



Resilience of Rural Entrepreneurs in Marathwada Region Towards Vulnerability to Climate Change

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ABSTRACT

Climate-related uncertainty is becoming an important business risk for rural enterprises because many local firms depend on agriculture, natural resources, seasonal income and geographically concentrated markets. The Marathwada region of Maharashtra provides a relevant setting for examining this issue because recurrent drought, uneven monsoon behaviour, water stress and episodes of extreme heat can affect production systems and the purchasing capacity of rural households. This paper examines how rural entrepreneurs can build resilience when their operating environment is exposed to such risks. The study uses an exploratory secondary-research design and synthesises official government material, development-project documents and research literature. Rather than treating resilience as simple survival after a disaster, the paper conceptualises it as a combination of preparedness, shock absorption, adaptation and enterprise transformation. Six dimensions are proposed: financial preparedness, diversification, resource efficiency, market flexibility, knowledge and technology, and institutional connectivity. The analysis suggests that the resilience of rural enterprises is closely connected with the resilience of the wider rural economy. Business continuity can be improved when entrepreneurs diversify revenue sources, manage liquidity carefully, conserve scarce resources, use climate and market information, strengthen customer networks and establish links with financial and public institutions. The paper develops a conceptual model and offers recommendations for enterprise development programmes in Marathwada. It also identifies the need for future district-level primary research to test the proposed relationships quantitatively.

KEYWORDS

Climate adaptation, climate vulnerability, Marathwada, rural enterprise, entrepreneurial resilience, livelihood diversification, rural development

I. INTRODUCTION

Entrepreneurship in rural areas is closely connected with the economic conditions of the communities in which enterprises operate. Small processors, retailers, traders, transport operators, repair units, livestock-related businesses and service providers frequently depend on local agricultural activity. When climate conditions disturb farm production, the consequences can extend beyond the farm gate. Availability of raw material may change, prices may rise, customers may postpone purchases, and seasonal employment may become less predictable. Rural entrepreneurs therefore face climate risk through a combination of physical, financial and market channels.

Marathwada is particularly relevant to this discussion. Official Maharashtra sources describe the region as part of the state's rain-shadow area and note its frequent exposure to drought-like conditions. The



Maharashtra State Disaster Management Authority also identifies drought as a persistent hazard affecting agricultural productivity and water availability. [1][2] The state's own geographical profile describes the monsoon as highly variable, with short wet periods and long dry intervals contributing to drought and stress in the rural economy. [3]

Climate risk is not uniform across enterprises. A business using substantial quantities of water may be directly constrained by scarcity, whereas a village retailer may be affected mainly through declining household income. A food-processing unit may experience both problems when agricultural supplies become irregular and consumer demand weakens. This means that resilience needs to be considered at the enterprise level while recognising the wider rural system in which the enterprise is embedded.

The policy environment increasingly recognises climate resilience as part of rural economic development. The Maharashtra Project for Climate Resilient Agriculture was designed to improve the ability of small and marginal farmers in vulnerable districts to deal with adverse climate events through improved production practices, water-use efficiency and soil management. [4] The second phase of the project, approved in 2025, continues to emphasise resource-efficient and climate-resilient production and institutional support in districts that include much of Marathwada. [5] Although these initiatives are primarily agriculture-oriented, their effects are relevant to rural enterprises because agricultural resilience influences local supply chains, income and demand.

Against this background, the present paper focuses on rural entrepreneurs rather than treating farmers as the only economic actors exposed to climate change. It asks what makes a small rural enterprise capable of continuing its activities under repeated climatic stress and what forms of institutional support can improve that capability.

II. REVIEW OF LITERATURE

A. Climate Exposure and Rural Economy

The climate context of Maharashtra is characterised by substantial spatial and seasonal variation in rainfall. Water stress and drought are recurring concerns, with the Marathwada region repeatedly identified as drought-prone. [1][3] Such exposure is economically important because rural households and enterprises are connected through local labour, commodity and consumption markets. A shock to agricultural income can therefore become a demand shock for nearby businesses.

Development programmes in Maharashtra have increasingly combined resource conservation with climate adaptation. The World Bank-supported climate-resilience project, for example, was designed around soil health, efficient use of water and improved farm productivity in highly vulnerable districts. [4] This indicates that resilience is being approached as a capacity-building issue rather than only as emergency relief.

B. Rural Entrepreneurship as an Adaptive Capacity

Rural entrepreneurship can provide alternative sources of income when agricultural activity becomes uncertain. Enterprises based on processing, services, repair, trading, livestock and other non-farm activities can reduce dependence on a single seasonal income stream. At the same time, these businesses remain exposed to the purchasing power of rural households and to the availability of local resources.

Recent work on rural entrepreneurship under multiple crises globally [10] argues that resilience should be viewed dynamically: rural businesses must respond to immediate disruption while developing capabilities

that reduce exposure to future shocks. This perspective supports the use of preparedness, diversification, learning and institutional relationships as components of entrepreneurial resilience.

