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Trends in consumer preferences for ready-to-eat and ready-to-cook foods: Implications for applied agricultural research

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Abstract
The global food landscape has undergone significant transformations in recent decades, with ready-to-eat (RTE) and ready-to-cook (RTC) foods emerging as a dominant segment within the consumer market. These products respond to the increasing demand for convenience, time efficiency, and dietary diversification, particularly in urban and semi-urban settings where lifestyles are rapidly changing. This paper explores evolving consumer preferences for RTE and RTC foods and highlights their implications for applied agricultural research, focusing on supply chain integration, nutritional concerns, and sustainability. Drawing on both primary and secondary datasets, the study employs descriptive and inferential analyses to identify demographic drivers, socio-economic variables, and cultural influences shaping consumption patterns. The findings reveal that young adults, dual-income households, and metropolitan populations demonstrate the highest inclination toward these food categories, with health, taste, affordability, and brand reliability acting as key determinants of choice. At the same time, concerns about food safety, processing intensity, and long-term health impacts persist, reflecting a complex decision-making environment for consumers.
From an agricultural research perspective, the rise of RTE and RTC foods necessitates innovations in raw material quality, processing technologies, and post-harvest handling. The study argues that applied agricultural research must expand beyond yield and productivity targets to encompass consumer-centric outcomes, such as nutritional enhancement, value addition, shelf-life extension, and reduced food waste. Furthermore, the convergence of consumer trends with agricultural supply chains underscores the importance of interdisciplinary collaborations between food technologists, nutritionists, and agricultural scientists. Ultimately, this paper demonstrates that RTE and RTC foods are not merely products of consumer demand but drivers of systemic change in agriculture and food systems. The results provide actionable insights for researchers, policymakers, and industry stakeholders to align agricultural innovation with evolving consumer behavior.

Keywords: Ready-to-eat foods, Ready-to-cook foods, Consumer preferences, Agricultural research, Food supply chains, Nutrition, Processed food trends, Sustainability

Introduction
The global food industry is undergoing a profound transformation, shaped by demographic transitions, rapid urbanization, income diversification, and shifting household structures. One of the most visible outcomes of this change is the expanding market for ready-to-eat (RTE) and ready-to-cook (RTC) foods. Once considered peripheral conveniences, these products have now moved into the mainstream of consumer diets, both in developed and developing economies. Their rise reflects an accelerating demand for convenience, but it also raises important questions for agricultural research and practice. As consumption shifts toward packaged and semi-prepared products, the agricultural sector is increasingly required to supply raw materials that are not only high-yielding but also suitable for processing, nutritionally enhanced, and environmentally sustainable.

A critical driver behind the uptake of RTE and RTC foods has been structural changes in households. The rise of dual-income families, greater female participation in the workforce, and longer commuting times in urban environments have reduced the time available for traditional cooking. These trends were already documented two decades ago in developed nations but have recently intensified across middle-income economies. Research from Asia and Latin America shows that convenience foods are closely associated with changes in working patterns and urban lifestyles. In India, for example, the RTC sector has expanded rapidly as households seek solutions that balance traditional dietary preferences with reduced cooking time. This structural shift underscores the need to reconceptualize agriculture not only as a producer of bulk staples but also as a supplier of specialized crops and raw materials tailored for convenience food industries.

Consumer choices in this domain are shaped by overlapping determinants. Price and affordability remain decisive in low- and middle-income contexts, whereas convenience, taste, and branding dominate in urban and high-income markets. Health concerns complicate this landscape, as consumers often weigh the advantages of fortified or "health-oriented" RTE products against risks associated with sodium, sugar, and fat content. Monteiro *et al*. (2013) [11] argued that the rise of ultra-processed foods has significant implications for public health, linking them with rising non-communicable diseases. More recent studies have highlighted ambivalence: while fortified RTC cereals and instant mixes are marketed as nutritious, consumers express skepticism regarding their long-term health impacts. These tensions suggest that agricultural innovation must increasingly focus on supporting nutritional security alongside convenience.

Agricultural systems are critical enablers of RTE and RTC markets because raw material quality directly affects processing feasibility. Rice with appropriate amylose-amylopectin balance, high-protein wheat, and oilseeds with stable fatty acid profiles are necessary for producing quick-cooking and shelf-stable products. Research shows that varietal selection for processing traits is now influencing breeding priorities in multiple crops. Advances in packaging, cold storage, and post-harvest technologies have also expanded the scope of perishable RTE categories, including minimally processed fruits, dairy snacks, and frozen vegetables. Without directed agricultural research, however, bottlenecks in supply quality and consistency may constrain the growth of these industries.

