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CHALLENGES FOR AGRICULTURE INDUSTRY COMPANIES IN INDIA TO CREATE A SUSTAINABLE BUSINESS MODEL

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Abstract. This article explores sustainable business models in Indian agriculture, assessing sustainability levels through interviews and case studies. Findings show that companies primarily focus on profit creation, with low social and ecological sustainability. However, integrating sustainability elements leads to higher profitability and productivity. The study concludes that while Indian agriculture companies have not prioritized social and environmental aspects, they are increasingly adopting sustainability due to pressure from stakeholders, consumers, and the government.

Keywords: sustainable agriculture, sustainable business model, social responsibility, agriculture productivity, sustainability in agriculture.

JEL Classification: Q01.

Introduction

Agriculture is a vital sector in India, providing livelihood to millions of people and contributing significantly to the country's economy. However, the sector has faced numerous challenges in recent years, such as declining soil fertility, water scarcity, climate change, and the need to meet the demands of a growing population. To ensure long-term sustainability, Indian agribusiness companies must adopt sustainable business practices.

The decision to develop a sustainable business model for the agriculture industry in India is motivated by several factors. First, the industry's challenges, including declining soil fertility, water scarcity, climate change, and the need to meet the demands of a growing population, are critical and require urgent attention. Sustainable business practices offer a way to address these challenges by promoting the efficient use of resources, reducing waste, and promoting sustainable production and consumption practices (De Clercq, 2021).

According to a study (Rajput, 2019) sustainable agriculture practices are essential for promoting sustainable growth in India's agriculture sector. A sustainable business model can help agriculture companies reduce their negative environmental and societal impacts while promoting long-term financial success.

The research questions this article aims to address are: 1. To what extent is the Indian agribusiness sector sustainable, and what are its primary challenges? 2. What are the most significant challenges to implementing sustainable business practices in the Indian agriculture industry? 3. How have sustainable business models in the agribusiness sector helped companies become more productive and profitable? 4. What sustainable business model should be developed that integrates all aspects of sustainability, and how can it be effectively applied in the Indian agriculture industry?

By addressing these research questions, the development of a sustainable business model for the agriculture industry in India can provide valuable insights and recommendations for promoting sustainability and long-term success in the industry.

In this research paper, we investigate the significance of the agriculture sector in the Indian economy and explore the development of sustainable business models within the context of Indian agriculture. Our study is organized into four main sections, as described below:

The first section presents a literature review that examines the contributions of the agriculture sector to the Indian economy, emphasizing its importance. We delve into the concept of sustainable business models within the Indian agriculture context by reviewing various

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authors' perspectives. Furthermore, we incorporate the concepts of sustainability-oriented innovation and sustainable business model archetypes, as developed by (Bocken et al., 2014), to provide a theoretical foundation for our research.

In the second section, we outline the research methodologies employed in our study. Our approach includes conducting interviews with representatives from Indian agriculture industry companies and analysing case studies of four sustainable agriculture companies selected based on these interviews. This mixed-method approach allows us to gain insights into the practical application of sustainable business models in the Indian agriculture sector.

The third section presents the results and discussion derived from the interviews and case studies. We employ descriptive analysis to interpret and understand the findings from the interviews. Additionally, based on our insights and observations, we propose a sustainable business model tailored to the Indian agriculture context. This model aims to assist Indian agriculture companies in adopting and implementing sustainable practices within their operations.

In the fourth and final section, we provide a conclusion that summarizes our research findings and highlights their implications for the Indian agriculture sector. We also discuss the limitations of our study and offer recommendations for future research in the field. This section underscores the value of our research in fostering a more sustainable and resilient agriculture sector in India, ultimately contributing to the broader goals of economic growth, food security, and environmental sustainability.

