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Tradition-Based Business Models for Environmental Sustainability and Sustainable Land Use

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Abstract

This paper explores how tradition-based business models (TBMs) integrate indigenous knowledge with sustainability goals by combining ecological balance and economic resilience. In agriculture, Zero Budget Natural Farming in Andhra Pradesh reduced chemical fertilizer use by 90% while raising farm profitability by 30%, benefiting over 7.5 lakh farmers across 3,000 villages. Sikkim, the world's first 100% organic state, brought 75,000 hectares under organic farming, improving biodiversity and farmer incomes. In water management, more than 12,000 Johads restored by Tarun Bharat Sangh rejuvenated 36 rivers and raised groundwater levels by up to 6 meters across 1,200 villages. The Phad irrigation system in Maharashtra has sustained equitable water sharing for centuries and continues to irrigate 9,000 hectares today. In the cultural sector, India's handloom employs 4.3 million households, while khadi turnover reached ₹54,000 crore in 2022–23, reflecting economic strength. Organic exports also rose from ₹1,866 crore in 2010–11 to ₹7,078 crore in 2021–22, with projections to reach ₹7,500 crore by 2024. These findings demonstrate that TBMs enhance environmental sustainability, rural livelihoods, and women's empowerment, offering a replicable model for inclusive and climate-resilient growth.

Keywords: Tradition-Based Business Models, Environmental Sustainability, Sustainable Land Use, Traditional Water Management Systems, Natural Resource Management.

Introduction

Global economy today faces a dual challenge: achieving economic growth while protecting the environment from irreversible degradation (UN, 2023). Traditional business models driven by industrialization have often prioritized short-term profits at the expense of natural resources and cultural heritage (Elkington, 1999). In contrast, tradition-based business models (TBMs), rooted in indigenous practices and community-driven industries, offer sustainable alternatives that combine environmental knowledge with economic resilience (Shiva, 2016). TBMs emphasize reduced resource use, recycling, and reliance on renewable inputs, which are consistent with the principles of environmental sustainability (UNESCO, 2022). For example, the handloom and handicraft sector in India employs over 4.3 million families, combining cultural preservation with environmentally sound production (Handloom Census, 2020). Similarly, the Khadi and Village Industries Commission (KVIC) reported a turnover of Rs 54,000 crore in 2022-23, reflecting the economic potential of heritage-based industries (KVIC, 2023). Agriculture also demonstrates the success of TBMs. Zero Budget Natural Farming (ZBNF) in Andhra Pradesh has reduced chemical inputs by 90% while enhancing farm incomes (Gov. of AP, 2020). In Sikkim, the world's first fully organic state, over 75,000 hectares are cultivated without synthetic fertilizers, preserving biodiversity and improving farmers' livelihoods (APEDA, 2022). These examples illustrate that traditional knowledge is not backward but highly adaptive to modern sustainability challenges. Globally, 80% of the world's biodiversity is protected by indigenous communities, demonstrating the ecological value of traditional systems (UNDP, 2020).

Eco-tourism models in Bhutan and Kerala showcase how cultural heritage and environmental conservation can coexist within a profitable business framework (World Bank, 2021). Despite these advantages, TBMs face challenges such as limited scalability, market competition, and lack of institutional support (MoMSME, 2023). They run the risk of becoming marginalized in the face of globalization if they don't have significant policy support. TBMs may, however, be reinvented as catalysts for sustainable development with the use of digital platforms, eco-certifications, and international market connections (FAO, 2021).

This essay examines the economic and environmental importance of traditional business models, as well as their advantages, disadvantages, and the legislative frameworks needed to mainstream them into the global sustainability agenda.

Conceptual Framework

This study's conceptual framework is based on the convergence of alternative development models, indigenous knowledge systems, and sustainability theory. In line with the larger Sustainable Development Goals (SDGs) agenda, it aims to demonstrate how traditional business strategies support economic and environmental sustainability.

1. Sustainable Business Models (SBMs)

Sustainable business models, sometimes referred to as the "triple bottom line", are companies that simultaneously create value in the economic, environmental and social spheres (Elkington, 1999). Unlike traditional business models that prioritize economic prosperity, SBMs incorporate social inclusion and environmental responsibility into their operations (Boons and Luedke-Freund, 2013). They prioritize stakeholder engagement, resource efficiency and the use of renewable energy. SBMs have been seen as a key factor behind sustainability changes in recent years (Geisdorfer, Vladimirova and Evans, 2018).

