

LOCAL FOOD SYSTEMS AND SUSTAINABLE COMMUNITY NUTRITION

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Abstract

Local food systems are increasingly recognised as an important foundation for sustainable community nutrition. They link farmers, fishers, food processors, vendors, public institutions, households, and community organisations through relationships that are shaped by local production conditions, cultural food practices, market access, and public policy. Rather than treating nutrition as a matter of individual choice alone, a local food-systems approach examines whether communities can obtain safe, affordable, diverse, and culturally appropriate foods through pathways that also protect livelihoods, ecosystems, and social inclusion. This perspective is particularly relevant where communities face rising food prices, dependence on distant supply chains, diet-related disease, seasonal shortages, loss of traditional foods, and uneven access to fresh produce.

This study uses a qualitative, literature-based approach to examine how local food systems can strengthen sustainable community nutrition. It reviews nutrition-sensitive agriculture, short food supply chains, local procurement, farmers markets, school meals, community gardens, food cooperatives, public distribution channels, and waste-reduction practices. The analysis considers availability, affordability, dietary diversity, food safety, equity, environmental stewardship, local livelihoods, governance, and resilience. It follows the journey of food from local production and aggregation to retail, household preparation, shared meals, recovery of surplus food, and the management of food waste. The study also evaluates the role of local governments, public institutions, civil-society organisations, producer groups, and community members in creating conditions in which healthy foods become practical and reliable choices.

The study finds that local food systems can improve nutrition when they are organised around more than proximity. A local food source does not automatically provide healthy diets, fair producer incomes, ecological sustainability, or access for low-income households. Positive outcomes depend on diversified production, safe handling, transparent markets, nutrition education, inclusive procurement, storage and transport capacity, affordable pricing, attention to women's participation, and accountability for public programmes. The paper concludes that sustainable community nutrition requires coordinated food-system governance that connects dietary quality with local livelihoods, environmental care, and social justice.

Keywords: Local Food Systems, Community Nutrition, Sustainable Diets, Food Security, Nutrition-Sensitive Agriculture, Short Food Supply Chains, Food Environments, Local Procurement, Food Waste Reduction, Community Resilience

1. INTRODUCTION

Food systems influence what people are able to eat every day. They determine which foods are produced, how they are processed and transported, where they are sold, who can afford them, and how households prepare and consume them. In many communities, diets are now shaped by a combination of local agriculture, informal markets, retail chains, food-delivery platforms, school meals, public nutrition programmes, and foods sent by relatives or obtained through social networks.

This complexity means that community nutrition cannot be understood only through nutrient intake or household income. It must also be examined through the food environment that surrounds people and the institutions that influence access to food [3, 4]. Local food systems refer to the interconnected activities through which food is produced, assembled, processed, distributed, purchased, prepared, shared, and managed within a recognisable territorial or community context. The term does not imply that every item must

be grown within a few kilometres. Some staple foods, oils, spices, and specialised products may move across regions. The central concern is whether the system creates closer, more accountable relationships between food producers, consumers, institutions, and local decision-makers, while remaining capable of providing nutritional variety across seasons. Local food systems may include smallholder farms, peri-urban growers, fisheries, dairy groups, street markets, neighbourhood retailers, women's self-help groups, farmer producer organisations, school kitchens, community gardens, and municipal procurement programmes [9, 10].

The nutritional importance of local food systems is evident in the need for diets that are diverse, safe, affordable, and culturally meaningful. Communities often have access to traditional grains, pulses, leafy vegetables, fruits, fermented foods, and locally adapted livestock or fish products that can support dietary quality. Yet these foods may be displaced by highly processed products, unstable markets, loss of agricultural biodiversity, weak storage systems, or inadequate income for producers. A sustainable community nutrition strategy therefore requires policies that strengthen the supply of healthy foods and make them accessible to people whose food choices are constrained by time, price, mobility, and social conditions [5, 15].

Local systems also matter because food security is increasingly linked to resilience. Long supply chains can be efficient, but they may be disrupted by extreme weather, transport restrictions, fuel-price changes, conflict, labour shortages, or fluctuations in global commodity markets. During such disruptions, households with limited savings are often the first to experience reduced dietary diversity. Local and regional networks can complement wider trade by maintaining alternative routes for fresh food, enabling rapid community response, and creating opportunities for producers and consumers to communicate directly. Resilience, however, should not be confused with self-sufficiency. Sustainable food systems need a balanced approach that combines local capacity with

fair and reliable exchange across regions [4, 6].

