

BUSINESS MODEL INNOVATION FOR AGRICULTURAL RECARBONISATION: A SUSTAINABLE APPROACH FOR RURAL KARNATAKA

Project Reference Number: 49S_MBA_0144

College : GM University, Davanagere
Branch : Department of Finance Management and Business Analytics
Guide(s) : Dr. Keerthi S
Dr. Pradeep M J
Student(s) : Mr. Gururaj Malipatil
Mr. Honnappa Ramappa Talawar
Mr. Dinesh M
Mr. Nandan N

Keywords

Agriculture, Recarbonisation, Sustainability, Rural Development, Carbon Sequestration, Business Model Innovation

Introduction

Agriculture in Karnataka is currently facing serious challenges due to declining soil fertility, reduced organic carbon content, and increasing dependency on chemical fertilizers. Soil degradation not only reduces crop productivity but also negatively impacts farmer income and long-term sustainability. Agricultural recarbonisation has emerged as a promising solution to restore soil health by increasing soil organic carbon through sustainable practices.

Recarbonisation involves the use of regenerative agricultural techniques such as composting, biochar production, mulching, and agro-waste recycling. These practices help improve soil structure, water retention, and nutrient availability, while also contributing to climate change mitigation by capturing atmospheric carbon.

In rural Karnataka, farmers often lack awareness, resources, and access to structured business models that can support the adoption of such sustainable practices. There is a need to bridge the gap between environmental sustainability and economic viability.

This project focuses on designing an innovative business model that integrates soil recarbonisation with income generation for farmers. It emphasizes low-cost, scalable, and community-driven solutions that can be easily adopted by farmer groups and Farmer Producer Organizations (FPOs).

The study aims to contribute to sustainable agriculture, rural development, and climate resilience by creating a practical framework that benefits both farmers and the environment.

Objectives

- To study soil carbon issues in rural Karnataka and identify suitable regenerative practices for improving soil health.
- To develop a simple and feasible business model for agricultural recarbonisation that supports farmer income and long-term sustainability.

Methodology

The project follows an applied research methodology combining field study and model development. Primary data is collected through structured questionnaires, farmer interviews, and discussions with agricultural officers to understand current farming practices and soil-related challenges.

Secondary data is gathered from soil health records, research journals, government reports, and existing literature on sustainable agriculture. This helps in building a strong theoretical foundation for the study.

A soil carbon baseline analysis is conducted using simple statistical tools such as averages, comparisons, and correlation analysis to understand the relationship between farming practices and soil organic carbon levels.

Based on the analysis, suitable regenerative practices like composting, biochar production, mulching, and agro-waste recycling are identified. These practices are evaluated based on cost, feasibility, and farmer acceptance.

A business model framework is then developed by mapping the value chain, identifying key stakeholders, estimating costs and revenues, and assessing financial viability. The model focuses on affordability, scalability, and ease of adoption.

The methodology also includes feasibility testing through farmer feedback and evaluation of potential benefits such as increased productivity, reduced input costs, and improved soil health.

Results & Conclusions

The study identifies that soil degradation and low organic carbon levels are major issues affecting agricultural productivity in rural Karnataka. The analysis shows a strong link between sustainable farming practices and improved soil health.

Regenerative practices such as composting and biochar production are found to be cost-effective and beneficial in enhancing soil fertility. Farmers show willingness to adopt these methods if supported by a structured business model.

The developed business model demonstrates potential for improving farmer income while promoting environmental sustainability. It integrates low-cost techniques with value chain opportunities, making it practical for rural implementation.

The project concludes that agricultural recarbonisation can be successfully implemented through a community-based approach. The model is scalable and adaptable to different rural contexts.

Overall, the study provides a sustainable solution that balances ecological benefits with economic growth.

Project Outcome & Industry Relevance (10–15 lines)

The project delivers a practical and scalable business model for agricultural recarbonisation tailored to rural Karnataka. It has strong relevance to the agriculture sector, environmental sustainability, and rural development.

The model can be adopted by Farmer Producer Organizations (FPOs), NGOs, and agribusiness companies. It also aligns with government initiatives on sustainable agriculture and climate change mitigation.

The project contributes to reducing farming costs, improving productivity, and enhancing farmer income. It also supports the development of carbon credit opportunities in the future.

Industries related to agriculture, biotechnology, and environmental services can benefit from this model. It creates opportunities for innovation and sustainable business practices.

Working Model vs. Simulation / Study

This project is primarily a **study-based and model development project**. It does not involve a physical working model but focuses on designing a conceptual and practical business framework.

However, certain aspects such as composting and biochar preparation are demonstrated at a small scale for understanding feasibility.

The project relies on field data, analysis, and simulation of business outcomes to validate the model.

Project Outcomes and Learnings

- Understanding of soil carbon management and sustainable agriculture practices
- Knowledge of business model development in the agricultural sector
- Practical exposure to field surveys and data collection
- Skills in data analysis and interpretation
- Awareness of environmental sustainability and climate change issues
- Experience in integrating technology with rural development

References

1. Rao, C. S. (2020). *Soil Carbon Sequestration: Research, Technology and Policy Implementation Needs in India*. Journal of the Indian Society of Soil Science.
2. Meena, R. S., et al. (2021). *Soil Organic Carbon Restoration in India*.
3. Padbhushan, R., et al. (2024). *Impacts of Conservation Agriculture on Soil Carbon Sequestration*.
4. Patil, M., et al. (2025). *Regenerative Agriculture and Soil Organic Carbon in India*.
5. Priyanka V., et al. (2026). *Carbon Farming: An Interdisciplinary Survey*.

Future Scope

1. The project has significant scope for future expansion and real-world implementation. The developed business model can be tested on a larger scale across different regions of Karnataka.
2. Future work can include integration with digital platforms for farmer education and monitoring soil health. Advanced tools such as IoT and data analytics can be used to improve efficiency and decision-making.
3. The model can also be linked with carbon credit markets, providing additional income opportunities for farmers. Collaboration with government agencies and private organizations can enhance scalability.
4. Further research can focus on improving regenerative techniques and reducing costs. Pilot projects can be conducted to validate long-term benefits and adoption rates.
5. The concept can be extended to other states and adapted based on regional agricultural conditions. Overall, the project has strong potential to contribute to sustainable agriculture and rural economic development.