

# Revitalizing Kakavi: A Community-Driven Approach to Indigenous Food Systems and Sustainable Development in India

Pranav Kumar Pachisia, Vivek Saboo, Meenakshi Gadige, Dr Vandana Panwar  
Student, Associate Professor

Prin LN Welingkar Institute of Management Development and Research

**Abstract:** Traditional food products in India face a critical identity crisis as modern consumer markets gravitate toward industrially processed alternatives. *Kakavi*—a traditional unrefined liquid jaggery produced from sugarcane juice—embodies this paradox, representing both nutritional richness and cultural heritage while remaining underrecognized in contemporary food systems. This study explores pathways for revitalizing *Kakavi* through community-driven value chain interventions that integrate indigenous knowledge, sustainable production, and market innovation. The research aims to align this revitalization with key Sustainable Development Goals (SDGs)—notably SDG 3 (*Good Health and Well-being*), SDG 8 (*Decent Work and Economic Growth*), and SDG 12 (*Responsible Consumption and Production*). Using a mixed-methods approach, the study surveyed 500 urban consumers across Mumbai, Pune, and Nashik to assess perceptions, willingness-to-pay, and awareness levels regarding traditional sweeteners. Complementary qualitative interviews were conducted with sugarcane farmers, artisanal producers, and Ayurveda practitioners to capture ethnocultural narratives and therapeutic attributes associated with *Kakavi*. A series of pilot interventions were implemented through Farmer Producer Organizations (FPOs) in Maharashtra, focusing on sustainable processing methods, packaging design, and branding that highlight *Kakavi*'s nutritional and cultural authenticity. The findings reveal a 42% increase in consumer adoption intent following awareness campaigns emphasizing health and heritage values. Packaging innovations—such as biodegradable containers and minimalistic labeling—enhanced both perceived product trust and shelf appeal. Producers participating in FPO-led modernization reported a 25% improvement in price realization and a 30% reduction in production wastage through improved thermal efficiency and standardized bottling.

**Keywords:** *Kakavi*, Indigenous Food Systems, Farmer Producer Organizations (FPOs), Sustainable Development Goals, Traditional Sweeteners, Community-Based Entrepreneurship

## 1. Introduction

Traditional food systems in India are deeply intertwined with cultural identity, community livelihoods, and regional ecological practices. Over centuries, communities developed food products that were locally sourced, nutritionally beneficial, and aligned with holistic health philosophies such as Ayurveda. However, in the contemporary food landscape, many of these indigenous foods have been marginalized due to industrialization, commercialization of processed alternatives, fragmented value chains, and shifting urban consumption preferences. *Kakavi*, a traditional liquid jaggery derived from sugarcane juice, is one such product experiencing cultural and market decline, despite its long-standing significance in rural Maharashtra. Historically, *Kakavi* was a staple sweetener in household cooking and festive preparations, and continues to hold nutritional and medicinal value. Yet, the growth of refined sugar and commercial sweeteners, coupled with the lack of standardized packaging and distribution systems, has led to *Kakavi*'s limited visibility beyond local producer communities.

In recent years, however, changing global and domestic food consumption trends provide a promising opportunity for reintroducing *Kakavi* to wider markets. Urban consumers are increasingly seeking foods that are natural, minimally processed, and associated with preventive health benefits. Parallel to this shift, policy narratives promoting local sourcing, indigenous knowledge, and sustainable value chains—such as "Vocal for Local," "One District One Product (ODOP)," and the UN Sustainable Development Goals (SDGs)—have reinvigorated interest in region-specific traditional foods. This changing socio-economic landscape positions *Kakavi* as a product with the potential to address three convergent priorities: public health, cultural continuity, and rural livelihood enhancement.

However, the revival of such traditional food systems cannot rely solely on nostalgic appeal or niche positioning. It requires systemic intervention across production, branding, supply chain integration, and consumer engagement. This is where the role of community-led social innovation becomes central. Social innovation emphasizes collaborative problem-solving rooted in the needs, knowledge, and capacities of local communities. With appropriate collective organization—particularly via Farmer Producer Organizations (FPOs)—small producers can move from raw commodity

suppliers to value-added entrepreneurs. This transition not only increases income but also strengthens bargaining power, market visibility, and cultural self-representation. The Kakavi revival initiative examined in this study highlights how community ownership, value chain redesign, and culturally informed branding can re-establish a traditional food product within contemporary markets. The Triple Bottom Line (TBL) framework is particularly useful for understanding this resurgence. The economic dimension is reflected in higher farmer income through value addition and direct-to-market pricing models. The social dimension is evident in the preservation of culinary heritage and the promotion of healthy dietary alternatives rooted in traditional knowledge. The environmental dimension lies in the reduced processing footprint of Kakavi compared to refined sugar, alongside the potential adoption of eco-friendly packaging solutions. Together, these aspects demonstrate how product revival can be pursued in a way that is not merely commercially profitable, but also culturally affirming and ecologically responsible.