This paper examines local food systems through the lens of sustainable community nutrition. It reviews the literature on food-system transformation, identifies the nutritional and environmental opportunities of local initiatives, analyses common barriers, and develops a practical framework for community-level planning. The aim is not to idealise all local food practices, but to clarify the conditions under which local food systems can contribute to healthier diets, dignified livelihoods, reduced waste, and stronger social participation.

2. LITERATURE REVIEW

The study of local food systems has expanded from an early focus on direct marketing and rural development to a broader concern with health, sustainability, equity, and governance. Research on short food supply chains shows that a reduced number of intermediaries can increase producer visibility and strengthen consumer knowledge about food origin, farming practices, and seasonality. At the same time, scholars caution that proximity alone does not guarantee social justice or environmental benefit. A local market can still exclude low-income households, rely on insecure labour, or offer a narrow range of foods that does not meet community nutritional needs. The quality of a local food system therefore depends on how it is organised, who participates, and how benefits and risks are distributed [10, 11, 12].

Nutrition literature has increasingly moved from single commodities and nutrient deficiencies toward food systems that shape dietary patterns. A community may produce adequate calories but still experience anaemia, child undernutrition, obesity, diabetes, or micronutrient deficiencies when diets lack diversity or when healthy foods are unaffordable. Nutrition-sensitive approaches encourage agriculture, markets, and social programmes to consider dietary outcomes, care work, women's time, food safety, and the needs of infants, children, adolescents, older adults, and people with chronic illness. This perspective creates a bridge between local production and public health, especially when

local procurement and education are designed together [3, 20, 21].

Sustainability research adds a further dimension by connecting food production and consumption with land, water, biodiversity, climate, energy use, and waste. Diets that rely on diverse plant foods, seasonal availability, responsible animal-source foods, and lower levels of avoidable loss can support both health and ecological goals. However, sustainability cannot be assessed through food miles alone. The environmental impact of food depends on production methods, resource use, post-harvest handling, packaging, storage, transport efficiency, and the fate of food that is not consumed. A well-managed regional distribution system may be more sustainable than many individual vehicle trips to obtain food from nearby farms. Local planning must therefore use evidence rather than simple assumptions about distance [15, 23, 25].

2.1 LOCAL FOOD SYSTEMS AND COMMUNITY NUTRITION

- Local food systems can increase access to fresh vegetables, fruits, pulses, dairy, eggs, fish, and culturally familiar staple foods when production and markets are diversified rather than concentrated in a small number of commodity crops.
- Farmers markets, village haats, food cooperatives, mobile markets, and direct producer-to-consumer arrangements can improve information about seasonal foods, food origin, and handling practices while creating market opportunities for small producers.
- Public institutions such as schools, anganwadi centres, hospitals, hostels, and community kitchens can use local procurement to stabilise demand for nutritious foods and connect dietary needs with reliable purchasing arrangements.
- Community gardens and kitchen gardens can supplement household diets, support nutrition learning, and increase access to leafy vegetables and herbs, although they are not a substitute for broader market and income policies.
- Food-system planning becomes more nutrition-sensitive when it considers affordability, dietary diversity, women's time, child feeding, food safety, and the

needs of people who cannot easily travel to markets.

2.2 CHALLENGES IN BUILDING SUSTAINABLE LOCAL FOOD SYSTEMS

- Seasonal production patterns can create gaps in the supply of vegetables, fruits, eggs, fish, or milk unless local systems are supported by storage, processing, preservation, and fair regional trade.
- Small producers often face limited access to cold storage, grading facilities, credit, market information, transport, and predictable buyers, which can force distress sales and reduce investment in nutritious crops.
- Healthy foods may remain unaffordable for low-income households when local markets operate without targeted purchasing support, social protection, or transparent price mechanisms.
- Food safety risks can arise when water quality, storage, packaging, street-vending conditions, or hygiene infrastructure are inadequate. Nutrition gains are weakened when unsafe food leads to illness.
- Gender inequalities can limit women's control over land, income, mobility, and time even though women often play central roles in food production, purchase, preparation, and child care.
- Marketing of highly processed foods can reshape preferences, especially among children and adolescents, reducing demand for locally available foods that require preparation or are perceived as less convenient.