Cultural factors continue to influence acceptance of convenience foods. In South Asia, where culinary traditions emphasize fresh and home-prepared meals, RTE and RTC foods often face resistance from older consumers who view them as inferior substitutes. Younger consumers, however, are more receptive, particularly when RTC products replicate traditional recipes such as dosa or idli batter. This intergenerational divide illustrates the negotiation between cultural continuity and modern convenience, a process with implications for product innovation and agricultural inputs alike. Crops integral to traditional diets—rice, pulses, and spices—remain central in RTC product lines, underscoring the role of agriculture in supporting culturally embedded consumption.

The expansion of digital platforms has further reshaped access and visibility of RTE and RTC foods. Online grocery services and app-based delivery systems reduce barriers of availability and personalize consumer choices using recommendation algorithms. Studies have shown that these platforms contribute significantly to the growth of processed food categories by broadening reach and normalizing their consumption. For agricultural research, this indicates the growing importance of demand forecasting and supply chain resilience, as digital ecosystems can amplify sudden surges in consumption.

Sustainability has become an increasingly relevant concern. While RTE and RTC products can reduce household-level food waste by offering portioned servings, they often raise environmental concerns through packaging waste, energy-intensive processing, and dependency on monocultures. UNEP (2020) highlighted that plastic packaging associated with frozen and instant foods contributes substantially to global waste streams. Younger, educated consumers are becoming more aware of such issues, and sustainable packaging innovations are gradually influencing market choices. This points toward new opportunities in agricultural research, including the use of crop residues and biodegradable plant-based materials for packaging solutions.

At the policy level, processed food industries have gained recognition as both economic engines and employment generators. In India, initiatives under the Ministry of Food Processing Industries (MoFPI) have sought to promote infrastructure for cold chains and agro-processing clusters, aiming to integrate farmers into modern food systems. However, the effectiveness of such measures depends on a granular understanding of consumer preferences and trust in food safety standards. Regulatory credibility remains crucial, as earlier studies have shown that certification labels strongly influence consumer trust in processed foods.

Methodology

The study on consumer preferences for ready-to-eat and ready-to-cook foods required a methodological approach that combined both qualitative and quantitative strategies to capture the complexity of consumer behavior and its implications for applied agricultural research. Given the multidisciplinary nature of the subject, the design was developed to integrate market data, household consumption surveys, and agricultural datasets with consumer interviews and digital analytics, thereby ensuring that the analysis captured not only statistical trends but also the underlying motivations and constraints influencing choices. The research design was based on a mixed-methods paradigm, in which quantitative data established measurable trends while qualitative insights contextualized these findings within socio-cultural and economic frameworks.

The quantitative component relied heavily on secondary datasets sourced from national and international agencies. At the global level, databases from the Food and Agriculture Organization (FAO), World Bank, and Euromonitor International provided macro-level insights into market growth, consumer spending, and sectoral composition of processed food categories. At the national level, India's National Sample Survey Office (NSSO) and National Family Health Survey (NFHS) datasets were employed to trace household expenditure patterns, nutritional transitions, and demographic profiles associated with RTE and RTC consumption. Supplementary data were drawn from the Ministry of Food Processing Industries (MoFPI) and the Food Safety and Standards Authority of India (FSSAI), which offered valuable information on processing units, supply chain interventions, and regulatory frameworks. These sources were triangulated to build a robust baseline that could identify regional disparities, urban-rural contrasts, and temporal trends in consumption.

In addition to secondary data, primary data collection was undertaken through structured consumer surveys in four metropolitan cities—Delhi, Mumbai, Bengaluru, and Hyderabad—and two semi-urban clusters in Uttar Pradesh and Tamil Nadu. The survey sample included 1200 respondents, stratified across age, gender, income, and occupational categories, to ensure representativeness. The instrument was designed to capture variables such as frequency of RTE and RTC food consumption, expenditure patterns, preferred product categories, perceived health impacts, trust in brands, and awareness of nutritional labeling. Questions were both closed-ended, enabling statistical aggregation, and open-ended, providing narrative accounts of consumer experiences. To minimize response bias, the survey was piloted with a smaller group of 60 respondents before large-scale administration, and adjustments were made to clarify ambiguous questions. Data collection was conducted both physically and online, with digital surveys distributed through university networks and professional associations to reach younger and more technologically inclined participants.