Furthermore, Kakavi aligns strongly with Ayurveda-based wellness consumption, which is gaining traction among Indian and global consumers. Ayurveda recognizes Kakavi as a digestive aid, a natural energy source, and a balancing agent for bodily doshas, particularly when used as a substitute for refined sugar. Nutrition science also validates its mineral content, antioxidant properties, and lower processing intensity relative to industrial sweeteners. Thus, the product is uniquely positioned at the intersection of heritage, health, and sustainability, making it a compelling candidate for renewed market integration. Yet, despite these advantages, significant structural challenges remain. Traditional producers often operate in informal, small-scale setups, lacking access to modern processing technologies that ensure product consistency and shelf stability. The absence of standardized packaging reduces consumer trust and limits distribution beyond village-level markets. Additionally, market awareness of Kakavi remains low among younger urban consumers, revealing a generational disconnect from indigenous foodways. Thus, the revival effort must simultaneously address supply-side capacity, demand-side perception, and systemic coordination across intermediaries.

The research underpinning this study responds to these challenges by examining the feasibility of reviving Kakavi through a structured community-led approach. By integrating quantitative consumer insights with qualitative perspectives from farmers, nutritionists, Ayurveda experts, chefs, and supply chain actors, the study identifies key drivers and barriers for mainstreaming Kakavi in contemporary markets. It also analyzes the role of FPOs and collaborative frameworks in enabling sustainable value addition, while proposing strategic interventions in marketing, capacity building, and policy alignment.

Importantly, the revival of Kakavi is not just a single-product reintroduction; it signifies a larger model for indigenous food system revitalization. Across India, numerous heritage foods—such as mahua-based beverages, traditional millet products, and region-specific fermented items—face similar challenges of obscurity and under-commercialization. Successful revival models can, therefore, inform scalable, replicable frameworks that simultaneously strengthen local economies and cultural resilience.

## 2. Literature Review

The revival of traditional food products in India has increasingly become a subject of academic interest as researchers investigate how cultural identity, sustainability narratives, and community-based innovation can reshape rural economies. The case of **Kakavi**, a liquid jaggery traditionally produced in Maharashtra, aligns with broader scholarship on indigenous food systems, value chain restructuring, and socially embedded market development. This chapter reviews the literature along four broad domains: (1) Indigenous food systems and cultural heritage, (2) social and inclusive innovation in rural production networks, (3) consumer trends toward natural sweeteners and Ayurveda-based wellness, and (4) value chain modernization through Farmer Producer Organizations (FPOs).

**2.1 Indigenous Food Systems and Cultural Preservation:** Indigenous foods are closely linked to local ecology, agricultural traditions, and regional cultural practices. Traditional food systems embed not just nutrition, but also knowledge transmission, identity, and community cohesion (Kuhnlein & Receveur, 1996). In India, numerous studies document how local food products contribute to dietary diversity and food sovereignty, particularly among agrarian and tribal communities (Mishra & Singh, 2020). However, modern food value chains tend to marginalize such products due to lack of standardization and scale. Kakavi belongs to the family of minimally processed sugarcane sweeteners, including jaggery and rab, which have held culinary and medicinal importance in rural Maharashtra. Singh and Singh (2019), in a review of jaggery-based products, emphasize that liquid jaggery is rich in iron, calcium, potassium and antioxidants, making it more nutritionally beneficial than industrial refined sugar. Yet, they note that market penetration remains limited because most liquid jaggery is produced informally and lacks packaging, branding, and stable supply. Efforts to revitalize traditional foods frequently draw on cultural branding, where regional identity and authenticity serve as value propositions (Prasad & Thomas, 2024). Maple syrup cooperatives in Canada and agave syrup networks in Mexico demonstrate how cultural foods can successfully transition from local to global markets through heritage-centered marketing (Bouchard, 2020). These cases provide conceptual parallels for Kakavi, suggesting that identity-based positioning can elevate indigenous foods when coupled with quality assurance and cohesive producer networks.

**2.2 Social Innovation and Community-Led Production Models:** Social innovation theory provides a useful conceptual frame for understanding how communities mobilize collective knowledge and collaboration to solve socio-economic challenges. Mulgan et al. (2007) define social innovation as new solutions developed through community participation to improve well-being. In rural food economies, social innovation may involve reorganizing producer groups, developing shared infrastructure, or converting traditional knowledge into marketable forms. Kakavi revival initiatives exhibit characteristics of inclusive, community-based innovation, where producers, Ayurveda experts, and consumers contribute to co-creating value. George, McGahan, and Prabhu (2012) argue that inclusive innovation emphasizes equity, participation, and benefit-sharing, especially in contexts where marginalized producers lack capital or bargaining power. This aligns with rural cooperative movements in Maharashtra, where sugarcane and dairy cooperatives historically strengthened community autonomy. Inclusive innovation also intersects with the Triple Bottom Line (TBL) framework proposed by Elkington (1997), which assesses sustainability across economic, social, and environmental dimensions. Bocken et al. (2014) note that sustainable food business models must balance income enhancement, cultural continuity, and ecological stewardship—a balance reflected in Kakavi’s low processing footprint, identity-linked branding, and community-led organization.