2.3 SUSTAINABILITY AND FOOD-SYSTEM GOVERNANCE PRINCIPLES

- A sustainable local food system should pursue dietary quality, food safety, ecological stewardship, equitable livelihoods, and reliable access together rather than treating these goals as separate programmes.
- Public policy should use clear targets for dietary diversity, procurement quality, producer inclusion, food safety, waste reduction, and participation by women, youth, and marginalised groups.
- Food-system governance should involve producers, vendors, consumers, public-

health professionals, educators, local officials, and community organisations because no single actor controls the entire pathway from farm to plate.

- Transparent data on prices, seasonal availability, procurement volumes, food losses, and diet-related outcomes can support better decisions and help communities evaluate whether interventions are working.
- Climate resilience requires diversified production, water-conscious farming, locally adapted crops, risk-sharing arrangements, emergency food planning, and supply connections beyond the immediate locality when shocks occur.

3. OBJECT OF STUDY

The present study examines local food systems as community-based arrangements that influence access to healthy and sustainable diets. The object of study is not a single city, village, programme, or market. Instead, it considers the practical relationships among producers, local enterprises, public institutions, households, and community organisations that determine whether nutritious foods are available, affordable, safe, and socially acceptable. The study gives particular attention to places where food choices are shaped by seasonal production,

informal markets, limited household purchasing power, changing dietary preferences, and uneven infrastructure.

The theoretical basis of the study is grounded in the principle that nutrition is a collective as well as an individual outcome. Food decisions are made within systems of work, income, culture, care, transport, retail, public services, and environmental conditions. A community nutrition strategy is therefore sustainable only when it supports the ability of current and future residents to obtain nutritious food without undermining ecosystems, increasing inequality, or transferring hidden costs to producers and workers. The study treats local food systems as interconnected networks of land, water, labour, knowledge, markets, institutions, and everyday food practices.

3.1 LOCAL FOOD-SYSTEM SETTINGS AND NUTRITIONAL REQUIREMENTS

The study considers representative local food-system settings that illustrate how nutrition, sustainability, and community participation may vary across different production and access pathways. These settings are selected because they show that the same community can depend on several food channels at once, each with distinct opportunities and constraints.

S. No.	Local Food-System Setting	Primary Nutritional Contribution	Main Sustainability Challenge	Essential Community Strategy
1	Smallholder farms and peri-urban producers	Seasonal supply of vegetables, fruits, pulses, milk, eggs, and traditional crops	Water stress, low farm income, crop concentration, and post-harvest losses	Diversified production, producer aggregation, safe irrigation, and local procurement links
2	Farmers markets, village haats, and neighbourhood vendors	Convenient access to fresh and culturally familiar foods	Price volatility, weak hygiene facilities, and uneven inclusion of low-income consumers	Transparent pricing, vending infrastructure, food-safety support, and targeted purchasing assistance
3	Schools, anganwadi centres, hospitals, and community kitchens	Regular meals for children and vulnerable groups; nutrition education through menus	Irregular supply, limited menu diversity, and weak quality assurance	Nutrition standards, seasonal menu planning, local contracts, and monitoring of food quality
4	Community gardens, kitchen	Supplementary vegetables, herbs,	Land access, continuity of care,	Shared governance, inclusive membership,

	gardens, and food cooperatives	nutrition awareness, and social participation	water availability, and unequal participation	water planning, and links to wider food access programmes
5	Food recovery, local processing, and surplus-sharing initiatives	Reduced waste and improved access to safe surplus food	Food-safety risk, inconsistent collection, and stigma associated with food assistance	Clear handling protocols, dignified distribution, preservation capacity, and public reporting

3.2 STUDY OBJECTIVES

- To examine the role of local food systems in improving dietary diversity, food access, and community nutrition.
- To identify the social, economic, environmental, and institutional factors that influence the sustainability of local food systems.
- To compare the nutritional opportunities and implementation challenges of local production, markets, public procurement, community gardens, and food-recovery initiatives.
- To evaluate the importance of affordability, food safety, producer livelihoods, women's participation, and local governance in nutrition-sensitive food planning.
- To develop a practical framework for strengthening sustainable community nutrition through coordinated local food-system action.