The qualitative dimension of the research was enriched by focus group discussions conducted with three distinct consumer cohorts: young professionals aged 20-35, middle-aged dual-income households, and homemakers above 40. Each focus group included 8-10 participants and discussions were moderated using semi-structured guides. The themes explored included cultural perceptions of traditional versus modern diets, the role of advertising and branding in shaping preferences, and the perceived trade-offs between convenience and health. These discussions generated nuanced insights into the cultural negotiations surrounding processed foods, particularly in India, where traditional meal preparation carries deep social value. Transcripts were coded using NVivo software, allowing themes to be systematically analyzed and linked to survey findings.

Digital data sources were also employed to supplement traditional methods. Google Trends was used to analyze the relative search interest in RTE and RTC keywords over a five-year period, offering insights into the seasonal and regional variations in consumer curiosity. Social media platforms such as Twitter and Instagram were monitored using Python-based scraping tools to identify emerging discussions, hashtags, and consumer complaints related to processed foods. These digital footprints helped in mapping not only consumption patterns but also consumer sentiment and the responsiveness of companies to public concerns. The inclusion of digital data was especially valuable in contextualizing the influence of e-commerce platforms and online grocery services on consumer behavior.

Statistical analysis was carried out using SPSS and R, with Stata used for cross-validation of regression models. Descriptive statistics provided summaries of consumer demographics, consumption frequencies, and expenditure levels. Inferential analyses, including chi-square tests and ANOVA, were conducted to establish associations between demographic variables and food preferences. Multinomial logistic regression models were employed to predict the likelihood of RTE and RTC consumption based on predictors such as age, gender, education, and household income. In parallel, time-series analyses were conducted to evaluate the growth trajectory of these food categories across global and national markets. Data visualization was facilitated through Tableau and Microsoft Excel, enabling the creation of charts, tables, and maps that illustrated key patterns in an accessible yet rigorous format.

To link consumer data with agricultural research implications, the study incorporated agricultural production datasets, including crop yield statistics, post-harvest loss assessments, and supply chain logistics reports. This integration enabled the examination of how the demand for specific processed food categories translated into shifts in agricultural practices. For example, increased demand for RTC rice products necessitated analysis of the rice varieties cultivated, their processing suitability, and their geographical distribution. Similarly, the expansion of frozen vegetable categories required mapping cold chain infrastructure against production zones. By aligning consumer preference data with agricultural statistics, the study highlighted the degree to which agricultural research must adapt to the processing demands of modern food markets.

The reliability and validity of the methodology were carefully considered. Reliability was ensured by using established datasets from credible sources and by standardizing survey administration protocols. Validity was addressed through triangulation, whereby quantitative trends were cross-verified with qualitative insights and digital analytics. Content validity of the survey instrument was ensured through expert consultation with food technologists and consumer researchers, who reviewed the questionnaire for relevance and clarity. Statistical reliability was tested through Cronbach's alpha for internal consistency of survey scales, yielding a coefficient of 0.84, which is considered acceptable for behavioral studies.

Ethical considerations were addressed in both primary and digital data collection. All survey and focus group participants provided informed consent, and participation was voluntary. Confidentiality was assured by anonymizing responses and storing data securely. Digital scraping was restricted to publicly available data, with no private information accessed, ensuring compliance with ethical guidelines for internet research.

The methodological framework also incorporated an interdisciplinary lens, recognizing that consumer preferences for RTE and RTC foods cannot be fully understood through market data alone. Agricultural science, nutrition, sociology, and information technology were brought together in the research design, reflecting the interdependent nature of food systems. This interdisciplinary approach allowed the study to go beyond descriptive analysis and generate insights that are actionable for agricultural researchers, policymakers, and industry stakeholders.

Results

The analysis of consumer preferences for ready-to-eat (RTE) and ready-to-cook (RTC) foods revealed a multi-layered set of findings that extend beyond simple consumption trends to include demographic influences, economic conditions, cultural attitudes, and agricultural linkages. The results presented here draw on both primary and secondary data, integrating survey outcomes, focus group insights, digital analytics, and agricultural production statistics. Together, they provide a comprehensive overview of how consumer demand for convenience foods is evolving and what these trends imply for applied agricultural research.

The first and most visible result from the survey analysis is the steady increase in consumption frequency of RTE and RTC products across all demographic groups, with notable differences in intensity. Among the 1200 respondents, 68 percent reported consuming at least one RTE product per week, while 54 percent indicated the same for RTC foods.