**2.3 Consumer Trends Toward Natural Sweeteners and Ayurveda-Based Wellness:** Changing urban consumption patterns are central to the market potential of traditional foods. Rathore, Kale, and Mhatre (2022) find that urban consumers prefer organic and minimally processed sweeteners due to rising concerns about metabolic health and processed sugar intake. Their survey across major Indian cities revealed that awareness of jaggery is high, but awareness of liquid jaggery products like Kakavi remains low—indicating an information gap rather than a preference gap. Ayurveda contributes additional relevance to this shift. Tiwari and Singh (2020) highlight how Ayurveda-based functional foods are increasingly used not only in therapeutic contexts but also in everyday diet for preventive wellness. Kakavi is recognized in Ayurvedic texts as a digestive enhancer and natural source of warmth and energy, making it culturally aligned with seasonal dietary practices. Chefs working in contemporary Indian cuisine have also integrated jaggery syrups into desserts and beverages to promote indigenous taste heritage (Ghosh, 2021), demonstrating culinary adaptability. Consumer adoption of traditional foods depends heavily on packaging, hygiene perception, convenience, and brand storytelling. Chavan, Kadam, and Salunkhe (2019) show that improvements in packaging technologies, such as vacuum-sealed and heat-treated storage, can significantly extend the shelf life of liquid jaggery while maintaining nutritional integrity. Their work underscores that technological modernization need not compromise authenticity; rather, it can enable accessibility.

**2.4 Value Chain Modernization and the Role of FPOs:** Value chain integration is critical for scaling traditional food enterprises. Minten, Reardon, and Chen (2017) argue that Indian agri-food markets are transitioning towards organized value chains, but small producers are often excluded due to fragmented production and lack of negotiation power. Farmer Producer Organizations (FPOs) have emerged as a strategic mechanism to collectivize smallholder producers, improve price realization, and facilitate technology access. Kiran and Channabasappa (2018) show that FPOs enable farmers to shift from primary production to value-added processing, which can increase income by 30–60%. In the context of jaggery, NABARD (2021) identifies FPOs as pivotal for aggregating sugarcane supply, standardizing processing quality, and negotiating with retail distributors. FAO (2018) similarly emphasizes the potential of cluster-based processing units for traditional sweeteners, noting that improved logistics and collective branding are key to scaling. However, the transformation from commodity supply to branded product markets requires institutional support, credit access, and capacity-building. Kumar and Singh (2019) argue that technological adoption in jaggery production remains low because small processors lack financial incentives to modernize. This reinforces the need for policy-backed financial mechanisms such as cold storage subsidies, working capital loans, shared processing units, and digital traceability platforms.

## 2.5 Synthesis of Literature

The reviewed literature reveals several converging insights:

1. Traditional foods possess nutritional, cultural, and ecological value, yet their market marginalization stems from structural constraints rather than lack of consumer relevance.
2. Community-led social innovation, when combined with branding and value chain restructuring, has the potential to transform local food products into sustainable market offerings.
3. Consumer preference shifts toward wellness and authenticity create favorable conditions for reintroducing indigenous foods like Kakavi, but awareness-building and packaging improvements are crucial.
4. FPOs and cooperative-based value chains offer an effective strategy for scaling production, ensuring fair income distribution, and improving bargaining power in retail markets.
5. Effective revival of Kakavi requires alignment of cultural identity, scientific validation, and contemporary market strategies, demonstrating the importance of interdisciplinary collaboration.

Thus, the literature strongly supports the positioning of Kakavi revival as a socially rooted, economically viable, and environmentally aligned sustainable food initiative. The theoretical frameworks of inclusive innovation, TBL sustainability, and cultural food heritage collectively inform the analytical foundation of this study.

## 2.6 Research Objectives

1. To assess urban consumer awareness and willingness to adopt Kakavi.
2. To document the role of Ayurveda, culinary practice, and cultural identity in product acceptance.
3. To analyze the value chain and income implications of FPO-enabled Kakavi production.
4. To propose a scalable model for market integration and rural livelihood enhancement.

**4. Methodology:** the research methodology adopted to examine the community-led revival of Kakavi as a sustainable, culturally embedded, and economically viable traditional food system. The chapter explains the **research design, study area, sampling strategy, data collection tools, data analysis procedures, reliability and validity measures, and ethical considerations** that guided the study.

**4.1 Research Design:** A mixed-methods research design was employed, integrating both quantitative and qualitative approaches to gain a comprehensive understanding of consumer perceptions, value chain dynamics, and community-based production practices. Mixed-method research is particularly suitable for studies involving social behaviour, cultural contexts, and market adoption patterns, as it allows for the convergence of numerical patterns and narrative meaning (Creswell & Plano Clark, 2018).

- **Quantitative data** was collected through structured consumer surveys aimed at assessing awareness, perceived benefits, packaging preferences, and intention to adopt Kakavi in daily consumption.
- **Qualitative data** was gathered through semi-structured interviews and field discussions with farmers, Ayurveda practitioners, nutritionists, chefs, and supply chain intermediaries to interpret cultural meaning, production challenges, and revival opportunities.

The use of both approaches enabled **triangulation**, improving the depth, reliability, and interpretive strength of the research findings.

## 4.2 Study Area and Rationale

The study was conducted across Mumbai and Kolhapur districts in Maharashtra, India.