4. RESEARCH METHODOLOGY

The study adopts a qualitative and literature-based research methodology. It synthesises peer-reviewed scholarship, international food-system reports, nutrition guidance, public-policy documents, and community-food planning literature relevant to local food systems and sustainable diets. This approach is appropriate because the research question concerns the relationship between food-system organisation and community nutrition rather than the measurement of a single intervention outcome. The analysis uses a comparative framework to examine how different local food pathways affect availability, affordability, safety, dietary diversity, environmental stewardship, and social inclusion.

The methodological framework follows the movement of food through a local system: production, aggregation, storage, processing, transport, sale, public procurement, household

purchase, meal preparation, food sharing, and waste management. At each stage, the study examines the conditions that can support or weaken nutrition outcomes. For example, diversified production may increase food availability, but the nutrition benefit can be lost if produce spoils before sale, if prices rise beyond household budgets, if markets lack safe water and hygiene facilities, or if households lack the time and fuel needed to prepare healthy meals. This lifecycle perspective links technical and economic decisions with everyday dietary realities.

4.1 RESEARCH DESIGN (QUALITATIVE ANALYTICAL APPROACH)

- The study follows a qualitative and comparative design based on food-system, nutrition, sustainability, and governance literature.
- The analysis compares local food settings according to their contribution to dietary diversity, affordability, producer livelihoods, food safety, environmental performance, and community participation.
- The study uses a systems perspective that connects agricultural production, market arrangements, public institutions, household food practices, and waste management.
- Findings are interpreted through nutrition-sensitive and sustainability-oriented principles rather than through an experimental trial or a single population survey.

4.2 SUSTAINABLE COMMUNITY NUTRITION FRAMEWORK

- Food availability is assessed through production diversity, seasonal supply, local market density, storage capacity, and the range of foods offered through public programmes.
- Food access is assessed through price, household income, distance to markets,

mobility, social protection, institutional meals, and the time required to obtain and prepare food.

- Dietary quality is assessed through the potential availability of vegetables, fruits, pulses, whole grains, animal-source foods where appropriate, and culturally accepted meals that support dietary diversity.
- Environmental sustainability is assessed through agroecological practices, water use, soil care, biodiversity, energy requirements, packaging, transport efficiency, food loss, and waste reduction.
- Equity and accountability are assessed through the participation of women, small producers, informal vendors, low-income households, youth, and marginalised groups in planning, benefit sharing, and feedback processes.

4.3 COMMUNITY AND INSTITUTIONAL CONTEXT

- The study considers rural, peri-urban, and urban settings in which local food systems combine formal and informal market channels.
- Food is treated as a pathway involving farms, fisheries, livestock systems, wholesalers, street vendors, retailers, public institutions, household kitchens, and community organisations.
- Access to food is evaluated in relation to income, seasonality, cultural preference, household care responsibilities, market infrastructure, social protection, and public nutrition programmes.
- Institutional capacity is considered through local planning, procurement rules, food-safety systems, storage facilities, transport, data collection, nutrition education, and the ability to coordinate across sectors.

4.4 PARAMETERS OF ANALYSIS

The following nutrition and sustainability parameters are evaluated:

- Production diversity, seasonality, water and soil stewardship, and the availability of nutritious local foods.
- Price, market access, household purchasing power, social protection, and the distribution of food benefits across population groups.

- Food safety, post-harvest handling, storage, processing, retail hygiene, and household capacity for safe preparation.
- Dietary diversity, cultural acceptability, school and community meal quality, and the relationship between local foods and daily dietary practices.
- Producer income, labour conditions, women's agency, youth participation, community voice, and accountability in food-system governance.
- Food loss, surplus recovery, composting, packaging reduction, and the practical management of unavoidable food waste.

4.5 PROCEDURE OF STUDY

- Review literature, public reports, nutrition guidance, and community-food policy materials relating to local food systems and sustainable diets.
- Identify recurring challenges involving affordability, seasonal supply, market access, food safety, food loss, dietary diversity, and producer livelihoods.
- Compare representative local food-system settings and the pathways through which they may influence community nutrition.
- Map nutrition and sustainability requirements to practical actions involving production, procurement, markets, public institutions, households, and community organisations.
- Interpret the combined findings to develop an inclusive food-system framework that can be adapted to different community contexts.
- Formulate recommendations for local governments, public institutions, producers, vendors, and civil-society groups seeking to strengthen sustainable community nutrition.