The urban respondents, particularly those in metropolitan cities such as Bengaluru and Mumbai, demonstrated the highest frequency, with 81 percent consuming RTE products weekly and 72 percent consuming RTC foods. In contrast, semi-urban respondents showed more moderate adoption rates, though even in these clusters, 47 percent consumed RTE foods weekly and 39 percent reported using RTC items. This indicates a diffusion effect where urban consumption patterns gradually permeate into smaller towns and semi-rural markets.

Age emerged as a significant determinant of consumption behavior. The highest adoption levels were recorded among young professionals aged 20 to 35, with 79 percent consuming RTE products and 71 percent consuming RTC products on a weekly basis. Middle-aged dual-income households (36-50 years) also demonstrated strong engagement, with 65 percent reporting weekly consumption of RTE foods, motivated primarily by time constraints and convenience. By contrast, older participants above 50 exhibited lower adoption levels, with only 38 percent reporting weekly consumption of RTE products, often citing health concerns and cultural preferences for traditional cooking as reasons for restraint. This generational divide highlights the possibility of further market expansion as younger cohorts become the dominant consumer base.

Income levels also influenced purchasing behavior. Higher-income households (annual income > INR 12 lakhs) reported not only greater frequency of consumption but also higher expenditure per purchase, with an average monthly spend of INR 2,800 on RTE and RTC foods. Middle-income households (annual income between INR 4-12 lakhs) reported spending INR 1,500 monthly, while lower-income households spent only INR 600 on average, relying primarily on low-cost RTC products such as instant noodles and basic frozen vegetables. This stratification reflects how affordability and perceived value-for-money shape consumer decisions, especially in price-sensitive economies such as India.

Gender differences, while less pronounced, were still visible. Female respondents in dual-income households often indicated higher reliance on RTC foods as cooking aids, whereas male respondents reported a preference for RTE snack categories such as packaged fried foods, ready-made sandwiches, and instant beverages. These findings align with focus group discussions where women articulated the pressures of balancing professional responsibilities with traditional expectations of meal preparation, thereby turning to RTC items as pragmatic compromises.

One of the more striking findings relates to consumer motivations. When asked to rank the primary factors influencing their decision to purchase RTE or RTC foods, 73 percent of respondents highlighted convenience, followed by 62 percent citing taste, 48 percent citing affordability, and 36 percent citing health or nutritional value. This hierarchy underscores that while health awareness has grown, convenience continues to dominate as the central driver of behavior. Interestingly, focus group transcripts revealed that health-conscious consumers often attempt to rationalize consumption by selectively choosing “fortified” or “low-fat” variants of RTE products, though many admitted skepticism about the authenticity of nutritional claims on packaging.

Perceptions of food safety and trust in brands also featured prominently in the results. Approximately 58 percent of respondents expressed strong trust in well-known multinational brands, while only 32 percent reported similar confidence in smaller domestic producers. This brand trust gap was particularly pronounced in metropolitan cities, where consumers equated multinational labels with quality assurance and safety. However, in semi-urban areas, local producers retained greater influence, largely due to lower prices and localized distribution networks. This duality suggests opportunities for domestic brands to strengthen consumer confidence through certifications, transparent labeling, and marketing that emphasizes quality and authenticity.

Digital consumption patterns provided another dimension of insight. Google Trends analysis indicated sharp seasonal spikes in searches for RTC categories such as “frozen parathas” and “instant biryani” during festive seasons, suggesting that convenience foods are increasingly integrated into traditional celebrations. Similarly, searches for RTE snacks such as “instant soup” and “packaged sweets” surged during winter months. Social media analysis corroborated these patterns, with hashtags related to “quick meals” and “instant cooking” gaining traction during exam periods and professional deadlines. This temporal alignment of digital engagement and consumption indicates the potential of predictive analytics to forecast demand and optimize agricultural supply chains.

From the perspective of product categories, frozen vegetables, instant noodles, RTE snacks, and RTC mixes for traditional dishes such as dosa batter emerged as the most popular items. Among these, frozen vegetables were particularly significant, with 44 percent of respondents citing them as regular purchases. This finding aligns with agricultural production trends that indicate rising demand for crops suited for freezing and cold chain distribution. For example, peas and sweet corn cultivation in states such as Punjab and Uttar Pradesh has expanded significantly to meet processing industry demand. In contrast, minimally processed items such as ready-to-cook fresh salads were less frequently purchased, with only 19 percent of respondents reporting regular use, primarily due to concerns over freshness and hygiene.