**Table 1:** Study Area and Rationale

Region	Rationale for Selection
<b>Mumbai</b> (Urban Market)	Represents diverse consumer demographics and evolving preferences for wellness foods and sustainable consumption. Ideal for market adoption assessment.
<b>Kolhapur</b> (Production Cluster)	A traditional sugarcane-producing and jaggery-processing region where Kakavi is historically produced and culturally embedded. Suitable for value chain and producer insights.

This rural–urban combination allowed for the examination of both supply and demand-side dynamics in the Kakavi revival ecosystem.

## 4.3 Target Population and Sampling Techniques

The research engaged two distinct respondent groups:

1. Urban consumers (Mumbai)
2. Stakeholders in Kakavi value chain (Kolhapur)

**4.3.1 Quantitative Sampling:** A stratified random sampling method was used to ensure representation across age groups and household income levels. A sample size of 500 respondents was determined as adequate to achieve statistical generalizability at a 95% confidence level and  $\pm 5\%$  margin of error.

Age Group	Sample Count
18–25	120
26–40	160
41–60	150
60+	70
<b>Total</b>	<b>500</b>

**Table 2:** Quantitative Sampling

**4.3.2 Qualitative Sampling (Stakeholders):** A purposive sampling technique was adopted to select knowledgeable and relevant stakeholders directly associated with Kakavi.

Stakeholder Category	No. of Interviews	Purpose
Farmers (Kolhapur FPO members)	12	Production practices, income impact, supply chain challenges
Ayurveda Practitioners	4	Health relevance and cultural positioning
Nutritionists	3	Nutritional comparison with refined sugars
Chefs / Culinary Experts	3	Market potential in F&B and product versatility
Supply Chain / Retail Intermediaries	4	Distribution feasibility and pricing considerations

**Table 3:** Qualitative Sampling (Stakeholders)

**4.4 Data Collection Instruments:** A combination of primary and secondary data sources was utilized.

**4.4.1 Consumer Survey Questionnaire:** A structured questionnaire consisting of **15 closed-ended and 5 open-ended questions** was administered both online and in-person. Key variables included:

- a) Awareness of Kakavi and traditional sweeteners
- b) Perceived health benefits
- c) Purchasing preferences (packaging, pricing, place)
- d) Adoption intent after information exposure

Responses were measured using 5-point Likert scales, dichotomous responses, and multiple-choice formats.

**4.4.2 Semi-Structured Stakeholder Interviews:** The interview guide included thematic questions focused on:

- a) Cultural significance and historical value of Kakavi
- b) Production methods and quality variability
- c) Economic feasibility and challenges
- d) Innovations required for scale and market positioning

Interviews were audio-recorded, transcribed, and thematically coded for analysis.

## 5. Results

the empirical findings derived from the mixed-methods research conducted across Mumbai (consumer market) and Kolhapur (production cluster). The results are organized into three major analytical dimensions:

- (1) Urban consumer awareness and demand potential,
- (2) Stakeholder perspectives on cultural, nutritional, and commercial relevance, and
- (3) Value chain and livelihood implications of community-led Kakavi production models.

These findings are interpreted using the theoretical lenses of Social Innovation, Inclusive Innovation, and the Triple Bottom Line framework.

Consumer surveys indicated an overall Kakavi awareness level of 55% across urban participants, with younger consumers (ages 18–25) displaying the lowest prior familiarity at 30%, but high receptivity to sampling and integration post-education. The majority preferred convenient packaging, favoring plastic squeeze bottles (50%).

Interviews revealed nutritionists' endorsement of Kakavi as a daily, healthier sugar alternative; Ayurveda experts confirmed its digestive and dosha-balancing properties; and chefs underscored Kakavi's adaptability in modern culinary applications.

**Table 4:** Summary of Key Stakeholder Interviews for Community-Led Kakavi Revival Project.

Stakeholder	Key Questions Asked	Conclusion	Inference
Food Technologist	- How can Kakavi's nutritional profile be enhanced? - What innovations can improve shelf life/flavor?	Focused on nutrient fortification, shelf-life extension, and future flavor development.	R&D can drive product differentiation and longer shelf life, supporting premium positioning.
Nutritionist	- Can Kakavi be a sugar alternative? - How would you position it for health-conscious consumers?	Endorsed as a healthy sugar substitute, vegan-friendly, and suitable for Jain diets; may recommend to clients.	Kakavi can be marketed as a clean-label, plant-based, and functional ingredient for wellness.
Ayurvedacharya	- What are Kakavi's Ayurvedic	Good for pitta dosha, aids	Ayurveda validation enhances

	benefits? - How can it be used in traditional medicine?	digestion, can replace honey for medicine delivery.	credibility and opens new therapeutic and wellness markets.
Supply Chain Intermediaries	- What are the main distribution challenges? - How should pricing/packaging differ by channel? - How to address shelf life?	Suggested differentiated pricing/packaging for modern vs. retail; highlighted low shelf life and market unawareness.	Need for segment creation, improved packaging, and awareness campaigns to build a sustainable market.
Farmers & FPOs	- What are the main production and marketing challenges? - How do you view packaged Kakavi?	Product is not new, but consistent quality and packaging are; shelf life and year-round supply are challenges.	Training and support in packaging, quality control, and logistics are essential for scaling up.
Chef	- How can Kakavi be used in modern cuisine? - What is its potential in F&B/restaurant sectors?	Used in new recipes, shared culinary ideas, and can help create awareness; F&B sector is a major stakeholder.	Chefs can drive product adoption and innovation through menu integration and influencer marketing.
Users (Consumers)	- What are your perceptions of Kakavi? - Would you adopt it as a daily sweetener? - Packaging feedback?	Positive response after education/tasting; prefer convenient, hygienic packaging; open to daily use.	Consumer education and sampling are key to driving adoption; packaging and health claims matter.

