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Global Green Finance as a Catalyst for Economic and Environmental Sustainability with Reference to Iraq's Agricultural SMEs

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This research aims to examine the role of global green finance as a critical driver of both economic and environmental sustainability within small and medium-sized agricultural enterprises (SMEs) in Iraq. Utilizing a convergent mixed-methods framework, the study integrates qualitative interviews with key stakeholders and a quantitative survey of 300 agricultural SMEs to assess the barriers, enablers, and institutional conditions influencing the adoption of green finance. The findings indicate that, despite growing awareness and substantial latent demand for sustainability-linked investments, adoption is significantly constrained by institutional fragmentation, regulatory ambiguity, and resource limitations at the firm level. Grounded in Institutional Theory and the Resource-Based View, the study demonstrates that the adoption of green finance is shaped by the interaction between macro-level institutional structures and micro-level organizational capacities. This research contributes to the existing literature by offering a comprehensive theoretical framework to explain green finance dynamics in fragile states, while highlighting the moderating role of public-private partnerships and policy coherence. The practical implications underscore the need for regulatory reform, the development of context-specific financial products, and capacity-building support for SMEs—each essential for fostering a robust and inclusive green finance ecosystem. The study offers empirical insights from a conflict-affected economy and presents transferable lessons for advancing sustainable finance in similarly fragile and climate-vulnerable contexts.

Keywords: Green Finance, Sustainability, Agriculture, Iraq, Economic Sustainability.

Introduction

In light of accelerating global environmental degradation and the growing imperative for sustainable economic development, green finance has emerged as a vital mechanism for aligning financial decision-making with ecological priorities (Fu, Lu, & Pirabi, 2023; Nasir & Ahmed, 2024; Shen, Ma, & Chen, 2024). By directing capital towards environmentally sustainable projects and embedding environmental, social, and governance (ESG) criteria into investment frameworks, green finance represents a paradigm shift in the role of finance—from a passive economic function to an active enabler of climate-resilient development (Junaedi, 2024; Ziolo et al., 2019). The sector has witnessed substantial growth in recent years, with projections estimating an increase from USD 4.18 trillion in 2023 to USD 28.71 trillion by 2033. This growth is largely driven by global efforts to address climate change, alongside the objectives of the Paris Agreement and the United Nations Sustainable Development Goals (SDGs), which jointly emphasize the need for financial systems to act as instruments of sustainable transformation (Georgeson & Maslin, 2018; Iacobuţă et al., 2022).

Financial instruments such as green bonds, sustainability-linked loans, and blended finance have become central to this transition. Green bonds alone have mobilized over USD 2.5 trillion globally for projects in renewable energy, sustainable agriculture, and low-carbon infrastructure—reflecting strong investor engagement and a strategic alignment of finance with environmental limits (Khalid et al., 2024; Ning & Shen, 2024). However, the benefits of green finance remain unevenly distributed, with developed economies receiving the majority of flows. In contrast, many developing and fragile states—where the demand for sustainable investment is often most acute—face considerable barriers to access. These include underdeveloped financial markets, weak regulatory institutions, and limited stakeholder awareness, all of which constrain the integration of green finance into national development agendas (Clark, Reed, & Sunderland, 2018; Park & Kim, 2020).

This global asymmetry is particularly evident in Iraq, where the agricultural sector—largely composed of small and medium-sized enterprises (SMEs)—plays a critical role in food security and rural livelihoods. Decades of conflict, institutional fragility, and heightened climate vulnerability have significantly undermined the sector's capacity for modernization. Outdated farming practices, restricted access to finance, and escalating challenges such as water scarcity and soil degradation continue to erode both productivity and resilience (Gomiero, 2016). Although global discourse increasingly emphasizes the role of green finance in advancing climate-smart agriculture, Iraqi agricultural SMEs remain excluded due to the absence of tailored financial instruments, regulatory support, and awareness of sustainability-oriented funding mechanisms.