Nutritional perceptions formed another layer of analysis. When asked whether they considered RTE and RTC foods healthier, only 28 percent responded positively, while 41 percent expressed skepticism and 31 percent remained undecided. The skepticism was more pronounced among older respondents, who frequently described these products as “junk” or “chemically treated.” Conversely, younger respondents tended to perceive fortified RTE items such as breakfast cereals or protein bars as healthier alternatives to traditional snacks. This divergence suggests that nutrition-focused branding strategies are more likely to resonate with younger consumers, whereas broader public health messaging may be necessary to address concerns among older populations.

Agricultural linkages emerged strongly when consumer demand was mapped against production data. The demand for RTC rice products has driven the cultivation of specific rice varieties optimized for parboiling and quick cooking. Similarly, the expansion of instant pasta and noodle markets has increased the demand for high-protein wheat, encouraging targeted breeding programs. Frozen RTC vegetable categories have spurred investments in contract farming arrangements, where processors provide farmers with seed varieties and buyback guarantees, ensuring supply consistency. This pattern illustrates how consumer preferences are beginning to directly shape agricultural research priorities, influencing varietal development, post-harvest technologies, and storage innovations.

A comparison of consumption across metropolitan and semi-urban locations also revealed significant geographic variations. In Delhi and Mumbai, RTE snacks dominated, reflecting urban consumer lifestyles that prioritize portability and immediate consumption. In Bengaluru and Hyderabad, RTC foods such as dosa batter and idli mixes were more popular, indicating the importance of cultural preferences in shaping product categories. Semi-urban consumers, by contrast, preferred RTC staples such as frozen vegetables and instant noodles, which provided affordability and ease of preparation without diverging significantly from traditional meal structures. These geographic differences suggest that agricultural strategies must be region-specific, aligning crop choices and processing technologies with local consumption patterns.

The survey also revealed an interesting relationship between education levels and consumption choices. Respondents with higher education were more likely to scrutinize nutritional labeling and to experiment with premium RTC items such as quinoa mixes and millet-based products. Conversely, those with lower educational backgrounds gravitated toward familiar products such as instant noodles or packaged fried snacks, often demonstrating limited awareness of nutritional labeling. This education-consumption linkage indicates that literacy campaigns and awareness drives can potentially shift preferences toward healthier options, with implications for agricultural diversification into nutritionally rich crops.

Table 1 summarizes the demographic and motivational factors influencing consumption frequency.

Table 1. Demographic Influences on RTE and RTC Food Consumption (Survey Sample, n=1200)

Factor	Weekly RTE Consumers (%)	Weekly RTC Consumers (%)	Key Motivations
Age 20-35	79	71	Convenience, taste, brand reliability
Age 36-50	65	58	Time-saving, affordability
Age >50	38	29	Cultural preference, health concerns
High-income households	82	74	Premium quality, variety, health claims
Middle-income households	64	53	Affordability, convenience
Low-income households	42	37	Low cost, basic convenience

Another layer of results involved the link between consumer trust and regulatory frameworks. Approximately 46 percent of respondents reported that they were influenced by FSSAI certification labels when choosing RTC products, while 52 percent admitted that they rarely checked for such certifications, relying instead on brand reputation. In metropolitan areas, certification labels were viewed as a baseline requirement, whereas in semi-urban markets, trust was built through word-of-mouth and long-term familiarity with local sellers. These findings point to the need for stronger communication strategies around certification to enhance consumer trust and expand acceptance of smaller producers.

Environmental sustainability perceptions were also explored. Approximately 34 percent of respondents indicated concern over packaging waste associated with RTE and RTC foods, with younger, educated respondents particularly vocal in highlighting the issue. Focus group discussions revealed frustration about the lack of recycling options, with several participants calling for biodegradable packaging. This environmental awareness, though still secondary to convenience, suggests an emerging trend that could shape future consumer expectations and agricultural processing requirements.

Discussion

The results presented in this study highlight the increasing integration of ready-to-eat (RTE) and ready-to-cook (RTC) foods into consumer diets across both metropolitan and semi-urban regions. These findings resonate with a growing body of research that has consistently pointed to the rising importance of convenience in food consumption decisions. Previous studies have argued that modern lifestyles, characterized by time scarcity, shifting gender roles, and changing household structures, have generated new demands for food that is quick to prepare yet sufficiently adaptable to cultural norms. The observed preference for convenience as the primary driver of RTE and RTC consumption in the present study confirms the robustness of this argument while adding new dimensions regarding how these preferences intersect with agricultural production systems.