1. Theory

Over the past two decades, the field of sustainability has attracted significant attention and recognition. A 2009 HBR article (Nidumolu et al., 2009). emphasized the emergence of sustainability as a new frontier for innovation, claiming that it has become a "mother lode" of organizational and technological innovations that yield both bottom-line and top line returns. This trend has only grown more intense in the last decade. Sustainability presents challenges related to products, processes, technologies, and business models, as well as more abstract aspects such as cognitive, psychological, and organizational challenges (Dutta et al., 2020). Nevertheless, most businesses now acknowledge the importance of sustainability and consider it a crucial driver of innovation (De Clercq, 2021). This paper's theory section is structured around the following topics: sustainability in the agri-food sector, sustainable business models, sustainability-oriented innovations, and eight sustainable business model archetypes.

1.1. Sustainable business model and its importance for Indian agriculture sector

The Indian agriculture industry faces various challenges, including declining soil fertility, water scarcity, climate change, and the need to meet the demands of a growing population. Sustainable Business Model (SBM) is an approach that can help the industry address these challenges by promoting the efficient use of resources, reducing waste, and promoting sustainable production and consumption practices. According to Gupta and Kadian (2021), sustainable agriculture practices are essential for promoting sustainable growth in India's agriculture sector. A sustainable business model can help agriculture companies reduce their negative environmental and societal impacts while promoting long-term financial success (Nayak, 2021).

However, there are several challenges to implementing sustainable business practices in the Indian agriculture industry. These challenges include a need for more awareness and understanding of sustainability issues, limited access to capital and resources, and a lack of supportive policies and regulations (Singh & Dwivedi, 2021). To address these challenges, it is essential to develop supportive policies and regulations, increase awareness and understanding of sustainability issues, and provide access to capital and resources (Alex Coad, 2017).

Despite these challenges, some companies in the Indian agriculture industry have successfully adopted sustainable business practices. For example, Godrej Agrovet has implemented various sustainable practices, including using organic fertilizers and water-efficient irrigation techniques (Godrej Agrovet Limited, 2020). Similarly, Mahindra & Mahindra has developed fuel-efficient tractors designed to minimize soil compaction, reducing the negative impact of agriculture on the environment (Mahindra & Mahindra Ltd, 2018).

1.2. Sustainability oriented innovation

Sustainability-oriented innovation is developing and implementing new products, processes, or services contributing to sustainable development (Adams, 2021). Such innovations focus on reducing the environmental impact of business operations while simultaneously generating economic, social, and environmental benefits (Hossain, 2021). This concept has gained significant attention recently as more companies recognize the need to adopt sustainable practices.

An example of sustainability-oriented innovation involves developing circular economy models. In a circular economy, designers create products that can be reused, repurposed, or recycled to reduce waste (Hossain, 2021). This approach is gaining traction, and some companies have already implemented circular economy practices. For instance, Philips developed a circular economy business model that includes leasing and refurbishing medical equipment. This approach has helped Philips reduce waste, increase revenue, and improve customer satisfaction (Philips, 2021).

Several studies have highlighted the importance of SOI in measuring sustainability in the agriculture sector. For example, a study by Ramos et al. (2017), found that SOI was essential in improving the sustainability of

smallholder farming in developing countries. Another study by Van Rijswick (2014) found that SOI was critical in promoting sustainable agricultural practices, particularly in areas vulnerable to climate change.

1.3. SBM archetypes

Bocken et al. (2014) have developed eight archetypes of the Sustainable Business Model (SBM) that can be used to measure sustainability in different industries, including the agriculture industry sector. The eight SBM archetypes are mentioned in the Table 1.

Table 1. The eight SBM archetypes (Bocken et al., 2014)

SBM archetypes	Focus
Maximize material and energy efficiency.	Resource Utilization, waste reduction.
Create value from waste.	Reuse, recycle, manufacture. Better use of under-utilized resources.
Substitute with renewable processes.	Environmental impact reduction.
Deliver functionality.	Service-oriented approach.
Adopt a stewardship role.	Stakeholder well-being.
Encourage efficiency.	Find solutions to cut down on both consumption and production.
Re purpose the business for society.	Environmental & social advantages.
Develop scale-up solutions.	Large-scale eco-friendly solutions.