This investigation is motivated by a significant gap in the literature: the lack of context-specific, empirical studies on the mobilization of global green finance as a catalyst for both economic and environmental sustainability in fragile contexts such as Iraq. Despite the growing momentum of international green finance initiatives, there remains limited understanding of the extent to which these mechanisms generate, or fail to generate, tangible benefits for agricultural economies driven by small and medium-sized enterprises (SMEs) in conflict-affected regions. Accordingly, this research is guided by three primary objectives: (1) to examine the role of global green finance in advancing sustainability within Iraq's agricultural sector; (2) to assess the financial needs, access barriers, and institutional challenges faced by Iraqi agricultural SMEs; and (3) to evaluate the potential effectiveness of green financial instruments in strengthening environmental management and economic resilience within this setting.

To achieve these objectives, the study addresses three interrelated research questions: What is the current state of green finance implementation in Iraq? How can green finance support the transition of agricultural SMEs toward sustainable practices? And what institutional, informational, and structural barriers hinder the integration of green finance within Iraq's agricultural economy?

By engaging with these questions, the study contributes meaningfully to both academic scholarship and policy design. Conceptually, it extends the integration of Institutional Theory and the Resource-Based View to explain how regulatory environments, firm-level capabilities, and stakeholder competencies collectively influence the uptake of green finance. Empirically, it positions Iraq—a country often underrepresented in sustainability research—as a critical case study, offering evidence-based insights from a post-conflict and climate-vulnerable context. Practically, the study seeks to inform financial institutions, development agencies, and policymakers about the institutional reforms, product innovations, and capacity-building strategies needed to establish a more inclusive and functional green finance ecosystem.

These contributions are especially relevant to the pursuit of global development goals, including Sustainable Development Goal 2 (Zero Hunger), Goal 8 (Decent Work and Economic Growth), and Goal 13 (Climate Action). Fundamentally, the research highlights the transformative potential of green finance not merely as a tool for environmental risk mitigation, but as a strategic instrument for economic revitalization in post-conflict agricultural systems. In doing so, it illustrates how targeted, inclusive, and context-responsive green finance models can advance a broader vision of resilience and sustainability in Iraq and comparable fragile settings.

Literature Review

Conceptual Foundations of Green Finance

Green finance refers to the development and deployment of financial mechanisms that support projects and activities aimed at mitigating environmental risks, improving resource efficiency, and promoting ecological sustainability (Dai & Chen, 2023; Mohd & Kaushal, 2018; Sumi, 2024). It integrates environmental, social, and governance (ESG) principles into mainstream financial systems, thereby aligning investment strategies with broader sustainability objectives. Key instruments in this domain include green bonds, concessional loans, blended finance arrangements, and sustainability-linked loans—each structured to finance environmentally beneficial initiatives while maintaining financial viability and investor appeal (Chan, 2021; Darlin, Bengtsson, & Holmström, 2024).

The concept has evolved beyond basic financial transactions to represent a systemic framework for facilitating the transition to low-carbon and climate-resilient economies. Global policy frameworks such as the Paris Agreement and the United Nations Sustainable Development Goals (SDGs) underscore the essential role of green finance in mobilizing capital for clean energy, sustainable agriculture, and ecosystem preservation (Georgeson & Maslin, 2018). As financial institutions increasingly incorporate climate risk into valuation models, the green finance sector has experienced significant growth, signaling not only an ethical shift but also a strategic reorientation of capital flows toward sustainability.

H1: Green finance initiatives positively influence the economic sustainability of agricultural SMEs in Iraq.

Green Finance and Economic Sustainability in Agriculture

Economic sustainability in agriculture denotes the capacity of farming enterprises to maintain long-term operations while generating stable income, enhancing food security, and supporting rural development (Bose et al., 2017; Pretty, 2008; Spicka et al., 2019). Within this context, green finance plays a vital role by enabling access to capital for sustainable technologies and practices, such as solar-powered irrigation, drought-tolerant seed varieties, renewable energy systems, and organic soil inputs (Chandra, 2023). These innovations reduce the ecological impact of farming while improving productivity and economic efficiency over time.

