b).

Changing demands in the fresh produce market require farmers located in the market catchment of cities to produce certain commodities, as most fresh produce is typically sourced from adjacent agricultural areas. Farmers in the neighbourhood choose their crops, varieties, inputs, and agronomic practices in response to these demand signals. This nexus between Bengaluru's food economy and consumer culture, the farming patterns in its peripheries, and the small family farms feeding the city (for a characterization of family farms, see Purushothaman 2019) needs detailed exploration. Bengaluru is projected to add 11.9 million more people and 251 villages to the metropolitan area by 2030 (BDA 2017), further reinforcing this need.

This essay is an account of the initial insights from the first round of primary surveys conducted between September and December 2021 to understand how urban consumers' demand for perishable agricultural produce is changing in Bengaluru, and how such changes may impact peri-urban areas. These surveys will help us design the next phase, which will focus on the impact on the peri-urban agroecology and livelihoods.

2. DATA ON RETAIL BUYING AND SELLING OF FRESH PRODUCE

The city's consumers of vegetables and fruits include resident households, its considerable floating population, food processing firms, and mushrooming food joints of various kinds. Its retail market space for fresh produce consists of supermarket chains, small traders, co-operatives, online stores, street vendors, and pushcart hawkers.

We designed the field survey for this study to focus on fresh vegetables supplied from peri-urban areas, covering Bengaluru's rural district and the rural parts of Bengaluru district. This focus, along with the eventual objective of connecting urban consumers and producers for informed interactions in the next phase, made it necessary to choose marketing spaces that facilitate the identification of peri-urban producers and urban consumers.

Observations during our exploratory visits to various retail sellers of vegetables indicated the following: a) different types of retailers cater to different income groups located in different parts of the city; and b) there are two broad categories of fresh produce sold—vegetables that are common ingredients in the local cuisine and high-value exotic produce.

Based on these observations, we categorized retail stores in the city into premium stores, mid-range stores, and affordable markets, according to their customer base. We shortlisted two retail chains catering to each of the three categories of consumers—low, middle, and high income—for customer surveys. We targeted select stores of retail supermarket chains, online retailers, and unorganized sellers.

Sales data on fresh produce in organized retail stores are managed centrally in their respective corporate head offices. The store managers of these retail chains either refused to entertain us or directed us to their corporate offices in Bengaluru or Mumbai. This made data on the urban food–agriculture nexus mostly inaccessible. Wherever sales data was accessible, it was not

organized or digitized. Only the state-wide co-operative chain, HOPCOMS (Horticultural Producers' Cooperative Processing and Marketing Society), was open to sharing sales data on fresh produce. Thus, our strategy in the current phase was to seek informed consent from customers coming out of stores after buying fresh produce so that we could interview them using a short survey. Thus, we conducted brief interviews with 34 willing customers outside six stores of retail chains catering to three income categories.

Next, we interviewed unorganized sellers, like street vendors and cart pullers, in nine neighbourhoods spread over three localities, catering to households from various income categories. In this very widespread retailing segment, bookkeeping was non-existent. The third step in data collection was an online survey circulated among our personal networks in Bengaluru. This yielded 43 responses from the three income categories. Thus, altogether, there was a purposive sample of 86 consumer responses to analyse. We summarize specific conclusions from the surveys conducted among the retailers and consumers in the next two sections.

3. VEGETABLE RETAILING IN BENGALURU

Premium stores selling vegetables and catering to high-income households were located in the core of the city. HOPCOMS and large supermarkets belonged to the mid-range retail segment, though the latter also catered to low-income groups. Accessible and affordable by all, the smaller supermarkets, neighbourhood stores, and street vendors were absent in the centre of the city. Both high- and middle-income customers relied partially but regularly on online purchases, especially after July 2020. This was a Covid-induced shift, with most retailers entering the electronic market space. Before the COVID-19 pandemic, fewer options existed for the online purchase of vegetables, especially for low- and middle-income groups.

All organized retail chains procure vegetables through their collection centres (CC) located in peri-urban farming areas. Farmers and CCs enter buy-back contracts that enforce pre- and post-harvest conditions. Such grading and packaging standards deter many small farmers from entering into these contracts or make them reliant on middlemen even after doing so. Small retailers either directly procure produce from farmers or farmers' collectives, or they get supplies from wholesale markets. Most street hawkers get their supplies from wholesale markets, except for a few whom we met in the outskirts of the city, who were directly connecting with farmers and consumers in the second half of 2020, during the lockdown of markets and transport.

Some online marketplaces announce their catchment areas for vegetable procurement, including farmers' collectives. These are generally self-declared sources of "safe/chemical-free/sustainable/organic" vegetables and fruits. Only a few hawkers, small stores, and some online suppliers verify the source of the vegetables they sell and the agronomic practices followed in their cultivation.

4. TRANSITION IN FRESH PRODUCE DEMAND AMONG BANGALOREANS

Accurately estimating the quantities demanded by the city was infeasible due to the data issues we mentioned earlier. The data from HOPCOMS show that nearly 9,150 tonnes of fresh vegetables were sold in the city in 2020–21 through its 280 outlets, some mobile stores, and its recently launched online marketing platform. The sale of exotic produce by HOPCOMS has been steadily increasing, from around 18 tonnes in 2014–15 to 40 tonnes in 2020–21.