The SBM archetypes developed by Bocken et al. (2014) can measure sustainability in the agriculture sector by promoting sustainable production practices, reducing waste, and promoting the efficient use of natural resources. By adopting sustainable business models aligned with these archetypes, companies in the agriculture industry sector can promote long-term sustainability and contribute to a more sustainable future for the industry and the country. Table 2 shows the combined approach of Sustainability oriented innovations and Sustainable business archetypes developed by Bocken et al. (2014).

Table 2. SOI and SBM archetypes combine (Bocken et al., 2014)

Approach	SBM Archetypes
Operation Optimization	1. Maximize material & energy efficiency
	6. Encourage efficiency
	9. Deliver functionality rather than ownership
Organizational Transformation	5. Adopt stewardship role
	2. Create value from waste
	3. Substitute with renewables & natural processes
System Building	7. Repurpose the business for society/ environment
	8. Develop scale-up solutions

2. Research methodology

This study aimed to explore the adoption of sustainable business models (SBMs) in the Indian agriculture industry through a mixed-method approach, combining interviews and case studies. The research design was carefully outlined with clear sample selection criteria, data collection methods, and analysis techniques. A sample of 364 Indian agriculture companies with a turnover of over 1 million Indian rupees and at least five years of business experience was selected. Telephone and video interviews were conducted to gather quantitative and qualitative data on companies adopting the eight SBM archetypes and their motivations, challenges, and strategies for implementing sustainable practices. Descriptive analysis was used to examine the telephone interview data. At the same time, the case studies were analysed qualitatively to gain insights into the practical aspects of adopting sustainable business models in the agriculture industry. The findings revealed that while many Indian agriculture companies recognize the importance of sustainability, challenges such as limited access to capital, lack of supportive policies, and limited awareness of sustainability issues hinder the adoption of sustainable business practices. Successful adoption of sustainable practices can contribute to economic stability, efficiency, and social and environmental benefits.

2.1. Interviews

This study used a systematic approach to collect data from a target group of Indian agriculture industry companies. The sample size of 364 companies with a turnover of over 1 million Indian rupees, equivalent to approximately 11,700 euros As of Feb 28, 2023, and being in business for at least five years was used as a selection criterion to ensure that the companies had the necessary experience and resources to implement sustainable business practices. An email invitation was sent to 380 companies, out of which 68 companies agreed to participate in the telephone interview. The response rate for the telephone interview was approximately 17.9% (68 out of 380 companies). While a response rate of 20–30% is considered ideal, a response rate of 10% or more is considered sufficient to represent a population in social science research (Cornelius & Aday, 2006). Therefore, the response rate of 17.9% is reasonable for this study. Participants were also asked about suitable timing for telephone interviews and their telephone numbers. The interviews were conducted from Sep 20 to Oct 6, 2022, and the responses were analysed using descriptive analysis.

Before conducting the telephone survey, a mailing was sent to the companies that included descriptions and examples of the eight Sustainable Business Model (SBM) archetypes. The mailing explained the intention to learn which of the eight SBM archetypes matched the companies' existing business models. Subsequently, telephone interviews were conducted with the company

representatives, who were asked to respond to the statement for each of the eight SBM archetypes.

During the telephone interviews, the respondents were provided with a scale ranging from completely agree to disagree, indicating their agreement or disagreement with the statements. The scale comprised five options: 1 = completely agree, 2 = partly agree, 3 = neutral, 4 = partly disagree, and 5 = disagree entirely. The respondents were instructed to select the option that best represented their perspective on the presented statement.

2.2. Case studies

The research aimed to identify best practices and strategies for sustainable agriculture in India by conducting case studies of four sustainable agriculture companies. The companies were selected based on telephone interviews and were interviewed via video calls to gain deeper insights into their sustainable practices. The companies were asked about their sustainability journey, motivations for adopting sustainable practices, and challenges. The case studies aim to provide valuable insights into the practical application of sustainable business models in the agriculture industry and their impact on the environment, society, and the economy.