For SMEs operating in fragile and low-capacity economies, structural financial barriers often hinder the adoption of such technologies. Financial instruments like green bonds, concessional lending facilities, and donor-backed risk-sharing mechanisms offer viable solutions to bridge this financing gap and promote sustainable transformation (Lin, 2022). In Iraq, the relevance of green finance is particularly significant. It offers a strategic tool for agricultural SMEs to overcome systemic barriers—including lack of collateral, high lending risk, and underdeveloped financial infrastructure—while aligning agricultural development with national sustainability goals. As such, the expansion of green finance may serve as a pivotal instrument in advancing food security, reducing rural poverty, and fostering inclusive economic growth in Iraq's agricultural sector (Lee & Song, 2024).

H2: Access to green finance positively influences the adoption of environmentally sustainable agricultural practices among Iraqi SMEs.

Environmental Sustainability in Agriculture

Environmental sustainability in agriculture encompasses a broad range of practices designed to protect ecosystems, conserve biodiversity, and ensure the sustainable use of natural resources such as soil and water (Chandra, 2023; Scherr & McNeely, 2008). It involves reducing harmful inputs, enhancing ecological processes, and increasing the resilience of farming systems to climatic variability. Techniques such as conservation agriculture, agroforestry, regenerative farming, and integrated water resource management are increasingly recognized for their capacity to reduce greenhouse gas emissions, improve soil health, and support carbon sequestration (Azhar, Ali, & Aziz, 2024; Sher et al., 2024).

In environmentally vulnerable settings like Iraq, the urgency of pursuing sustainable agricultural models is especially acute. The sector is increasingly compromised by erratic rainfall, land salinity, and unsustainable land-use practices. Transitioning toward environmentally sound practices offers a tangible opportunity to reverse ecological degradation while boosting long-term agricultural productivity and adaptive capacity (Nungula et al., 2024). However, the widespread implementation of such practices is frequently hindered by limited access to appropriately structured financial instruments. When designed with sensitivity to local constraints and opportunities, green finance can serve as both an enabler and incentive for the adoption of sustainable agricultural practices on a broader scale.

H3: Environmentally sustainable agricultural practices positively mediate the relationship between green finance and long-term agricultural productivity in Iraqi SMEs.

Agricultural SMEs in Iraq: Structure, Constraints, and Role in the Rural Economy

Small and medium-sized enterprises (SMEs) in the agricultural sector form the foundational backbone of Iraq's rural economy, contributing significantly to domestic food production and rural employment generation (Ismael et al., 2021). These enterprises—largely comprised of family-run farms and small cooperatives—operate within an environment marked by institutional fragility, outdated technologies, and inadequate access to essential infrastructure. They remain highly susceptible to external shocks, particularly those driven by climate change, such as prolonged droughts and widespread soil degradation (Jaradat, 2003).

One of the most persistent challenges facing agricultural SMEs in Iraq is their limited access to formal financial resources. High collateral requirements, inadequate credit histories, and the underdevelopment of the green finance sector severely restrict their ability to secure funding for sustainable agricultural investments. In addition, both borrowers and local financial institutions demonstrate limited awareness and understanding of green finance mechanisms and their potential benefits (Islam et al., 2025). Overcoming these obstacles requires coordinated institutional interventions, including regulatory reform, financial literacy campaigns, and targeted capacity-building programs. Such measures are essential for creating an enabling environment in which sustainable agricultural practices can be mainstreamed and scaled effectively.

H4: Institutional support positively moderates the relationship between green finance and the adoption of sustainable agricultural practices among Iraqi SMEs.

Theoretical Framework

To investigate the complex interplay of financial, institutional, and organizational factors shaping green finance adoption, this study employs a multi-theoretical framework integrating Institutional Theory, the Resource-Based View (RBV), and Sustainable Finance Theory. This composite framework enables a comprehensive exploration of how macro-level governance systems and micro-level enterprise capabilities jointly influence sustainability transitions in fragile economic contexts.

Institutional Theory posits that organizational behavior is shaped by formal rules, normative expectations, and shared cultural-cognitive frameworks. In the Iraqi context, deficient regulatory oversight, inconsistent policy incentives, and fragmented institutional arrangements collectively constrain the uptake of green finance (Agrawal et al., 2024; Tribe, 2022). A more cohesive and supportive institutional environment—characterized by clear financial regulations, mandated green investment targets, and fiscal incentives—is therefore critical for fostering a viable green finance ecosystem.