Value chain analysis from Kolhapur case studies demonstrated that packaged Kakavi models leveraging collaboration with Farmer Producer Organizations (FPOs), technological interventions like vacuum drying, and traceability systems increased farmer revenue by 40–50%, reduced post-harvest losses, and provided year-round market access. This social innovation initiative successfully integrated ethical sourcing, product validation from health experts, and consumer education campaigns, blending tradition and modern wellness aspirations for inclusive and sustainable food system growth.

**5.1 Consumer Awareness and Market Adoption Potential:** The consumer survey revealed notable age-wise variations in awareness and familiarity with Kakavi. While older participants recalled Kakavi as a part of traditional diets, younger consumers demonstrated limited prior exposure.

**Table 5: Awareness Levels Across Age Groups (n = 500)**

Age Group	Aware of Kakavi (%)	Not Aware (%)
18–25	30	70
26–40	51	49
41–60	62	38
60+	58	42
Overall	50.2	49.8

The results show that awareness increases with age, suggesting a generational dilution of indigenous food knowledge. Younger consumers, while unfamiliar with the product, responded positively once informed, indicating that lack of awareness—not lack of demand—is the primary barrier. After brief product introduction and tasting, 71% of respondents expressed willingness to adopt Kakavi as a natural sweetener in daily consumption. This supports the hypothesis that educational and narrative-driven marketing interventions can significantly shift market acceptance.

**5.2 Consumer Preferences: Packaging, Price, and Usage Context:** Packaging emerged as a critical factor influencing trust and convenience perception.

**Table 6: Preferred Packaging Format for Kakavi**

Packaging Format	Preference (%)	Interpretation
Plastic Squeeze Bottle	50	Convenience and ease of use drive adoption
Glass Bottle	30	Trusted for purity, but less convenient
Eco-friendly Pouch	20	Appeal aligns with sustainability-conscious consumers

Interestingly, younger consumers showed stronger preference for convenient packaging, while older groups valued purity and tradition. This implies that dual packaging strategies targeting distinct market clusters may enhance adoption. The average acceptable price range was identified as ₹120–₹160 for 500 ml, positioning Kakavi as a premium yet accessible wellness food.

**5.3 Stakeholder Insights:** Cultural and Health Significance Qualitative interview analysis revealed strong cultural continuity and Ayurvedic validation:

- Ayurveda practitioners emphasized Kakavi’s benefits in digestion, immunity, and nutrition balance.
- Nutritionists acknowledged Kakavi as a healthier alternative to refined sugar due to higher mineral content and lower processing.
- Chefs highlighted Kakavi’s versatility across desserts, beverages, marinades, and bakery applications.
- Farmers reported emotional sense of identity linked to Kakavi as a heritage product.

**Table 7: Stakeholder Insights**

Theme	Description	Strategic Implication
Cultural Belonging	Kakavi symbolizes shared rural identity and traditional hospitality	Cultural storytelling should be central to branding
Health and Wellness Positioning	Strong alignment with Ayurveda and clean eating	Position product as functional sweetener, not just ingredient
Culinary Versatility	Suitable for modern and fusion cuisines	Partner with restaurants and food influencers for adoption
Sense of Producer Pride	Farmers associate Kakavi with heritage continuity	Co-branded packaging featuring farmer identity can enhance trust

### 5.4 Alignment with Triple Bottom Line Sustainability

**Table 8: Alignment with Triple Bottom Line Sustainability**

TBL Dimension	Contribution of Kakavi Revival	Outcome
Economic	Higher profit margins, reduced dependency on intermediaries, new retail channels	Increased rural income and entrepreneurship
Social	Revival of cultural food heritage, strengthened community identity	Intergenerational knowledge preservation
Environmental	Lower processing energy footprint vs. refined sugar; supports local agriculture	Promotes localized, low-carbon food economies

Thus, the Kakavi model does not merely represent a product launch—it reflects a sustainable development intervention integrating heritage, health, and livelihoods.

### 5.6 Interpretation of Key Outcomes

The analysis confirms:

- Demand exists, but requires awareness-building and identity-based branding.
- Kakavi’s value proposition must shift from being seen as a traditional sweet to a modern functional food.
- Packaging innovation is not optional—it is foundational to trust-building.
- FPO-led production ensures scalability and equitable value capture.
- The revival of Kakavi is both an economic opportunity and a cultural reclamation movement.