The four sustainable agriculture companies include a family-owned milk producer, a milk cooperative, a poultry farm, and a farmer-operated business that sells organic milk. Additionally, the respondents were asked to respond to a statement about their business practices and indicate their agreement, disagreement, or neutrality on a scale of 1 to 5. The statement offered three options, primarily focused on measuring achievement in monetary terms, defining achievement in both monetary and social/environmental terms, or defining achievement mainly in terms of social/environmental benefit and secondarily in financial terms.

3. Results and discussion

3.1. Interview results

The interview results reveal that only 34 out of 68 participants confirmed a match with any of the Sustainable Business Model (SBM) archetypes, implying that the other half did not adopt any SBM archetype. Some companies adopted more than one archetype among the 34 participants with a match. The most adopted SBM archetypes among these companies were Maximizing material and energy efficiency and adopting a stewardship role. This finding suggests that many companies interviewed have implemented sustainable practices. However, the percentage of companies matching each archetype varied, with Re-purpose the business for society/environment being the least adopted archetype. The results indicate that while some companies are making sustainability efforts, many have yet to adopt any SBM archetype, emphasizing the need for additional efforts to encourage and support businesses adopting sustainable practices. The responses of the Participants are depicted in Table 3.

Table 3. The response of participants regarding success.

Measurement of success	Responses in percentage
we only consider success in financial aspect (profit)	4
We consider success mainly in monetary terms, although we also consider social advantages and/or environmental advantages.	30
We consider success mainly in terms of social benefit and/or environmental value, and secondarily in financial terms (profit)	5

3.2. Case studies

Company 1, a family-owned business that produces milk and milk products, has adopted a new vision to become an ideal farm for animals and society and establish a reputation as a sustainable company. They have diversified their operations, reduced waste by 25%, and used renewable sources to meet almost 60% of their energy usage. They view sustainability as an ongoing process that requires continuous modifications and have expanded their stewardship leadership style. However, their expanding commercial operations have increased water consumption for industrial activities, which they have been unable to reduce. Company 1's commitment to sustainability and its efforts to diversify operations, reduce waste, and use renewable energy sources is commendable. However, it is essential to recognize that sustainability is an ongoing process that requires continuous improvement.

Company 2, a dairy cooperative owned by 35 small milk farms, sells premium cheese. Established in 1955, it formed a cooperative association with other dairy farms to boost profitability. Their products are sold in central India's grocery stores and directly to consumers at their farms. The dairy uses solar energy for operations, shares surplus energy with neighboring companies, and pays farmers above-average wages. About 50% of the company's managers are women. The focus on wind energy, quality, proximity, and sustainability values demonstrates their commitment to the triple bottom line theory of social, economic, and environmental benefits. Company 2 is an example of a business that has successfully integrated sustainability and is evolving into a modern and sustainable enterprise.

Company 3, a poultry farm established in 2000, specializes in producing high-quality chicken sausages, meat, and eggs. They sell fresh and processed meat in their farm shop and city grocery stores. The company has diversified its activities by offering nutrition, food waste minimization, sausage-making courses, and running a farm restaurant for lunch and conferences. They foster long-term relationships with customers, other

companies, subcontractors, and neighbors. The owner views sustainability as generating revenue, caring for employees, land, and animals, and building positive stakeholder relationships. The company has adopted sustainable business practices, including maximizing material and energy efficiency, substituting conventional energy with renewables, and providing courses to educate society and cultivate positive relationships. As a sustainability pioneer in central India, Company 3 has made significant progress and inspired other companies to follow a similar model, emphasizing the importance of developing positive relationships with stakeholders.

Company 4, a traditional farm with vast land and numerous cows, shifted its business model in the early 2000s to produce ecological milk, increasing revenue and embracing sustainability. They began inviting visitors to learn about farming activities and have since renovated old buildings and constructed new ones, including a restaurant, conference center, and vineyard. A nearby windmill now powers its operations, and the company focuses on resource utilization.

The farm has diversified its operations, concentrating on revenue generation while aligning with three Sustainable Business Model archetypes: creating value from waste, substituting with renewables and natural processes, and adopting a stewardship role. The owner perceives new challenges as opportunities for growth. Company 4 has made significant strides toward sustainability and continues to develop its business model, emphasizing sustainable revenue generation.