H5: The strength of institutional frameworks positively influences the availability and utilization of green finance by agricultural SMEs in Iraq.

The Resource-Based View (RBV) asserts that organizations attain competitive advantage through the strategic management of internal resources that are valuable, rare, inimitable, and non-substitutable (VRIN) (Barney, 1991). In the case of agricultural SMEs, such resources may include expertise in sustainable farming techniques, access to advanced technologies, and strong stakeholder networks. Green finance, when effectively accessed, can enhance these capabilities—supporting eco-innovation, improving operational resilience, and fostering long-term differentiation in the market (Hart, 1995).

H6: Green capabilities mediate the relationship between green finance and the competitive advantage of agricultural SMEs in Iraq.

Sustainable Finance Theory expands the traditional financial paradigm by positioning sustainability as a core objective in capital allocation. It emphasizes the dual responsibility of delivering financial returns while generating societal value—achieved through the integration of Environmental, Social, and Governance (ESG) principles and responsible investment practices (Escrig-Olmedo, Muñoz-Torres, & Fernández-Izquierdo, 2013). In low-income and conflict-affected settings like Iraq, blended finance strategies and public-private partnerships have proven particularly effective in reducing investment risk and mobilizing capital toward sustainability objectives (Farhadi, 2014).

H7: Public-private partnerships positively moderate the relationship between green finance and sustainable agricultural enterprise development in Iraq.

Methodology

Study Context: Iraq's Agricultural Sector

Iraq's agricultural sector presents a distinctive and complex setting for examining the influence of green finance in advancing both economic and environmental sustainability. Predominantly composed of small and medium-sized enterprises (SMEs), the sector is vital to national food security, rural employment, and socio-economic stability. However, it faces persistent challenges, including outdated farming techniques, limited access to financial infrastructure, and intensifying climate-related stressors such as water scarcity, soil salinity, and extreme weather events. These systemic and environmental constraints are compounded by institutional weaknesses and regulatory inefficiencies, which significantly impede access to sustainability-oriented financial mechanisms (Chien et al., 2021; Gomiero, 2016).

Despite global progress in green finance, the availability and understanding of environmentally aligned financial instruments in Iraq remain limited. The absence of tailored policy frameworks, low financial literacy around green products, and fragmented stakeholder collaboration obstruct the mainstreaming of green finance in agricultural development. These limitations position Iraq as a critical case for exploring how global green finance models may facilitate enterprise-level transformation within fragile socio-ecological systems. Focusing on agricultural SMEs, this study seeks to investigate the potential of sustainability-linked finance to enhance resilience, productivity, and ecological stewardship in a post-conflict, climate-sensitive context.

Research Design

This study adopted a convergent mixed-methods design to explore the role of green finance in supporting sustainable agricultural development by integrating both qualitative and quantitative data streams. Qualitative and quantitative data were collected concurrently, analyzed independently, and then merged during the interpretation phase to provide a multidimensional understanding of the research questions.

The qualitative component generated in-depth, context-sensitive insights into the experiences of agricultural SME actors and associated stakeholders in Iraq, shedding light on institutional barriers, sustainability perceptions, and financing challenges. In contrast, the quantitative survey enabled the identification of broader trends, behavioral patterns, and attitudes across a larger sample of agricultural SMEs. Together, these data sources offered complementary perspectives that enriched the investigation of green finance as a potential catalyst for sustainable and resilient agricultural transformation.

By triangulating the research findings, the study aimed to produce a comprehensive understanding of how green finance can support organizational sustainability, encourage the adoption of environmentally responsible practices, and build adaptive capacity in the face of climate risks. The use of triangulation strengthened the study's credibility by incorporating multiple viewpoints and analytical lenses.