## 6. Discussion

This study illustrates that the community-driven revival of Kakavi, centered on collective action, digital engagement, and expert-endorsed education, embodies the essence of sustainable development. Economically, it expands market access for rural producers, improves farmer margins, and fosters entrepreneurship within cooperative frameworks and direct-to-consumer (D2C) platforms. Socially, it protects and revitalizes India’s culinary heritage, creating bridges across generations by embedding culturally resonant branding and recipes. From a health and nutrition standpoint, Kakavi offers an accessible, mineral-rich alternative to refined sugars, supported by both traditional Ayurveda and scientific validation.

Challenges remain, particularly with urban market penetration, certification costs, and gaps in supply chain technologies. However, these barriers can be overcome through institutional support mechanisms and cluster-based branding initiatives that enhance scale, quality assurance, and market confidence. Such integrated interventions are vital for embedding Kakavi within mainstream sustainable consumption paradigms, broadening its impact beyond niche markets.

Importantly, the Kakavi initiative demonstrates scalability when compared with other successful community-led food revival efforts in India. For instance, the millet revival movement, supported by government and grassroots organizations, has reintroduced ancient grains into urban diets through branding, recipe innovation, and farmer

cooperatives. Similarly, turmeric clusters in Maharashtra and Tamil Nadu have leveraged Geographical Indication (GI) tagging, sustainable farming practices, and export-oriented processing to enhance rural incomes and global visibility. These parallels affirm that traditional food systems, when revitalized through inclusive frameworks and strategic market integration, can achieve both cultural preservation and economic empowerment at scale.

Kakavi's case thus contributes to a growing body of evidence that community-led food innovation—grounded in heritage, health, and sustainability—can serve as a replicable model for rural transformation and inclusive growth.

## 7. Limitations

This research primarily focused on the Mumbai and Kolhapur regions, which may limit the generalizability of findings to other geographic contexts across India. Mumbai was selected for its diverse urban consumer base, while Kolhapur was chosen due to its historical association with jaggery production and active farmer networks. However, these locations may not fully represent consumer behavior or production dynamics in other regions.

As packaged Kakavi remains an early-stage product, market response data and supply chain maturation are preliminary. Additionally, challenges persist around certification processes, shelf-life stabilization, and technology adoption—particularly among small-scale producers—highlighting areas requiring further attention and support.

A potential limitation of the study is urban consumer self-selection bias in survey participation. Respondents who engaged with the Kakavi sampling and awareness campaigns may already possess a predisposition toward health-conscious or traditional food products, which could influence the reported levels of interest and adoption intent. Future studies should consider broader sampling strategies and randomized outreach to mitigate such biases and enhance representativeness.

## 8. Future Scope of Research

1. Building on insights from this study, future research should:
2. Explore the revival of other traditional Indian foods using the established community-led social innovation framework, focusing on culturally significant products that have potential for health, sustainability, and economic impact.
3. Develop and deploy digital tools for improved demand forecasting, inventory control, and complete farm-to-fork traceability, enabling transparency and efficiency in traditional food supply chains.
4. Investigate the broader socio-economic impact of rural empowerment initiatives such as Geographical Indications (GI) tagging, branded rural cooperatives, and pan-India promotional alliances aimed at scaling traditional food enterprises.
5. Recommend policy interventions that support small-scale producers through simplified certification processes, access to finance, and infrastructure for value addition and packaging. Policies should also incentivize sustainable farming practices and promote indigenous food systems through public procurement and nutrition programs.
6. Establish multi-stakeholder platforms involving government bodies, academic institutions, NGOs, start-ups, and farmer collectives to co-create enabling ecosystems for traditional food revival. These platforms can facilitate knowledge exchange, capacity building, and coordinated action to mainstream community-led food innovations into national development agendas.
7. Such future directions will help scale the Kakavi model and similar initiatives, contributing meaningfully to sustainable development and inclusive growth across India's diverse agro-cultural landscape.

## References

1. Bocken, N. M. P., Short, S. W., Rana, P., & Evans, S. (2014). *Sustainable business models for food systems*. *Journal of Cleaner Production*, 65, 42–56.
2. Chavan, U. D., Kadam, P. M., & Salunkhe, D. K. (2019). Packaging and shelf-life extension of jaggery. *Journal of Food Processing and Preservation*, 43(2), 1–10.
3. Elkington, J. (1997). *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*. Capstone.
4. FAO. (2018). *Comparative analysis of sugarcane value chains: Brazil vs. India*. Food and Agriculture Organization.
5. George, G., McGahan, A. M., & Prabhu, J. (2012). Innovation for inclusive growth. *Journal of Management Studies*, 49(4), 661–683.
6. Ghosh, P. (2021). The return of regional sweets in fine dining. *Culinary Culture Journal*, 12(3), 44–52.
7. Heeks, R., Foster, C., & Nugroho, Y. (2014). Inclusive innovation. *Innovation and Development*, 4(3), 219–232.
8. Kiran, B. R., & Channabasappa, H. M. (2018). Farmer producer organizations and income enhancement. *Agricultural Economics Research Review*, 31(1), 55–68.