3.3. Integration of the results from interview and four case studies based on Sustainability oriented innovations and Sustainable business model archetypes

This section discusses the integrated results of the telephone interview and case studies of four sustainable agriculture companies in India. The results are based on combining sustainability-oriented innovations and sustainable business model archetypes. The most popular strategy among agriculture companies is the operational optimization approach, which focuses on maximizing material and energy efficiency. However, many businesses are also concentrating on organizational transformation, taking a stewardship role, and encouraging sufficiency. It is also interesting to note that a considerable percentage of agriculture companies are moving towards system building, creating value from waste, substituting with renewables and natural processes, repurposing the business for society and the environment, and developing scale-up solutions. Table 4 shows the result of telephone interview and four case studies.

The four case study companies exhibit stewardship elements in their sustainable business models and focus on boosting material and energy efficiency. Companies 2 and 3 actively engage in system development, while Companies 1 and 4 have introduced new procedures and completed organizational changes to become more environmentally friendly. All the companies are committed to partnering with other businesses to create more sustainable business models.

Table 4. Result of telephone interview and four case studies

Strategy	Operational optimization: Doing more with less	Organizational transformation: doing good by doing new things	System building: doing good by doing new things with others
The interview of the SBM archetypes	1. Maximize material and energy efficiency (11 out of 50)	4. Deliver functionality, rather than ownership (5 out of 50)	2. Create value from waste (5 out of 50)
		5. Adopt a stewardship role (9 out of 50)	3. Substitute with renewables and natural processes (6 out of 50)
		6. Encourage sufficiency (7 out of 50)	7. Re-purpose the business for society/ environment (3 out of 50)
			8. Develop scale-up solutions (4 out of 50)
	Total: 11	Total: 21	Total: 18
SBM archetypes case studies	Company 1, Maximize and Stewardship	Company 4, Functionality and Stewardship	Company 2, Substitute, and stewardship
			Company 3, Repurpose and stewardship

3.4. The proposed Ideal SBM for the agriculture industry companies in India

Kumar and Kalia (2021) emphasize the importance of economic stability, efficiency, and local economy as primary elements of the economic aspect of sustainable business models for India's agriculture industry. Social security and working conditions should also be prioritized. Mukharjee and Sen (2021) suggest considering profitability, income stability, reliance on purchased inputs and subsidies, and cash flow sufficiency in the sustainable business model framework. Furthermore, integrating the International Labor Organization's (ILO) core labor standards can contribute to achieving sustainability for the agriculture sector (Dutta et al., 2020).

The proposed business model is based on the SBM archetypes developed by Bocken et al. (2014). Generating a profit is essential for businesses, especially in India's agriculture industry, due to its status as a low-income developing nation. The empirical research found that adverse government laws, uncertain environmental events, and changing customer behaviors are vital factors influencing income stability for farm enterprises in India. As a result, the government and other relevant authorities

should prioritize formulating favorable regulations to support the agriculture industry.

Bocken et al. (2014) advocate that agriculture industry companies should focus on delivering functionality rather than ownership. Businesses should emphasize providing services to customers rather than product ownership. They should also engage with stakeholders by adopting a stewardship leadership model to improve cooperation with suppliers, subcontractors, and customers which can increase goodwill in the market, contributing to brand value and profit generation (Mangla & Kumar, 2021). Company 3's case study demonstrated the benefits of the stewardship role for profit growth and brand value creation.

Moreover, the agriculture industry should adopt a "buy one, give one" approach, signifying that they should provide something to the underprivileged for every sale. Adhering to the ILO's core labor standards will enable Indian agricultural enterprises to contribute to public welfare (Gupta & Kadian, 2021). Although corporate social responsibility (CSR) is not legally mandatory, every agriculture industry company in India should participate in CSR initiatives to benefit society (Biswas & Sahoo, 2020).