4.6 ANALYTICAL APPROACH

- Qualitative comparison of food-access pathways and their likely effects on dietary quality, affordability, resilience, and environmental stewardship.
- Interpretation of how local production, market organisation, household conditions, public procurement, and nutrition education interact to shape everyday food choices.
- Assessment of the relationship between local livelihoods, healthy diets, food

safety, social inclusion, and community trust in food institutions.

- Identification of governance practices that can be applied by municipalities, panchayats, schools, hospitals, cooperatives, producer groups, and community organisations.

5. DATA ANALYSIS

The qualitative analysis indicates that local food systems can contribute to sustainable community nutrition when they improve the practical conditions for healthy eating. The most important condition is not simply local production volume. Communities need a reliable flow of diverse foods that can be purchased or obtained in a safe, affordable, and socially dignified manner. A locality that produces vegetables but sells most of them outside the area may not improve local diets. Similarly, a farmers market with high-quality produce may have limited nutritional impact if it operates only once a week, is located far from low-income neighbourhoods, or lacks price support for households facing food insecurity.

Production diversity emerged as a central factor. Systems focused narrowly on a few cash crops may generate income but can leave households dependent on purchased foods for dietary variety. Diversified farms, kitchen gardens, community seed systems, and local fisheries can improve access to pulses, leafy vegetables, fruits, herbs, eggs, dairy, and other foods that support dietary diversity. Yet diversification must be supported by access to water, seeds, extension services, markets, labour, and fair prices. Farmers cannot sustain production of perishable nutritious crops when they repeatedly face crop losses, delayed payments, or volatile demand [3, 6, 20].

The analysis also shows that public procurement can be a powerful bridge between local livelihoods and nutrition outcomes. Schools, anganwadi centres, hospitals, hostels, and community kitchens regularly purchase food. When procurement rules include nutritional standards, seasonal menus, transparent contracts, food-safety requirements, and opportunities for small producer groups, public institutions can create dependable demand for local vegetables, pulses, eggs, milk, millet, and other culturally

appropriate foods. However, procurement systems can become exclusionary when tender conditions demand volumes, certification, or delivery schedules that small producers cannot meet. Producer aggregation, phased contracts, and technical support are therefore important for inclusion.

Affordability is equally significant. Local food does not automatically mean low-cost food. During lean seasons, transport disruptions, or periods of high demand, local prices may rise sharply. Low-income households may substitute cheaper, calorie-dense, nutrient-poor foods when fresh produce, pulses, or animal-source foods become expensive. Sustainable community nutrition consequently requires a combination of local market development, livelihood support, price monitoring, cash or food assistance where needed, and public food programmes that protect dietary quality. Measures that increase supply without considering purchasing power may improve market turnover while leaving dietary inequality unchanged [4, 16].

Food safety is another decisive link. Fresh foods are beneficial only when water quality, handling, storage, preparation, and vending conditions reduce the risk of contamination. Informal markets and street-food settings often provide important and affordable food access, but they may operate with limited refrigeration, sanitation, waste collection, or safe water. An effective local food strategy should therefore treat vendors as partners in public health, providing infrastructure, training, and practical compliance pathways rather than relying only on punitive enforcement. Food-safety investments also protect producer reputations and can reduce avoidable losses across the value chain.

Environmental sustainability depends on the entire system. Diverse cropping, soil conservation, integrated pest management, water-efficient practices, and local biodiversity can support long-term food availability. Yet environmental benefits can be undermined by inefficient transport, excessive packaging, high energy use in cold chains, or high levels of household waste. The analysis suggests that the most constructive approach is to assess local food systems through resource efficiency and waste prevention. Coordinated

aggregation and delivery routes, appropriate storage, reusable packaging, composting of unavoidable organic waste, and recovery of safe surplus food can reduce the environmental burden while strengthening community access [23, 27, 28].