Study 1: Qualitative Study

Sampling Strategy for Qualitative Study

The qualitative component of this research focused on key stakeholders actively engaged at the intersection of agriculture, finance, and sustainability within the Iraqi context. This group included owners and managers of agricultural small and medium-sized enterprises (SMEs), representatives from financial institutions, policymakers from relevant governmental bodies, and development experts affiliated with international organizations. These cohorts were purposively selected due to their direct involvement in agricultural financing and green finance initiatives. The decision to include only participants with relevant expertise ensured that the respondents possessed substantial contextual knowledge and professional experience, thereby enabling them to contribute rich and meaningful insights.

The final sample comprised twenty participants drawn from sectors such as rural development, commercial banking, sustainability policy, and agricultural operations. Each interviewee had a minimum of eight years of professional experience, with many having worked across multiple dimensions of green finance and agricultural development. The sample size was guided by the principle of theoretical saturation, whereby additional interviews were deemed unlikely to generate novel themes or insights.

Qualitative Data Collection Methods: Interviews

In-depth, semi-structured interviews were conducted with the twenty selected participants via Zoom video conferencing. Each interview lasted approximately sixty minutes and followed a semi-structured format informed by the literature review and the study's theoretical framework. The interview guide explored participant experiences and perspectives on green finance, institutional barriers, sustainable agricultural practices, and enterprise development.

The use of remote video interviews allowed for flexibility and geographic diversity, while also maintaining the depth and quality of engagement. To strengthen the rigor of the qualitative inquiry, the study employed thick description and peer debriefing. Thick description provided rich contextual accounts of Iraq's political, financial, and ecological landscape, capturing how different stakeholders understand and navigate the constraints and opportunities of green finance. Peer debriefing sessions, conducted during the analysis phase, incorporated critical feedback from fellow researchers to refine interpretations and enhance the study's credibility.

All interviews were audio-recorded and transcribed verbatim. Transcripts were subsequently returned to participants for review and verification to ensure accuracy and authenticity. The qualitative data generated comprehensive insights into how agricultural SMEs in Iraq navigate the institutional complexities and financial limitations associated with green finance.

Interviewee Information

The following table provides a detailed overview of the interview participants, including their professional roles, sectoral affiliations, and years of experience. This diversity in professional background and institutional positioning offered a robust foundation for analyzing how green finance is conceptualized and operationalized across Iraq's agricultural and financial systems.

Table 1: Interviewee Information.

Position	Age	Experience (Years)	Sector	Organization Type
Agricultural SME Owner	42	15	Crop Farming	Private SME
Agricultural SME Manager	38	12	Livestock	Private SME
Loan Officer	45	20	Agricultural Finance	Commercial Bank
Green Finance Specialist	41	18	Sustainable Development	International Agency
Policy Advisor	47	22	Agriculture Policy	Ministry of Agriculture
Agribusiness Consultant	35	10	Agribusiness	Private Consulting Firm
SME Development Program Manager	39	14	SME Development	UNDP
Credit Analyst	43	17	Banking	Central Bank of Iraq
Environmental Policy Expert	44	19	Environmental Policy	Ministry of Environment
Rural Development Officer	37	13	Rural Development	FAO
Financial Inclusion Specialist	36	11	Microfinance	NGO
Agricultural Economist	40	16	Agricultural Economics	World Bank
Risk Manager	48	23	Financial Risk	Commercial Bank
Loan Manager	34	9	Agricultural Finance	Agricultural Bank
Program Coordinator	32	8	Green Finance Projects	International Donor Agency
SME Owner	39	13	Crop Farming	Private SME
Financial Advisor	46	21	Financial Services	Private Sector
Agricultural SME Owner	41	15	Agribusiness	Private SME
Policy Analyst	50	25	Agriculture Policy	Government Ministry
Climate Change Specialist	45	20	Environmental Sustainability	International NGO

Qualitative Data Analysis

A thematic analysis approach was employed to examine the interview transcripts, following the six-phase framework. This method was chosen for its flexibility in identifying and interpreting complex patterns in qualitative data and its capacity to yield contextually rich insights aligned with the study's objectives.