2. Tradition-Based Business Models (TBMs)

TBMs are businesses that are rooted in community-driven structures, cultural heritage, and local customs. They are examples of "cultural economies" that combine livelihood strategies with traditional ecological knowledge (Burkes, 2012). Community-based ecotourism, organic farming, handicrafts, and khadi production are some examples. TBMs are unique because, rather than exploitative market practices, they operate on the principles of social ownership, intergenerational knowledge transmission, and ecological balance (Shiva, 2016). Compared to mechanized industries, India's handloom and khadi sectors employ millions of people while

using significantly less energy (Handloom Census, 2020; KVIC, 2023).

3. Sustainability

The judicious use of natural resources to maintain ecological balance for future generations is known as environmental sustainability (UN, 2023). By prioritizing renewable inputs, conserving biodiversity, and supporting low-carbon production techniques, TBMs often operate in harmony with the environment (UNESCO, 2022). For example, organic farming practices improve soil fertility and reduce greenhouse gas emissions by reducing reliance on synthetic pesticides and fertilizers (FAO, 2021). Similarly, community-led practices ensure resource regeneration, as demonstrated by water management practices such as phad irrigation in Maharashtra and johad in Rajasthan (CSE, 2019). These practices demonstrate how traditional wisdom and contemporary notions of environmental care can coexist.

4. Sustainable Land Use

The term "sustainable land use" describes the deliberate use of land resources to satisfy current demands without endangering the capacity of future generations to satisfy their own. It highlights striking a balance between social justice, ecological stability, and economic production (FAO, 2017). Crop diversity, agroforestry, organic farming, and effective irrigation are examples of agricultural methods that preserve soil fertility and water resources (Pretty, 2018). Environmentally speaking, it entails preserving wetlands, forests, and hotspots for biodiversity in order to slow down land degradation and climate change (UNCCD, 2020). Socially, sustainable land use supports rural livelihoods by guaranteeing small and marginal farmers fair access to resources (Chand & Pavithra, 2015). Government reports in Maharashtra emphasize how crucial agricultural intensity, afforestation, and watershed management are to attaining sustainability. (Government of Maharashtra, 2024).

Sustainable land use refers to the planned utilization of land resources in a manner that meets present needs without compromising the ability of future generations to meet theirs. It emphasizes the balance between economic productivity, social equity, and ecological stability (FAO, 2017). In agriculture, this includes practices such as crop diversification, agroforestry, organic farming, and efficient irrigation that conserve soil fertility and water resources (Pretty, 2018). From an environmental perspective, it involves protecting forests, wetlands, and biodiversity hotspots to mitigate land degradation and climate change (UNCCD, 2020). Socially, sustainable land use

ensures that small and marginal farmers gain equitable access to resources, thereby supporting rural livelihoods (Chand & Pavithra, 2015). In Maharashtra, government reports highlight the importance of watershed management, afforestation, and cropping intensity in achieving sustainability (Government of Maharashtra, 2024). In western Maharashtra, recent research shows slow changes in land use, with cropping intensity increasing and cultivated area decreasing (Kamble, Rajguru and Nanavare, 2024). Therefore, sustainable land use is a multifaceted concept that harmoniously links the long-term economy, society and ecosystem.