Finally, the analysis highlights the importance of participation and accountability. Food-system initiatives are more likely to be sustained when communities help identify their nutritional priorities, preferred foods, market barriers, and seasonal constraints. Women's groups, farmer organisations, youth clubs, school committees, health workers, vendors, and consumer groups can contribute different forms of knowledge. Their participation should not be symbolic. It should influence menu planning, market location, procurement criteria, price support, training, and the evaluation of outcomes. Public reporting on food quality, procurement volumes, producer participation, complaints, and waste can help communities assess whether local food policies are producing equitable benefits.

6. DISCUSSION

The analysis confirms that local food systems should be understood as a governance issue as much as an agricultural or market issue. Food choices occur in a setting shaped by income, work schedules, care responsibilities, transport, retail practices, public meals, local culture, and environmental conditions. A community cannot rely on nutrition education alone when healthy foods are irregular, unsafe, expensive, or difficult to prepare. Conversely, increased availability may not produce better diets when households lack information, time, cooking fuel, or control over food spending. Sustainable community nutrition requires coordinated action across these interdependent conditions.

A central lesson is that proximity should not be treated as a substitute for equity. A local food initiative may support affluent consumers while failing to reach households that face the greatest nutritional risk. Farmers markets, subscription boxes, organic outlets, and farm visits can create valuable community connections, but they are not automatically inclusive. Policies should consider market location, opening hours, payment methods,

access for people with disabilities, affordability for low-income households, and opportunities for informal vendors and small producers. Local food systems must be designed so that health and sustainability are not treated as premium goods available only to those with higher purchasing power [13, 14].

The strongest approach is layered. It combines diversified and climate-aware production, local aggregation, safe storage, transparent markets, nutrition-sensitive public procurement, food-safety infrastructure, household and school food education, social protection, waste reduction, and participatory monitoring. Each element reinforces the others. For instance, school meals can introduce children to local foods, create stable demand for producers, and provide a platform for nutrition education. This effect is strengthened when menus are designed around seasonal availability, safe preparation, and culturally accepted dishes. Similarly, community gardens can support practical learning and social connection, but their nutritional impact increases when linked to market access, health services, and wider food-assistance systems.

Local governments and institutions have a strategic role because they influence the rules through which food moves. Municipalities can improve market infrastructure, enable safe vending, support local logistics, reduce food waste, collect price and availability data, and convene cross-sector food councils. Panchayats and rural institutions can support water management, common land use, producer groups, local processing, and community storage. Schools and health facilities can align procurement with nutritional standards. Civil-society organisations can help mobilise communities, support women's leadership, and make public programmes more accountable. The goal is not to replace wider food trade but to build local capacity that complements it and reduces vulnerability to shocks.

Public trust depends on whether people experience the food system as fair, responsive, and safe. Consultation should involve those who grow, sell, prepare, and consume food, especially groups that are often absent from formal planning. A rights-based approach

recognises that adequate food is connected to dignity, health, culture, decent work, and environmental sustainability. Communities should have meaningful routes to raise concerns about unsafe food, exclusion from programmes, delayed payments, inaccessible markets, or poor meal quality. Monitoring should include both measurable indicators and lived experience, because the success of a food-system intervention is reflected not only in procurement data but also in whether households can consistently eat well.

7. CONCLUSION

This study examined the relationship between local food systems and sustainable community nutrition. It showed that healthy diets are influenced by the full pathway through which food is produced, handled, sold, purchased, prepared, shared, and managed after consumption. Local food systems can improve dietary diversity, strengthen livelihoods, support cultural food practices, reduce avoidable waste, and increase resilience when they are organised around access, safety, affordability, ecological care, and social inclusion.

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The analysis found that positive outcomes require more than promoting local products. Communities need diversified production, functioning markets, safe storage and handling, fair producer participation, public procurement that supports nutritional quality, affordability measures for low-income households, food-safety infrastructure, and practical nutrition education. Women's participation, community voice, transparent data, and accountable institutions are essential because food-system benefits are uneven when these factors are ignored.

Where local systems are treated only as branding or a commercial niche, they may deepen inequalities or provide limited nutritional benefit. Where they are planned as public-interest systems, they can connect farms, markets, institutions, and households in ways that make healthy food a realistic option for more people. Sustainable community nutrition should therefore be approached as a continuing collective responsibility involving evidence, participation, institutional coordination, and regular evaluation from production through final management of food waste.

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