One of the clearest implications of these findings is the necessity of reorienting agricultural research toward consumer-responsive outcomes. Traditionally, agricultural research in developing economies, including India, has emphasized yield improvements, pest resistance, and input efficiency as the dominant goals. While these priorities remain important, the rise of RTE and RTC foods requires agricultural systems to adapt in ways that prioritize processing compatibility, nutritional enhancement, and shelf-life stability. Previous research by Kumar and Kalita (2021) [5] demonstrated that varietal traits such as amylose content in rice or protein concentration in wheat strongly influence processing suitability and final product quality. The present study reinforces this argument by showing that consumer demand for RTC rice and noodle products has already stimulated demand for specific varietal attributes. Thus, applied agricultural research must expand beyond field productivity into traits that align with downstream processing needs.

The generational divide in RTE and RTC consumption, with younger cohorts demonstrating greater adoption than older ones, has also been reported in earlier studies. Verma and Dutta (2020) [6] found that Indian millennials are more inclined to experiment with novel food formats, while older generations maintain loyalty to traditional cooking practices. Our results not only confirm this generational split but also provide evidence of its deepening, with younger consumers displaying trust in fortified RTE items and older respondents remaining skeptical about their nutritional authenticity. This divergence carries significant implications for agricultural innovation, as future demand will likely concentrate on nutritionally enhanced crops such as millets, quinoa, and legumes, which can be integrated into RTC mixes marketed as health-oriented alternatives. Indeed, Popkin and Ng (2022) [7] observed a broader "nutrition transition," where diets in middle-income countries increasingly oscillate between convenience foods and health-driven consumption. The challenge for agricultural research lies in navigating these dual imperatives by supporting crop diversification into both high-yield staples and niche health crops.

Cultural adaptation emerged as a critical factor in shaping consumption choices, particularly in the preference for RTC mixes that replicate traditional dishes such as dosa or idli. Earlier studies have similarly emphasized that cultural compatibility is vital for consumer acceptance of processed foods in South Asian markets. While Western RTE formats such as breakfast cereals and protein bars are gaining traction, the enduring popularity of RTC batters and spice mixes demonstrates that convenience products succeed most effectively when they align with existing cultural frameworks. This finding suggests that agricultural research and food processing strategies should prioritize culturally embedded crops and ingredients. The continued prominence of rice, pulses, and spices in RTC categories indicates that their varietal improvement and post-harvest technologies remain central to aligning agriculture with consumer preferences.

Economic stratification in consumption patterns also requires close examination. While higher-income groups exhibited greater diversity and frequency in RTE and RTC purchases, lower-income households gravitated toward affordable RTC staples. These results echo Gupta and Thomas's (2021) [9] findings that affordability acts as a primary determinant of processed food adoption in low- and middle-income segments. The preference of lower-income groups for low-cost instant noodles or frozen vegetables underscores the role of price elasticity in consumer decisions. For agricultural systems, this creates a dual challenge: meeting the volume demand of affordable staples while also enabling diversification into premium products for affluent consumers. This duality has been previously documented in Southeast Asian markets, where agricultural supply chains simultaneously cater to budget-conscious RTC noodles and premium organic RTE salads. The Indian context mirrors this tension, with affordability driving bulk consumption while aspirational consumption fuels niche product growth.

Health perceptions, or the lack thereof, constitute another dimension where the results intersect with previous literature. Only 28 percent of respondents in this study perceived RTE and RTC foods as healthy, a finding consistent with prior research that has identified skepticism toward processed foods. Kearney (2010) [12] highlighted that health concerns frequently moderate consumer adoption of convenience foods, even when other motivations such as taste and convenience dominate. More recent studies have shown that branding and nutritional labeling can partially mitigate such scepticism. Our results align with these findings, as younger respondents indicated trust in fortified and labeled products, while older groups remained doubtful. This underscores the importance of agricultural research into biofortification and nutrient-retaining processing techniques, which can bridge the gap between convenience and health perceptions. Fortified rice with iron or zinc, protein-rich wheat, and high-antioxidant vegetables are examples where agricultural science can directly enhance the nutritional profile of convenience foods.

Digital platforms and e-commerce further amplify consumer trends, as evidenced by spikes in online searches during festive seasons and professional deadlines. Deloitte's 2021 report emphasized the accelerating role of digital platforms in shaping food retail, particularly in Asia. Our study builds on this by showing how digital interest aligns temporally with cultural and social events, suggesting that predictive analytics could be harnessed to synchronize agricultural supply chains with consumer demand. For instance, spikes in demand for RTC sweets during Diwali could be anticipated by scaling up supply of specific ingredients such as gram flour or ghee. This integration of digital analytics with agricultural forecasting marks a frontier for applied agricultural research, requiring cross-disciplinary collaboration between data scientists and agronomists.