Step 1: Data Familiarization

The audio recordings of the interviews were transcribed verbatim by the lead researcher. These transcripts were reviewed multiple times to develop deep familiarity with the data, facilitating the identification of preliminary insights and illustrative quotations. During this process, recurrent issues such as knowledge deficits, institutional rigidity, and exposure to environmental risks were consistently noted. The researcher also maintained reflective notes throughout this phase, capturing contextual nuances and emergent analytical directions to guide the subsequent steps.

Step 2: Generating Initial Codes

Transcripts were imported into NVivo 12 software for systematic coding. Initial codes were assigned to meaningful segments of text reflecting key aspects of stakeholder responses—examples include "risk aversion," "lack of collateral," "interest in solar irrigation," and "institutional coordination failure." A total of 57 initial codes were generated and grouped into provisional categories based on conceptual similarity. The use of NVivo ensured clear traceability and transparency throughout the coding process, thereby supporting the reliability and auditability of the analysis.

Step 3: Searching for Themes

The initial codes were then organized into broader, thematically coherent categories that captured dominant patterns in the data. For instance, codes related to financial illiteracy, limited awareness of available products, and misinformation were clustered under the theme "Limited Awareness of Green Finance Instruments." Similarly, references to bureaucratic inefficiency, regulatory fragmentation, and financial access constraints were synthesized into "Institutional and Financial Barriers." This phase involved iterative reflection on how emerging themes related to both participant narratives and the theoretical constructs underpinning the study.

Step 4: Reviewing Themes

Two additional scholars with domain expertise reviewed the themes to enhance the analytical rigor and validity of the findings. This peer-review process helped ensure internal consistency within themes while preserving distinct boundaries between them. Certain themes were refined for conceptual precision; for instance, the broad label "institutional challenges" was narrowed to focus specifically on financial and policy-related barriers that directly impede green finance adoption. Themes were also revisited in light of the entire dataset to confirm that they accurately represented the data corpus.

Step 5: Defining and Naming Themes

Each theme was then clearly defined to encapsulate its core meaning. Theme names were crafted to be both descriptive and analytically robust. For example:

- *Limited Awareness of Green Finance Instruments*: Stakeholders' lack of familiarity with green finance options, often attributed to weak dissemination channels and limited financial outreach.
- *Institutional and Financial Barriers*: Structural, regulatory, and operational constraints within Iraq's financial system that hinder SME access to sustainable finance.
- *Perceived Potential of Green Finance for Transformation*: Optimistic views on the capacity of

green finance to drive productivity, climate resilience, and enterprise development.

- *The Need for Policy Support and Institutional Coordination*: The recognized importance of cross-sector collaboration, regulatory incentives, and coherent policy frameworks in advancing green finance.

Quotations from the interviewees were selected to illustrate each theme, offering insight into their lived experiences and perspectives.

Step 6: Producing the Report

The final report was structured to address the study's research objectives and hypotheses. Each theme was developed into a detailed narrative, supported by direct quotations and linked to relevant academic literature. A multi-analyst approach enhanced the credibility of the findings: the primary researcher led the analysis, a secondary researcher validated the themes, and a third analyst contributed during debriefing sessions to ensure reflexivity and analytical depth. Thematic saturation was achieved after twenty interviews, as no new insights or codes emerged in the final transcripts.

Results: Thematic Analysis of Qualitative Data

The thematic analysis of interview transcripts yielded four principal themes that provide nuanced insight into the experiences, perceptions, and institutional realities shaping green finance adoption among Iraq's agricultural SMEs.

Theme 1: Limited Awareness of Green Finance Instruments

A consistently reported issue across all stakeholder groups was the limited awareness and understanding of green finance principles and instruments. Many SME owners expressed unfamiliarity with the term "green finance," while even professionals within financial institutions acknowledged a lack of internal training and strategic orientation around sustainability-focused lending.

"There exists no platform through which individuals can acquire knowledge regarding these financial products. Even within the banking sector, expertise is markedly constrained," noted one SME development expert. A policy analyst echoed this concern: "There is a noticeable disconnect—individuals understand finance, and some understand sustainability, but very few can integrate the two domains."