India ranked fourth in the world in solar PV deployment in 2021, intending to reach the first place by 2030. Shifting to solar energy could help Indian agriculture companies achieve this goal. Empirical studies show that many Indian agriculture firms are unconcerned about industrial waste management. However, wastewater treatment is crucial, and agriculture enterprises should establish a separate unit or partner with third-party firms for wastewater treatment. Indian businesses need to improve waste reduction efforts, following the European Union's 72–73% waste reduction target by 2030 (Nigam & Virat, 2021). Recycling industrial waste can significantly benefit enterprises by creating value from waste, resulting in higher revenue and environmental benefits (Prajapati & Vyas, 2020). The Proposed Developed Sustainable Business Model is depicted in Figure 1.

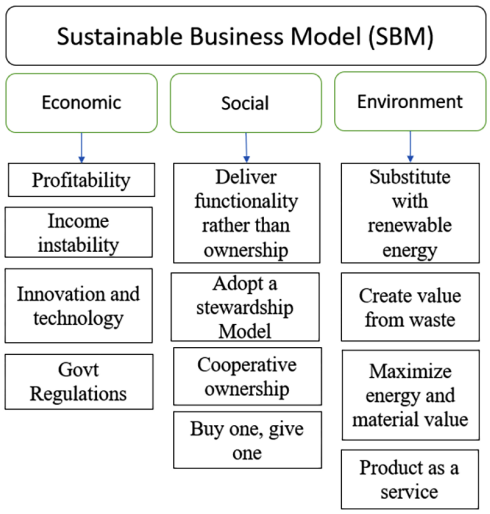

Figure 1. Proposed SBM for Indian agriculture industry

Conclusions

In conclusion, this study aimed to assess the sustainability level within Indian agriculture companies by conducting telephone interviews with 68 companies and performing case studies on four selected companies known for their sustainable business practices. Researchers evaluated the level of sustainability using the eight SBM archetypes developed by Bocken. The interview results revealed that most surveyed companies primarily concentrated on the SBM archetypes that emphasized profitability. However, there has been a significant increase in companies pursuing societal and environmental benefits due to pressure from stakeholders, society, and the government. This trend is driven by consumers' growing preference for businesses that regard sustainability as an integral part of their operations, suggesting a promising opportunity for Indian agribusiness companies to become more sustainable.

The case studies of the four sustainable agriculture companies demonstrated that adopting sustainable business practices led to increased profitability, productivity, and environmental and societal benefits. This finding addresses the research question concerning the positive impact of sustainable business practices on the overall productivity of Indian agribusiness companies. The authors' proposed SBM presents an idealized view of the sustainability aspects that Indian agriculture businesses can adopt to become more sustainable. Researchers developed this proposed SBM in the Indian business environment, drawing on suggestions from various research studies and the SBM archetypes developed by Bocken.

However, the study has some limitations, such as the small number of participants that do not adequately represent the vast agriculture sector in a large country like India. Unstable internet connections in rural India also hindered communication with many participants. Additionally, in-person interviews might have yielded more comprehensive responses from the participants.

Future researchers should focus on collecting data from a larger, more representative sample of participants. Moreover, they should provide additional recommendations to further enhance the sustainability of India's agriculture industry by addressing the diverse challenges and opportunities in this sector.

To enhance the sustainability of India's agriculture industry, we recommend the following:

1. Educate and train farmers in sustainable farming practices, such as crop rotation and precision agriculture.
2. Encourage stakeholder collaboration to develop innovative sustainable agriculture solutions, including water-efficient irrigation systems.
3. Provide incentives for adopting renewable energy sources, reducing reliance on fossil fuels.
4. Strengthen regulations and enforcement for environmental and labour standards, promoting transparency and accountability.

5. Foster partnerships between agribusinesses and local communities for responsible land management and biodiversity conservation.
6. Develop Agri-tourism initiatives that showcase sustainable practices and generate income for farmers.
7. Encourage circular economy principles, including waste reduction and recycling, within the agriculture sector.

Implementing these recommendations can contribute to a more sustainable and resilient future for the Indian agriculture industry.

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