Sustainability concerns, though not dominant, are gaining traction among educated, younger respondents. Approximately one-third of participants expressed concern about packaging waste and environmental footprints, reflecting a gradual convergence with global trends. UNEP's 2022 report on food packaging sustainability highlighted the dual challenge of convenience and environmental responsibility. Previous research by Filho *et al*. (2020) [16] also emphasized that sustainable packaging innovations can significantly influence consumer acceptance. For agricultural systems, this raises the possibility of research into biodegradable crop-based packaging materials, such as cassava starch films or bamboo fiber composites. Thus, sustainability considerations open new avenues where agricultural by-products and secondary crops can be repurposed into packaging solutions, adding value beyond traditional food uses.

The role of regulatory frameworks emerged prominently in the results, particularly regarding consumer trust in certification labels. While FSSAI labels were recognized by nearly half of respondents, trust remained uneven across demographics. Earlier studies have shown that regulatory credibility is central to consumer trust in processed foods. In contexts where enforcement is inconsistent, consumers rely more heavily on brand reputation, as was evident in metropolitan respondents' preference for multinational labels. This gap indicates that agricultural research and policy must work in tandem to enhance food safety standards and ensure transparent supply chains. Farmer-processor partnerships, backed by certification mechanisms, could improve traceability from farm to fork, thereby strengthening consumer trust.

When viewed globally, the trends observed in this study align with broader shifts documented in food consumption literature. Kearney (2010) [12] and Popkin (2022) [7] both described how the "nutrition transition" in middle-income countries is characterized by increasing reliance on processed foods. Euromonitor International (2023) reported that Asia-Pacific markets are among the fastest-growing segments for RTE and RTC products. Our findings corroborate these claims while providing granularity on how demographic, cultural, and economic variables mediate these global trends in the Indian context. They also extend the literature by linking consumer preferences explicitly to agricultural research imperatives, an area often underexplored in consumer studies.

The alignment of consumer preferences with agricultural production was perhaps most evident in the demand-driven cultivation of specific crop varieties. This study showed that rising demand for RTC rice and noodles has increased interest in varietals suited to quick cooking and processing. Similar trends were documented by Singh and Sharma (2022) [18], who observed how maize and wheat breeding programs in India were increasingly oriented toward processing traits. Globally, research by FAO has emphasized the importance of "demand-oriented agriculture," where breeding programs and supply chains respond directly to consumer markets. The present study contributes to this discourse by demonstrating how demand for RTC vegetables, noodles, and batters is already shaping cultivation and contract farming arrangements in India.

The discussion also highlights the importance of equity in agricultural transitions. While affluent consumers benefit from premium RTE and RTC options, lower-income households continue to rely on inexpensive and often less nutritious variants. This bifurcation reflects what Reardon *et al*. (2019) [24] described as the "supermarket revolution," wherein processed foods can simultaneously expand consumer choice and exacerbate nutritional inequalities. Agricultural research must therefore not only support high-value crops for affluent markets but also ensure that staples consumed by lower-income groups are nutritionally adequate and safe. Biofortified staples and low-cost fortified RTC mixes could address this challenge, bridging the gap between affordability and health.

Finally, the results underscore the need for interdisciplinary approaches in applied agricultural research. Consumer preferences are not driven solely by economic rationality but also by cultural, technological, and environmental factors. Previous research has shown that isolated approaches, whether in crop breeding, supply chain management, or nutrition education, have limited impact unless integrated within broader systems. The present study provides empirical evidence supporting this systems-based perspective, showing how consumer preferences for RTE and RTC foods reverberate across agricultural production, processing technologies, regulatory frameworks, and environmental considerations.

Conclusion

The exploration of consumer preferences for ready-to-eat (RTE) and ready-to-cook (RTC) foods has revealed a rapidly transforming food environment shaped by urbanization, income diversification, generational shifts, and cultural adaptation. The evidence demonstrates that convenience has become the most influential determinant of food choice in contemporary societies, surpassing traditional considerations of freshness and, in many cases, overshadowing concerns about health and sustainability. Yet, while convenience dominates, other dimensions such as taste, affordability, nutritional authenticity, and environmental impact continue to shape consumer decision-making, often in complex and sometimes contradictory ways. This multidimensionality reflects not only the changing character of food systems but also the growing importance of aligning agricultural research with consumer-driven realities.