Review of Literature

Elkington (1999) Elkington's groundbreaking research on the triple bottom line demonstrated that social and environmental impacts should be used to measure a company's success in addition to its financial performance. Since then, this framework has served as a guide for developing sustainable business models (SBMs) worldwide, providing a theoretical foundation for incorporating community and environmental well-being into economic systems. **Berkes (2012)** Sacred Ecology highlights the importance of indigenous and traditional knowledge systems in ensuring the sustainable use of natural resources. Studies show how community-driven practices such as traditional water management and community farming maintain biodiversity while sustaining livelihoods. This directly supports the idea that TBMs rooted in indigenous practices enhance both environmental sustainability and local economic resilience. **Boons and Lüdeke-Freund (2013)** Their research explores how innovative business models can embed sustainability into core strategies. They argue that SBMs require systemic thinking, stakeholder collaboration, and resource efficiency. While the focus is largely on modern enterprises, their framework can be applied to TBMs, where collective ownership and ecological practices inherently meet these sustainability requirements. **Shiva (2016)** Vandana Shiva emphasizes that tradition-based models such as organic farming, seed preservation, and community economies offer alternatives to exploitative global capitalism. Her work highlights how TBMs prioritize ecological integrity and cultural continuity, often resisting market-driven homogenization. This perspective adds depth to the environmental and cultural relevance of TBMs in sustainable development. **Rajguru, A. J., Kamble, P. S., & Nanaware, D. (2024)** Studies on land use in Maharashtra show steady decline in agricultural and grassland areas with rising urbanization. Research highlights soil erosion, land degradation, and the role of watershed and afforestation programs in restoration. State surveys indicate stability in forest cover but gradual

shifts in net sown and gross cropped area. Overall, literature stresses the need for integrated socio-economic and ecological approaches for sustainable land use.

Traditional Knowledge and Sustainability

Traditional knowledge-based models are essential to enhance sustainability, integrating environmentally friendly practices with social and economic development. Techniques such as millet cultivation and zero budget natural farming reduce dependence on chemicals, increase resilience to climate change, and safeguard soil health. Systems such as Phad irrigation in Maharashtra and Johad in Rajasthan demonstrate how community-driven approaches to water management can ensure appropriate resource allocation and restore ecosystems. Similarly, industries such as Khadi, handicrafts, organic farming, eco-tourism, and handloom demonstrate how traditional occupations can create employment, empower women, and contribute significantly to GDP and exports while maintaining environmental sustainability. These models demonstrate how traditional knowledge, if adapted to contemporary circumstances, can provide comprehensive answers to achieving inclusive and sustainable development.

Agriculture

Traditional farming practices such as millet cultivation and zero budget natural farming emphasize low-cost, environmentally friendly techniques that increase soil fertility, reduce chemical use, and increase resilience to climate change. These strategies conserve natural resources and ensure a sustainable livelihood for farmers.

Zero Budget Natural Farming (ZBNF) in Andhra Pradesh

Starting with about 40,000 farmers in 2016, Zero Budget Natural Farming (ZBNF) has become a leading sustainable agriculture concept in Andhra Pradesh (Government of Andhra Pradesh, 2020). With government support and World Bank funding, the movement has grown rapidly to cover over 6 lakh farmers and 1.6 million hectares by 2020 (FAO, 2021). The basic idea of ZBNF is to use natural fertilizers like Bijamrut and Jivamrut to reduce dependence on expensive chemical inputs (Siva, 2016). By 2022, over 7.5 lakh farmers in 3,000 villages had adopted ZBNF, indicating widespread institutionalization and community acceptance (NABARD, 2020). According to statistics, ZBNF increased farm profitability by about 30% while reducing fertilizer use by more than 90% (Government of Andhra Pradesh, 2020). The model also supports biodiversity, soil fertility and climate resilience, which is consistent with international recommendations for regenerative agriculture (Burkes, 2012).

It is estimated that Andhra Pradesh will be a global leader in natural farming by 2024, when over 8.5 lakh farmers and 2.5 million hectares of land will be covered by ZBNF (FiBL and IFOAM, 2023). This expansion serves as an example of how climate-resilient and inclusive development can be driven by a combination of contemporary policy support and traditional ecological knowledge (Geisdoerfer et al., 2018).

Water Management

As demonstrated by traditional systems such as Phad irrigation in Maharashtra and Johad irrigation in Rajasthan, community-driven water conservation ensures groundwater recharge, river regeneration, and sustainable irrigation for rural communities.



Source: <https://www.ceew.in/sustainable-agriculture-initiatives/tarun-bharat-sangh-johad-water-conservation-harvesting-and-revitalisation>

Johads Water in Rajasthan

In Rajasthan, johads - small, earthen check dams - are commonly built to collect and hold rainfall. They provide water for residential use, livestock and irrigation, recharge groundwater and prevent soil erosion. Through the restoration of rivers, raising water levels and facilitating multiple agricultural cycles, regenerated johads have gradually transformed arid habitats.