C. RESEARCH GAP

Much of the available discussion on climate vulnerability in Marathwada concentrates on agriculture, water management and farmer adaptation. Important evidence exists on climate-resilient farming and natural-resource management, but comparatively less conceptual attention is given to the small entrepreneurs who connect production with rural markets. This paper addresses that gap by developing an enterprise-centred framework for understanding climate resilience in Marathwada.

III. OBJECTIVES OF THE STUDY

- To identify the major climate-related pressures that can influence rural enterprises in Marathwada.
- To examine the principal capabilities through which rural entrepreneurs can prepare for and respond to climate-related disruption.
- To assess conceptually the importance of finance, diversification, resource management, market access, information and institutions in enterprise resilience.
- To propose a framework that connects climate vulnerability with entrepreneurial adaptation and business continuity.
- To recommend measures for strengthening climate-resilient rural entrepreneurship in the region.

IV. RESEARCH METHODOLOGY

This paper follows an exploratory and descriptive secondary-research design. Information has been drawn from official Maharashtra government sources, the Maharashtra State Disaster Management Authority, World Bank project documentation and related research material. The analysis is conceptual and interpretive; it does not report fabricated primary-survey observations, respondent percentages or statistical test results.

The geographical focus is the eight-district Marathwada region: Chhatrapati Sambhajnagar, Jalna, Beed, Latur, Dharashiv, Nanded, Parbhani and Hingoli. The analytical unit is a rural enterprise or entrepreneur. For the purpose of this paper, rural entrepreneurs include owners or operators of micro and small businesses whose activities are located in rural markets or depend substantially on rural resources and customers.

Entrepreneurial resilience is defined here as the capacity of an enterprise to anticipate disruption, absorb short-term losses, maintain essential functions, adjust its methods and, when necessary, redesign its business so that future vulnerability is reduced. This definition separates resilience from temporary survival and gives attention to both immediate response and longer-term adaptation.

V. MAJOR CLIMATE-RELATED RISKS FOR RURAL ENTREPRENEURS

Climate pressure	Potential business consequence	Possible adaptive response
Rainfall uncertainty	Unstable supply, seasonal sales and planning difficulties	Multiple suppliers, flexible inventory and activity diversification
Drought and water shortage	Higher operating costs and interruption of water-dependent activities	Water-saving systems, rainwater storage and less water-intensive products

Extreme heat	Lower labour efficiency and risk to people, livestock or temperature-sensitive goods	Work scheduling, shade/cooling arrangements and heat-aware operations
Heavy rainfall and local flooding	Transport delays, stock damage and temporary closure	Raised storage, drainage, emergency plans and insurance
Commodity-price fluctuations	Pressure on margins and working capital	Value addition, alternative inputs and diversified markets
Decline in rural purchasing power	Lower demand for discretionary products and services	Customer diversification and links with nearby towns and larger markets

VI. DIMENSIONS OF ENTREPRENEURIAL RESILIENCE

A. Financial Preparedness

Climate disruption can create a double financial pressure: receipts may fall at the same time that operating or replacement costs increase. A resilient entrepreneur therefore needs liquidity planning, manageable debt, emergency reserves and access to formal finance. Insurance and risk-sharing mechanisms can further protect productive assets and reduce the need to sell them after a shock.

B. Diversification and Value Addition

Dependence on one crop, one product, one customer group or one season increases exposure. Diversification can take the form of additional products, complementary services or activities spread across different seasons. Processing and value addition can also allow entrepreneurs to retain a larger share of the value generated within rural supply chains. Diversification should be guided by market feasibility and available skills rather than by expansion alone.

C. Resource Efficiency

Water is a strategic business resource in a drought-prone environment. Entrepreneurs can reduce vulnerability by improving water-use efficiency, maintaining storage where appropriate, reusing water where safe and feasible, and selecting activities that are compatible with local resource availability. Public programmes in Maharashtra place strong emphasis on water conservation and resource efficiency, providing an institutional basis for such practices. [4][6]

D. Market Flexibility

A climate shock may change not only supply but also the behaviour of customers. Businesses that depend exclusively on a village market can be especially exposed when agricultural income falls. Building relationships with nearby towns, wholesalers, digital marketplaces or institutional buyers can widen the customer base. Flexible product mixes and timely information about prices and demand can also support faster decisions.

E. Knowledge, Information and Technology

Information has value when it improves a decision. Weather alerts, seasonal forecasts, market information and technical advisories can influence procurement, production schedules, inventory levels and transport planning. Maharashtra's climate-resilience initiatives illustrate the growing role of evidence-based advisories and knowledge services in adapting to variable conditions. [5] Rural entrepreneurs can benefit when such information is translated into simple, enterprise-specific actions.