One of the central insights derived from this study is that RTE and RTC foods are no longer peripheral segments of the food market but have established themselves as mainstream components of household diets. Younger cohorts, particularly urban professionals and students, have emerged as the most consistent consumers of these categories, suggesting that future demand will only intensify as these demographics expand. Middle-aged dual-income households also exhibit significant reliance on RTC foods, reflecting the pressures of balancing professional and domestic responsibilities. Conversely, older generations, though less inclined toward adoption, are gradually participating through limited consumption of affordable RTC staples such as frozen vegetables. The cumulative effect of these demographic variations is the steady normalization of convenience foods across diverse social contexts.

From an agricultural perspective, these consumer trends carry profound implications. The demand for RTC rice, noodles, and batter products has already begun reshaping varietal preferences in crop cultivation, while the growth of frozen vegetable categories has accelerated investment in cold chain infrastructure and contract farming. Agricultural research, which has long focused on yield enhancement and pest resistance, must now expand its priorities to include processing suitability, nutrient retention, and supply chain resilience. The evidence presented here underscores the need for a demand-oriented agricultural research model in which crop breeding programs are informed not only by agronomic factors but also by the processing requirements of modern food industries. Such a reorientation will allow agriculture to serve as a foundation for innovation in food processing, thereby enhancing the value derived from primary production.

Nutrition represents another dimension where agricultural science and consumer preferences must converge. The skepticism expressed by older consumers toward the health implications of RTE and RTC foods, alongside the selective trust displayed by younger groups in fortified products, highlights the need for interventions that strengthen nutritional value at the crop level. Biofortification of staple grains, diversification into protein-rich legumes, and the cultivation of antioxidant-rich fruits and vegetables can help ensure that the convenience offered by RTE and RTC foods does not come at the cost of dietary quality. Moreover, as affordability remains a decisive factor for lower-income households, agricultural innovations must prioritize cost-effective fortification strategies that make nutritionally improved RTC products accessible to vulnerable populations.

The digital dimension of food consumption adds further complexity. Seasonal spikes in online searches for RTC sweets or frozen snacks during festivals and cultural events illustrate the importance of predictive analytics in aligning agricultural supply chains with consumer demand. By integrating agricultural forecasting with digital consumption patterns, stakeholders can reduce mismatches between supply and demand, minimize waste, and ensure that food systems remain responsive to shifting consumer behavior. This intersection between digital technologies and agricultural research represents a promising frontier that can enhance both efficiency and resilience in food supply chains.

Sustainability concerns, though not yet primary drivers of consumer choice, are steadily gaining prominence. Younger, educated consumers in particular are beginning to associate RTE and RTC foods with packaging waste and environmental degradation. While this concern currently remains secondary to convenience, it foreshadows a future in which environmental accountability will become integral to consumer trust. Agricultural systems can play a pivotal role in this transition by providing raw materials for biodegradable packaging, optimizing crop residues for secondary uses, and fostering circular economy practices. Thus, sustainability in the context of convenience foods extends beyond waste management to encompass holistic agricultural innovations that balance productivity with ecological responsibility.

Policy frameworks and regulatory mechanisms also emerge as crucial enablers of consumer trust. The mixed levels of reliance on food safety certifications observed in this study suggest that while labeling remains influential, it must be supported by more visible and credible enforcement mechanisms. Agricultural research institutions, policymakers, and food processors must work collaboratively to establish transparent supply chains that assure consumers of both safety and nutritional authenticity. Strengthening certification systems, promoting traceability technologies, and supporting farmer-processor partnerships can help close the trust gap between multinational brands and domestic producers, thereby ensuring equitable market participation.

Looking forward, the findings of this study point to several directions for future investigation. First, further research is needed to explore the long-term health impacts of RTE and RTC consumption, particularly in contexts where dietary transitions are accelerating. Second, there is scope for examining the role of traditional crops such as millets, pulses, and indigenous vegetables in shaping the next generation of RTC products, particularly in light of growing health awareness. Third, interdisciplinary collaborations between agricultural scientists, food technologists, digital analysts, and environmental researchers are essential to address the complex challenges at the intersection of consumer demand and agricultural supply. Finally, future research should consider the global implications of these trends, comparing how consumer preferences in emerging economies align or diverge from those in high-income countries, and what lessons can be transferred across contexts.

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