The increasing demand for fresh produce in Bengaluru has been attributed to the increasing population, incomes, and the changing consumption patterns of its rich and middle-income citizenry (Surie and Sami 2017). Food consumption is also influenced by exposure to various cuisines, food-related advertisements, the composition of households, and the cultural and ecological features of a region and its long-term resident communities.

Customers visiting premium stores in Bengaluru look for exotic produce for gourmet cooking. Their food preferences are driven by global exposure, a penchant for appealing colours and freshness, and safety and nutritional concerns. The most commonly bought premium vegetables are broccoli, lettuce, cherry tomatoes, and coloured bell peppers. These vegetables, popular among widely travelled Bangaloreans, are now spearheading a notable trend in the culinary culture of the city.

Consumers in the middle-income bracket mostly bought vegetables that matched their culturally embedded diet patterns. Within the middle-income households that have been keeping their food traditions alive, we also observed young professionals who enjoy exotic vegetables. But they kept a close watch on price trends in various retail chains. We found that their established food habits, especially those around fresh produce, were embedded in the agroecological features of their surroundings.

Figure 1: Increasing Shelf Space Occupied by Exotic Veggies in Supermarkets Located in High-income Localities



Source: Authors

The literature shows how the local food culture was built over time based on the agroecological features of the city's surroundings. For instance, Seshadri *et al.* (2018) discuss how both the established local food tradition, and the cropping systems around Bengaluru, integrated finger millet (*Eleusine coracana*) as a staple grain and legumes like pigeon peas (*Cajanus cajan*) and Dolichos beans (*Dolichos lablab*) as sources of protein (Varshney, 2020). Studies show that even while consumption pattern transitions are driven mainly by middle-class preferences, the notion of culture, freshness, and traditional food is important to a large section of the city's population (Ganguly 2017; Sahakian *et al.* 2018).

Nutrition is emerging as a new consideration in addition to these slowly changing food preferences of middle-class urbanites. Respondents mentioned how their buying of kiwi fruit and ginger increased with the spread of dengue fever and Covid respectively in the city (Yousefian *et al.* 2021; Shrinivasa 2015; Ashni 2021).

For low-income families (defined as those above the poverty line with one family member working in a salaried, informal-sector job), the price of fresh produce was the determining factor. This constituency does not seem too particular about food cultures or nutritional benefits. Over time, as retail chains started selling at cheaper rates, they moved from vegetable-cart pullers to large supermarkets. When it comes to cooked food, many low-income families are increasingly relying on mobile street food sellers.

Figure 2: Wayside Vegetable Stalls in a Middle-income Locality



Source: Authors

Overall, Bengaluru's established preference for fresh produce is being reinforced in certain ways—for instance, its demand for leafy vegetables is persistent throughout the year (Prabha *et al.* 2009). Meanwhile, Bengaluru is also charting new trends in other ways—for example, the rising demand for exotic and organic vegetables (Nandi *et al.* 2017). We found consumers who sought information on the origins and quality (in terms of food safety and nutritional value) of these vegetables only in the markets that claimed to sell safe, sustainably produced vegetables.

5. EMERGING IMPLICATIONS FOR STUDYING THE CITY'S IMPACT ON PERI-URBAN AGROECOLOGY AND LIVELIHOODS

The broad conclusions emerging from the findings of our surveys are as follows: a) retail vegetable markets cater differentially to the distinct demand patterns of different consumer groups; b) the distinctions between the demand patterns of consumer groups are gradually blurring; c) the nature and quantum of fresh produce demanded by the city as a whole are changing, though the change in the nature of the demand seems to be comparatively slower; and d) quantifying the change in the demand for fresh produce is fraught with the data-related challenges we mentioned in Section 2.

One overarching observation is that producers and consumers of perishable commodities transacting in various markets in the city, though not too distant from each other, rarely interact. Both consumers and producers of fresh produce are impacted by changes in input costs, quality of produce, and international trade (for instance, the export of high-value vegetables like gherkins and rose onions), among other factors such as weather parameters. Responses to these changes generate mutually impacting influences among and between consumers and producers (Thasnimol *et al.* 2016).

A notable rise in the demand for fresh, exotic, high-value produce implies corresponding changes in peri-urban farming patterns. Exotic vegetables are capital- and input-intensive crops that require shade houses with drip irrigation, temperature control mechanisms, and the application of chemicals (Rao and Sasanka 2015; Udayakumar 2020). From a profit-maximizing perspective, these may sound reasonable if one has to capture the sunshine markets offered by a neoliberal city. However, resource-constrained agrarian communities in the peri-urban landscapes around Bengaluru find it tough to enter and sustain their livelihoods in this high-value, low-volume market. Such risk-taking, like diversifying into exotic produce in the absence of a secure livelihood, may also impact the nutritional security of farm families producing their own vegetables and fruits.

Farming exclusively for commerce makes agrarian skilling through experimental and social learning redundant in peri-urban areas (Purushothaman *et al.* 2021c), as farming is entirely market driven at both ends – the input and output side. The exotic crops demanded by the city of Bengaluru will be the forte of corporate entities that can invest in modern technologies and infrastructure, hire full-time migrant labour, and connect

to elite consumers. Along with winter vegetables, perennial fruit crops, and tropical flowers, vegetables commonly used in the cuisines of communities long residing in the Western Ghats region—of which Bengaluru is part—may offer better support to peri-urban agrarian livelihoods.

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