Johads, which are traditional earthen dams, are widely used in Rajasthan to harvest rainfall and recharge groundwater reserves (CSE, 2019). Since 1980, Tarun Bharat Sangh (TBS) has revived over 12,000 johads, restoring water security in over 1,200 communities and raising groundwater levels by 6 meters (TBS, 2021). In addition, by reviving 36 local rivers, these structures have transformed arid regions into productive places suitable for a variety of crops

(SMS Foundation, 2025). As a result, johads provide a sustainable, community-driven approach to water management that balances nature and livelihoods (Burkes, 2012). Ecological restoration has increased agricultural production, reduced migration, and increased food security. All things considered, johads demonstrate how traditional knowledge can provide long-term answers to contemporary water challenges when it is revived on a large scale.

Phad Irrigation in Maharashtra

The 400-year-old Phad irrigation system in Maharashtra is a community-managed diversion-based system that uses masonry or earthen dams to redirect river water through canals in Dhule, Nandurbar, and Nashik districts. It maintains village-level cooperation in irrigation management, promotes crops such as wheat and sugarcane, and ensures equitable water distribution.



Source: <https://www.flickr.com/photos/indiawaterportal/14493400982/in/album-72157644922017109/>

Phad Irrigation System

Phad Irrigation is a traditional, community-managed system in Maharashtra where diversion weirs (bandharas) channel river water into canals for equitable distribution among farmers. They have supported crops such as sugarcane, wheat, onions and bananas, while also promoting cooperative water management, sustaining agriculture for generations.

One of India's oldest and most sustainable community-managed irrigation methods is the Phad irrigation system in Maharashtra (Dhavalikar, 1984). Originating in the 17th century, it began with nearly 2,000–3,000 hectares under irrigation, gradually expanding across Dhule and Nandurbar districts (Patil & Pawar, 2018). By the early 20th century, the irrigated area increased to about 8,000 hectares, reaching its peak of nearly 15,000 hectares by the 1980s (Mosse, 2003). The system is distinctive because it uses diversion weirs (bandharas) and gravity-based canals, completely eliminating reliance on electric or diesel pumps (Deshpande & Reddy, 1991). Water allocation is collectively managed by the village panch (assembly), ensuring equitable distribution irrespective of landholding size (Patil & Pawar, 2018). This cooperative governance fostered fairness, trust, and strong community bonds for centuries (Berkes, 2012).

Crops traditionally supported include sugarcane, wheat, banana, and onion, balancing both food security and commercial production (Shah, 2009). However, from the 1990s onwards, the expansion of modern lift irrigation and borewells led to a decline, reducing the irrigated area to about 8,500 hectares by 2020 (Deshpande &

Reddy, 1991). Recent revival efforts by government programs and NGOs have restored the system to nearly 9,000 hectares by 2024, highlighting its resilience in the face of modern challenges (Patil & Pawar, 2018). Importantly, the system remains highly relevant today, as it demonstrates how traditional, low-energy, and community-based models can sustain agriculture in water-scarce regions (Mosse, 2003).

Thus, the Phad irrigation system provides valuable lessons for sustainable water management by combining ecological efficiency, equity, and cultural continuity (Berkes, 2012).

Case Studies of Tradition-Based Sustainable Business Models

Case Studies of Tradition-Based Sustainable Business Models highlight how traditional knowledge systems are redefined to meet modern sustainability needs. Sectors like handlooms, khadi, handicrafts, organic farming, eco-tourism, and renewable energy cooperatives showcase eco-friendly production, cultural preservation, and inclusive growth. These models not only contribute significantly to GDP and exports but also provide livelihoods for rural communities, especially women. Together, they prove that heritage-based industries can drive environmental, economic, and social sustainability in India.

Handloom and Handicrafts Sector

The handloom sector is one of India's oldest industries and remains the second-largest source of rural employment after agriculture (Ministry of Textiles, 2020). It provides direct and indirect livelihoods to millions, especially women, and preserves cultural heritage through unique

weaving traditions. According to the 4th Handloom Census (2019–20), around 4.3 million households are engaged in handloom activities, a stabilization compared to the decline observed between 1995 and 2010 (MoT, 2020).