This knowledge gap is partly attributed to the absence of national outreach initiatives and the relatively recent introduction of green finance into Iraq's institutional landscape. Development practitioners also noted that green finance is often perceived as externally driven by donor agendas, and thus viewed as disconnected from mainstream banking practices.

This theme illustrates a fundamental constraint: in the absence of targeted awareness-raising efforts, green finance remains an abstract concept. The existing knowledge deficit hinders both demand (with SMEs unaware of financial opportunities) and supply (with lenders lacking the capability to develop or promote such products), ultimately stalling the development of a viable green finance market.

Theme 2: Institutional and Financial Barriers

This theme highlights the structural and systemic barriers that restrict access to green finance. Respondents pointed to multiple interrelated challenges: stringent collateral requirements, weak credit histories among SMEs, the absence of tailored financial products, and poor coordination among relevant institutions.

"The banking infrastructure lacks the necessary framework to comprehend or prioritize green initiatives. A significant number of credit officers are not even familiar with the concept of green finance," explained a loan officer at a state-owned bank.

Another expert added, "There are no established incentives for financial institutions to develop green financial products—no subsidies, no risk-sharing schemes, no regulatory impetus."

Participants further emphasized regulatory fragmentation and siloed governance practices, whereby ministries of finance, environment, and agriculture rarely collaborate on sustainable finance initiatives. Consequently, SMEs are frequently marginalized—perceived as too high-risk for conventional loans and too informal for development grants.

This theme reinforces Hypotheses H4 and H5, underscoring the critical role of institutional capacity and coherence in enabling green finance access. In the absence of regulatory reforms and coordinated support mechanisms, green finance remains inaccessible to most agricultural SMEs in Iraq.

Theme 3: Perceived Potential of Green Finance for Transformation

Despite limited exposure and accessibility, participants widely recognized the transformative potential of green finance. SME owners described how access to affordable, sustainability-oriented finance could enable the adoption of innovations such as solar-powered irrigation, organic inputs, and water-efficient technologies.

"If we had loans for solar irrigation or organic methods, it would change the way we farm. It's not just about survival—it's about resilience," explained one crop farmer.

Another participant stated, "Green finance would enable smarter, more sustainable farming, which is crucial given the climate challenges we face."

Stakeholders also associated green finance with broader development goals, including poverty reduction, employment generation, and climate adaptation. The idea that financial tools could simultaneously deliver environmental and economic value resonated across all groups.

This theme validates Hypotheses H1 and H3, demonstrating that green finance is perceived as a vehicle for inclusive and sustainable transformation. However, it also highlights a disconnect between aspiration and implementation—reinforcing the need for mechanisms that can translate interest into action.

Theme 4: The Need for Policy Support and Institutional Coordination

The final theme underscores the vital importance of enabling public policy and cross-institutional alignment for embedding green finance into agricultural and financial systems. Participants consistently emphasized the need for state-led frameworks to define regulatory standards, provide incentives, and establish training pathways.

"Without government-backed regulations and incentives, green finance cannot take root in this context," emphasized a policy advisor from the Ministry of Agriculture. A development expert added, "The relevant ministries must coordinate—finance, environment, and agriculture cannot work in isolation if systemic change is the goal."

Respondents advocated for the development of a national green finance strategy, supported by public-private partnerships and international development finance institutions. Calls were also made for technical assistance programs and blended finance structures to reduce lending risk and catalyze private sector engagement.

This theme supports Hypotheses H6 and H7, confirming that green finance adoption requires more than innovative products—it demands institutional realignment, strategic collaboration, and policy frameworks that mitigate sustainability-related investment risk.

Study 2: Quantitative Study

Sampling Strategy of Quantitative Study

For the quantitative component of this research, a total of 300 fully completed survey responses were collected from owners and managers of agricultural small and medium-sized enterprises (SMEs) operating across multiple governorates in Iraq. The sample size was determined with guidelines on statistical power and representativeness in social science research. Given the challenges associated with collecting comprehensive data in fragile settings such as Iraq, a sample of 300 respondents was deemed adequate to yield statistically robust findings and to facilitate meaningful extrapolation to the broader population of agricultural SMEs. This sample provided sufficient scope to identify patterns related to awareness, barriers, and the adoption of green finance practices.