F. Social and Institutional Networks

Small businesses rarely possess all the resources required for adaptation on their own. Relationships with self-help groups, producer organisations, cooperatives, banks, training institutions, extension agencies and local government can provide information, finance, skills and market access. Institutional connectivity should therefore be viewed as a productive resilience asset rather than merely as access to subsidies.

VII. CONCEPTUAL FRAMEWORK

The framework proposed in this study links external climate exposure with enterprise vulnerability and then with the internal and institutional capabilities that determine resilience.

CLIMATE EXPOSURE → ENTERPRISE VULNERABILITY → RESILIENCE CAPABILITIES → BUSINESS CONTINUITY AND ADAPTATION

Climate exposure represents drought, rainfall variability, extreme heat, water scarcity and damaging rainfall events. Enterprise vulnerability depends on the extent to which a business is dependent on climate-sensitive inputs, concentrated markets, limited finance or weak infrastructure. Resilience capabilities consist of financial preparedness, diversification, resource efficiency, market flexibility, knowledge and institutional networks. These capabilities are expected to influence the ability of the enterprise to continue operating, recover from disruption and redesign activities for future conditions.

VIII. DISCUSSION

The evidence reviewed suggests that rural entrepreneurial resilience in Marathwada cannot be separated from the condition of the surrounding rural economy. A drought may first reduce agricultural output, but its effects can subsequently move through input suppliers, transporters, processors, traders and local retailers. Likewise, improved agricultural resilience can create a more stable environment for related rural businesses.

Diversification appears to be one of the most practical routes for reducing concentration risk. A business that earns income from several complementary activities may be better able to absorb a weak season in one activity. However, diversification also creates managerial demands. Training, market intelligence and access to working capital are necessary if additional activities are to become productive rather than merely increase costs.

Resource management is another important dimension. Government climate-resilience programmes in Maharashtra have emphasised water-use efficiency, soil management and resource-conserving practices. [4] [5] For entrepreneurs, the corresponding principle is to treat scarce resources as strategic inputs and to invest in efficiency before scarcity becomes an operational crisis.

Institutional support also matters because small enterprises frequently have limited capacity to finance adaptation independently. The Maharashtra Agribusiness and Rural Transformation Project, for example, has sought to strengthen value chains, improve market access and build the capacity of producers and entrepreneurs to respond to market and climate-related challenges. [7] This suggests that enterprise resilience can be strengthened through coordinated support rather than through isolated training programmes.

The broader implication is that resilience should be measured by more than post-disaster recovery. An enterprise that returns to its previous condition but remains equally exposed has recovered, but it has not necessarily become resilient. A stronger outcome occurs when the entrepreneur learns from disruption,

changes the business model, reduces resource dependence, broadens markets or improves financial preparedness.

IX. RECOMMENDATIONS

- Establish simple climate-information services for rural businesses, linking weather and market information with decisions on procurement, production, inventory and transport.
- Include climate-risk assessment in entrepreneurship-development and business-plan training for rural youth and micro-enterprises.
- Expand access to working capital, emergency finance, insurance and other risk-management products suitable for small rural firms.
- Promote business diversification and value addition through skill development, common facilities, local clusters and market-linkage programmes.
- Encourage water-efficient enterprise practices and community-level conservation measures in drought-prone areas.
- Strengthen connections among entrepreneurs, self-help groups, producer organisations, cooperatives, banks, universities, Krishi Vigyan Kendras and local government agencies.
- Support rural businesses in reaching markets beyond their immediate village through digital channels, aggregation and institutional buyers.
- Develop district-level climate-enterprise maps identifying vulnerable value chains and the types of support required by businesses within them.
- Give special attention to women and young entrepreneurs in sectors that can combine local resources with climate-compatible production and services.

X. CONCLUSION

Climate vulnerability in Marathwada is not solely an agricultural concern. Because rural enterprises are connected to farm production, household income, local resources and seasonal markets, climate shocks can influence the continuity of many forms of rural business. The ability of entrepreneurs to respond therefore depends on a combination of individual capabilities and the strength of the surrounding institutional and market environment.

This paper proposes that rural entrepreneurial resilience should be understood through six interconnected dimensions: financial preparedness, diversification, resource efficiency, market flexibility, knowledge and technology, and institutional networks. Strengthening these dimensions can help entrepreneurs move from short-term crisis response towards planned adaptation. The most effective policy approach is consequently one that connects entrepreneurship development with climate adaptation, water management, market development and financial inclusion.

The study is conceptual and should not be interpreted as evidence of a measured causal relationship. A subsequent primary study should collect data from rural entrepreneurs across all eight districts of Marathwada and construct a resilience index. Variables such as climate exposure, financial preparedness, diversification, resource efficiency, market reach, information access and institutional support could then be

tested against business continuity, recovery time and enterprise performance using reliability analysis, correlation and regression techniques.

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