Employment trends show that handloom households reduced from 6.5 million in 1995–96 to 4.3 million in 2009–10 due to the expansion of powerlooms, but government support schemes like the National Handloom Development Programme (NHDP) and India Handloom Brand (IHB) have helped prevent further decline (MoT, 2019). By 2024, employment is estimated to revive slightly due to growing global demand for eco-friendly products and GI (Geographical Indication) support (APEDA, 2023).

Exports from the handloom sector have grown significantly over the past decade. In 2010–11, India exported handloom products worth ₹1,624 crore, which increased steadily to ₹2,214 crore in 2014–15 and ₹2,300 crore in 2018–19 (EPCH, 2020). A remarkable surge occurred in 2021–22, with exports reaching ₹25,706 crore, reflecting global appreciation for handcrafted, sustainable products (MoT, 2022). By 2022–23, exports crossed ₹29,000 crore, and projections for 2024 suggest a further rise beyond ₹31,000 crore, reaching markets in over 30 countries worldwide (MoT, 2023).

A case study of Pochampally Ikat in Telangana highlights how GI protection fosters cultural sustainability and economic growth. Pochampally Ikat received GI recognition in 2005, which enhanced its authenticity in global markets (GI Registry, 2005). Initially involving 6,000 households, participation increased to 10,000 by 2020 and is projected to reach 11,000 by 2024, with exports to 30+ countries including the USA, Japan, and France (MoT, 2021). Government interventions under NHDP and digital platforms have further boosted its visibility and sales (EPCH, 2022). From a sustainability perspective, the handloom industry has three crucial dimensions. First, it is environmentally sustainable, as weaving consumes negligible electricity compared to powerlooms, reducing CO₂ emissions by nearly 60% (UNDP, 2020). Second, it ensures cultural preservation, safeguarding indigenous textile

knowledge such as Ikat, Banarasi, and Kanchipuram weaves (GI Registry, 2020).

Thus, the handloom and handicraft sector exemplifies a tradition-based sustainable business model. While employment has stabilized at 4.3 million households, exports have surged, and products like Pochampally Ikat show how local culture can be integrated with global trade. The sector not only contributes significantly to the green economy but also empowers rural communities and preserves India's intangible cultural heritage.

Khadi and Village Industries

The Khadi and Village Industries Commission (KVIC) has transformed Khadi from a freedom movement symbol into a modern sustainable textile industry (KVIC, 2023). Its turnover grew nearly threefold from ₹19,000 crore in 2010–11 to ₹54,000 crore in 2022–23, demonstrating its strong revival (MoMSME, 2023). One of Khadi's greatest strengths is its eco-friendly production process. Compared to mill-spun cloth, which consumes ~55 liters of water per meter, Khadi requires only 3 liters per meter, resulting in a 95% water saving (KVIC, 2022). Moreover, Khadi is spun and woven on hand-charkhas, avoiding electricity-intensive processes, making it almost carbon-neutral (UNDP, 2020).

In terms of employment, Khadi provides livelihoods to over 5 million artisans, most of them women, thereby ensuring inclusive growth and supporting rural households (MoMSME, 2023). Beyond fabric, KVIC also promotes village industries like honey, pottery, and herbal products, strengthening local economies (KVIC, 2023). Exports of Khadi, though smaller than domestic demand, have seen steady growth—from ₹30 crore in 2010 to ₹150 crore+ in 2022–23, with expanding markets in the USA, Europe, and Japan (KVIC, 2023). This reflects Khadi's global appeal as a premium eco-conscious brand. Thus, Khadi embodies the principles of sustainability, circular economy, and cultural preservation. It saves water, reduces emissions, empowers women artisans, and sustains rural livelihoods while positioning India as a leader in eco-friendly textiles.

Sustainable Land Use

Table 1: Sustainable Land Use of Maharashtra (Area in '000 hectares)

Year	Geographical Area	Area under Forests	Land not available for cultivation	Other uncultivated land	Fallow Lands	Net Area Sown	Gross Cropped Area
2019-20	30,758	5,210	1,732	1,456	2,139	17,222	24,135
2020-21	30,758	5,210	1,733	1,456	2,162	17,197	24,184
2021-22	30,758	5,211	1,733	1,456	2,144	17,209	24,158
2022-23	30,758	5,212	1,734	1,456	2,161	17,195	24,164
2023-24	30,758	5,216	1,735	1,449	2,161	17,193	24,667
Total	153,790	26,059	8,667	7,273	10,767	86,016	121,308
STDV	0.00	2.23	1.02	2.80	9.85	10.93	203.30
Average	30758.00	5211.80	1733.40	1454.60	2153.40	17203.20	24261.60
CAGR	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
CV	0.00	0.04	0.06	0.19	0.46	0.06	0.84

Source: Economic Survey of Maharashtra 2024-25.