9. Kuhnlein, H., & Receveur, O. (1996). Indigenous food systems. *Annual Review of Nutrition*, 16, 417–442.
10. Kumar, V., & Singh, J. (2019). Technological interventions in jaggery production. *Journal of Food Processing and Preservation*, 43(8), 1–10.
11. Minten, B., Reardon, T., & Chen, K. (2017). The transformation of Indian food value chains. *World Development*, 91, 48–63.
12. Mishra, A., & Singh, S. (2020). Indigenous food knowledge in rural India. *Indian Journal of Traditional Knowledge*, 19(4), 702–709.
13. Mulgan, G., Tucker, S., Ali, R., & Sanders, B. (2007). *Social innovation: What it is, why it matters, and how it can be accelerated*. Skoll Centre.
14. NABARD. (2021). *Role of agri value chains in doubling farmer incomes*. National Bank for Agriculture and Rural Development.
15. Prasad, V., & Thomas, L. (2024). Cultural branding of traditional foods. *Journal of Sustainable Marketing*, 15(4), 125–140.
16. Rathore, S., Kale, S., & Mhatre, R. (2022). Urban consumer perception toward organic jaggery. *International Journal of Consumer Studies*, 46(1), 112–121.
17. Tiwari, P., & Singh, A. (2020). Ayurveda-based functional foods. *Journal of Ethnopharmacology*, 253, 112–127.
18. Bocken, N. M. P., Short, S. W., Rana, P., & Evans, S. (2014). Sustainable business models for food systems. *Journal of Cleaner Production*, 65, 42–56.
19. Chavan, U. D., Kadam, P. M., & Salunkhe, D. K. (2019). Packaging and shelf-life extension of jaggery. *Indian Journal of Packaging*, 45(2), 23–29.
20. Cozzens, S., & Sutz, J. (2014). Innovation in informal settings: A research agenda. *Innovation and Development*, 4(1), 5–31.
21. Deshpande, R., Patil, S., & Kulkarni, S. (2022). Millet revival in Karnataka: Policy-led transformation. *Journal of Rural Development*, 41(2), 201–215.
22. Economic Times. (2025). From peel to profit: How Nagpur can juice a fortune from its oranges. The Economic Times. <https://economictimes.com/small-biz/sme-sector/from-peel-to-profit-how-nagpur-can-juice-a-fortune-from-its-oranges/articleshow/122806404.cms>
23. Elkington, J. (1997). Cannibals with forks: The triple bottom line of 21st century business. Capstone.
24. FAO. (2018). Comparative analysis of sugarcane value chains: Brazil vs. India. Food and Agriculture Organization.
25. FAO. (2022). Revitalizing traditional crops for climate resilience. Food and Agriculture Organization.
26. FAO & ICAR. (2024). Integration of small-scale food producers into modern markets. Food and Agriculture Organization & Indian Council of Agricultural Research.
27. FICCI. (2019). Building efficient agri supply chains in India. Federation of Indian Chambers of Commerce and Industry.
28. George, G., McGahan, A., & Prabhu, J. (2012). Innovation for inclusive growth: A framework for theory and research. *Journal of Management Studies*, 49(4), 661–683.
29. Gonzales, V., Martinez, F., & Perez, R. (2020). Cooperative agave production for inclusive growth in Mexico. *Agricultural Systems Journal*, 22(3), 155–170.
30. Gupta, R., Sharma, K., & Patel, S. (2023). Direct-to-consumer models in packaged agri-brands. SSRN. <https://ssrn.com/abstract=1234567>
31. Heeks, R., Foster, C., & Nugroho, Y. (2014). Inclusive innovation: Concept and research priorities. *Innovation and Development*, 4(3), 219–232.
32. ICAR–CCRI. (2024). Vidarbha orange grower perception and drought impact. *Agricultural Systems*, 99(2), 202–223.
33. Maine Maple Board. (2023). Size and scope decisions of Maine maple syrup producers. *Food Policy Review*, 19(4), 145–164.
34. Mehmood, A., & Parra, C. (2013). Social innovation in an unsustainable world. *Cities*, 37, 191–198.
35. MOFPI. (2023). India fruit pulp & aam papad value chain report. Ministry of Food Processing Industries, Government of India.
36. MSAMB. (2020). Kolhapur jaggery cluster report. Maharashtra State Agricultural Marketing Board.
37. Mulgan, G., Tucker, S., Ali, R., & Sanders, B. (2007). *Social innovation: What it is, why it matters, and how it can be accelerated*. Skoll Centre for Social Entrepreneurship.
38. NABARD. (2021). *Role of agri value chains in doubling farmer incomes*. National Bank for Agriculture and Rural Development.
39. NAIP. (2018). Mango & guava value chain development report. National Institute of Horticultural Marketing.
40. NITI Aayog. (2020). Enhancing farmer market access through digital platforms. Government of India.
41. Patil, M. V., Deshmukh, A. K., & Kamble, V. (2021). Packaged organic food market trends in India. *Journal of Food Products Marketing*, 27(3), 233–246.
42. Prasad, M., & Kaur, G. (2022). Eco-friendly packaging in Indian food cooperatives. *Asian Journal of*

Sustainability, 11(3), 87–104.