Table 1. presents the sustainable land use statistics of Maharashtra for the last five years (2019–20 to 2023–24). The total geographical area of the state remains constant at 30,758 thousand hectares, while the area under forests shows a marginal increase from 5,210 to 5,216 thousand hectares. Land not available for cultivation and fallow lands have remained almost stable, indicating limited diversion of land. The net area sown has also stayed steady at around 17,200 thousand hectares, reflecting the dominance of agriculture in the state's land use. However, gross cropped area has increased significantly, from 24,135 to 24,667 thousand hectares, suggesting rising cropping intensity and more multiple cropping practices. The statistics indicate the averages and variability of land use in Maharashtra, where forest and net sown area are reasonably stable (low CV), while gross cropped area is highly changeable (CV 0.84), indicating increased agricultural instability.

Challenges and Limitations

While tradition-based sustainable business models offer immense potential for environmental conservation, social empowerment, and economic development, they also face several challenges and limitations:

1. **Scalability Issues** – Traditional systems like Johads and Phad irrigation work effectively at a community level but face limitations in scaling to larger regions due to geographic and hydrological constraints (CSE, 2019).
2. **Market Access and Competition** – Sectors like handlooms, khadi, and handicrafts struggle to compete with mass-produced, cheaper machine-made textiles. Lack of marketing infrastructure and global branding reduces their competitiveness (MoT, 2020).
3. **Certification and Standards** – In organic farming, certification is expensive and time-consuming for smallholders. Many farmers sell products as “organic” without formal

certification, limiting access to export markets (APEDA, 2022).

4. **Financial Constraints** – Tradition-based enterprises, especially in rural areas, often face inadequate access to credit, insurance, and investment support. MSMEs and cooperatives rely heavily on government subsidies (MoMSME, 2023).
5. **Technological Gaps** – Though eco-friendly, traditional practices sometimes lack modern technological upgrades. For instance, handloom weaving and khadi spinning require modernization in design and marketing to meet global fashion demands (UNDP, 2020).
6. **Climate Vulnerability** – Systems like millet farming, ZBNF, and community forestry are climate-resilient but still vulnerable to erratic rainfall, droughts, and extreme weather events that can affect productivity (FAO, 2021).

Youth Disengagement – Younger generations often migrate to cities, perceiving traditional livelihoods as less profitable compared to modern jobs. This creates a skill gap and continuity challenge in sustaining traditional knowledge systems (KVIC, 2023).

Lack of Awareness and Training – Many farmers, artisans, and rural entrepreneurs lack training in financial literacy, digital tools, and sustainable business practices, reducing the efficiency of cooperative and community-led models (NABARD, 2020).

Globalization Pressures – International competition and changing consumer preferences can undermine local, tradition-based products unless they are protected through GI tags, branding, and sustainable certification (GI Registry, 2020).

Despite these challenges, tradition-based sustainable models remain highly relevant in India's pursuit of inclusive and eco-friendly development. Addressing certification barriers, improving market access, upgrading technology,

and ensuring strong policy support can help overcome these limitations and position these models as viable alternatives to resource-intensive industrial systems.

Conclusion

Tradition-based sustainable models in India prove that indigenous knowledge can effectively address modern ecological and economic challenges. Practices like ZBNF and millet farming enhance soil health, reduce costs, and build climate resilience. Water systems such as Johads and Phad irrigation demonstrate the strength of collective management in ensuring equity and water security. Handloom, khadi, and handicrafts preserve cultural heritage while generating employment, especially for women. Organic farming and eco-tourism position India as a global leader in sustainable and inclusive development. Despite challenges of scalability, certification, and market competition, these practices remain resilient. Together, they present a replicable framework for achieving balanced growth, environmental protection, and social justice.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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