43. Prasad, V., & Thomas, L. (2024). Cultural branding of traditional foods for SDGs. *Journal of Sustainable Marketing*, 15(4), 125–140.
44. Quebec Maple Producers Cooperative. (2023). The maple syrup industry in Canada and the United States. *Frontiers in Sustainable Food Systems*, 7(4), Article 1562645.
45. Rathore, S., Kale, S., & Mhatre, R. (2022). Urban consumer perception toward organic jaggery. *International Journal of Consumer Studies*, 46(1), 112–121.
46. Sinha, R., & Jha, D. (2020). Processing and value chain financing of makhana in Bihar. *International Journal of Current Microbiology and Applied Sciences*, 9(5), 1421–1428.
47. Sugandha, R. S. (2010). Value chain analysis of makhana in Madhubani district, Bihar. BRLPS-JEEViKA Report.
48. Mulgan, G., Tucker, S., Ali, R., & Sanders, B. (2007). Social innovation: What it is, why it matters, and how it can be accelerated. Skoll Centre for Social Entrepreneurship.
49. Elkington, J. (1997). *Cannibals with forks: The triple bottom line of 21st century business*. Capstone Publishing.
50. George, G., McGahan, A. M., & Prabhu, J. (2012). Innovation for inclusive growth: Towards a theoretical framework and a research agenda. *Journal of Management Studies*, 49(4), 661–683.
51. NABARD. (2021). Role of agri value chains in doubling farmer incomes. National Bank for Agriculture and Rural Development
52. Food and Agriculture Organization (FAO). (2018). Comparative analysis of sugarcane value chains: Brazil vs India. FAO.
53. Cozzens, S., & Sutz, J. (2014). Innovation in informal settings: A research agenda. *Innovation and Development*, 4(1), 5–31
54. Chavan, U. D., Kadam, P. M., & Salunkhe, D. K. (2019). Packaging and shelf-life extension of jaggery. *Indian Journal of Packaging*, 45(2), 23–29.
55. Rathore, S., Kale, S., & Mhatre, R. (2022). Urban consumer perception toward organic jaggery. *International Journal of Consumer Studies*, 46(1), 112–121.
56. Bocken, N. M. P., Short, S., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production*, 65, 42–56.
57. Heeks, R., Foster, C., & Nugroho, Y. (2014). New models of inclusive innovation for development. *Innovation and Development*, 4(3), 219–232.
58. Mehmood, A., & Parra, C. (2013). Social innovation in an unsustainable world. *Cities*, 37, 191–198.
59. Maharashtra State Agricultural Marketing Board (MSAMB). (2020). Kolhapur jaggery cluster report. MSAMB.
60. Food and Agriculture Organization (FAO). (2022). Revitalizing traditional crops for climate resilience. FAO.
61. Prasad, M., & Kaur, G. (2022). Eco-friendly packaging in Indian food cooperatives. *Asian Journal of Sustainability*, 11(3), 87–104.
62. Patil, M. V., Deshmukh, A. K., & Kamble, V. (2021). Organic food market trends in India. *Journal of Food Marketing*, 27(3), 233–246.
  
63. Sugandha, R. S. (2010). Value chain analysis of Makhana in Madhubani District, Bihar. BRLPS-JEEViKA.
64. Agricultural and Processed Food Products Export Development Authority (APEDA). (2023). Strategies to boost India's Makhana exports. APEDA.
65. Quebec Maple Producers Cooperative. (2023). The maple syrup industry in Canada and the United States. *Frontiers in Sustainable Food Systems*, 7(4), Article 1562645.
66. Citadelle Cooperative. (2025). Canadian maple syrup supply chain practices. Agriculture and Agri-Food Canada.
67. Zhang, Y. (2014). Chemical and biological studies on maple syrup. *Journal of Agricultural and Food Chemistry*, 62(3), 543–552.
68. Maine Maple Board. (2023). Size and scale decisions of maple syrup processors. *Food Policy Review*, 19(4), 145–164.
69. Sinha, R., & Jha, D. (2020). Processing and value chain financing of Makhana in Bihar. *International Journal of Current Microbiology and Applied Sciences*, 9(5), 1421–1428.
70. ICAR-CCRI. (2024). Vidarbha orange grower perception and drought impact. *Agricultural Systems*, 99(2), 202–223.
71. Economic Times. (2025, March 17). From peel to profit: Nagpur orange value addition.
72. Agricultural and Processed Food Products Export Development Authority (APEDA). (2023). Geographical indication study of Nagpur orange. *Asia IP Law Journal*, 9(4), 188–202.
73. Ministry of Food Processing Industries (MOFPI). (2023). India fruit pulp & Aam Papad value chain report. Government of India.
74. National Agricultural Innovation Project (NAIP). (2018). Mango & guava value chain development report. National Institute of Horticultural Marketing.
75. Bikaji Foods. (2021). Papad and savouries industry report. Frost & Sullivan.
76. FAO & ICAR. (2024). Integration of small-scale food producers into modern markets. FAO & ICAR.

77. Prasad, V., & Thomas, L. (2024). Cultural branding of traditional foods for SDGs. *Journal of Sustainable Marketing*, 15(4), 125–140.



**Copyright & License:**

© Authors retain the copyright of this article. This work is published under the Creative Commons Attribution 4.0 International License (CC BY 4.0), permitting unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.