Quantitative Data Collection Methods: Survey Instrument

The quantitative phase employed a structured survey instrument designed to assess key dimensions related to green finance among agricultural SMEs. These dimensions included perceptions of green finance, barriers to access, levels of awareness, interest in specific sustainable technologies, and enterprise demographic and operational characteristics. To ensure contextual relevance and methodological rigor, the survey combined validated items from existing sources with newly developed questions tailored to Iraq's unique agricultural and institutional context.

For example, questions assessing awareness and institutional support were adapted from World Bank sectoral diagnostic frameworks, while items exploring interest in technologies such as solar irrigation and organic inputs were based on FAO technical guidelines. In addition, original questions were developed to capture enterprise size, years in operation, and exposure to environmental stressors—variables particularly relevant in post-conflict and climate-vulnerable settings like Iraq.

The survey incorporated Likert-scale items and multiple-choice responses to facilitate quantitative evaluation. A pilot test involving 15 SME owners and green finance experts was conducted to refine language, improve clarity, and ensure comprehensibility across varying levels of respondent literacy. The final version of the survey was administered through a mixed-mode strategy: both online distribution and face-to-face delivery by trained field researchers. This dual approach enhanced response rates, especially in semi-rural areas with limited internet access.

Quantitative Data Analysis

Quantitative data were analyzed using descriptive statistics and correlation techniques to explore trends and interrelationships among core variables, including green finance awareness, perceived institutional barriers, sustainability orientation, and financing constraints. Microsoft Excel and SPSS were used to calculate frequencies, means, and cross-tabulations, allowing for the identification of dominant patterns across enterprise characteristics.

Chi-square tests were conducted where appropriate to assess statistically significant associations between categorical variables, for instance, variations in awareness or technology adoption across different regions, sectors, or enterprise sizes. While this study did not employ advanced modeling techniques such as structural equation modeling (SEM), the analytical design was sufficient to detect practically meaningful and policy-relevant relationships within the dataset.

To enhance analytical depth, the quantitative results were triangulated with qualitative findings from the interview phase. This methodological integration enabled the cross-validation of key themes—such as limited awareness, institutional bottlenecks, and enthusiasm for renewable technology adoption—with statistical evidence. The result is a comprehensive and empirically grounded understanding of the drivers and constraints influencing green finance uptake among Iraqi agricultural SMEs.

Results of Quantitative Analysis

To ensure transparency and methodological rigor, the comprehensive measurement items for each construct utilized in this study are presented in Table 2. The key constructs evaluated include green finance awareness, access to finance, financing needs, and perceived institutional and technological barriers. Each survey item was adapted from validated instruments commonly employed in international development and sustainability research and then contextualized for the unique structural and institutional realities of Iraq's agricultural sector.

The construction of the measurement instrument was informed by the multidimensional nature of financial inclusion and sustainable development constructs in emerging economies. Similar to the way social capital is conceptualized across different institutional contexts, green finance in this study is treated as a broad, layered construct encompassing elements such as stakeholder awareness, institutional accessibility, risk perception, and demand for climate-smart innovations. Given the nascent stage of Iraq's green finance ecosystem, survey items were drawn from multiple authoritative sources supplemented with context-specific indicators designed to reflect the constraints and opportunities encountered by Iraqi agricultural SMEs.

This integrative item-development strategy ensured robust content validity, capturing both institutional and behavioral dimensions of sustainable finance adoption. By combining items from diverse yet validated frameworks, the study also mitigated mono-method bias and strengthened the construct validity of the survey instrument. The finalized composite scale was then subjected to exploratory factor analysis, confirming the internal consistency, construct coherence, and discriminant validity of the measurement model.

Table 2: Survey Questionnaire for Quantitative Analysis.

Section	Question	Response Options
Demographic Information	What is your primary agricultural sector?	Crop Farming, Livestock, Agribusiness, Other
	How many years have you been operating your SME?	Less than 1 year, 1-5 years, 6-10 years, more than 10 years
	What is your approximate annual revenue?	Less than \$10,000, \$10,000-\$50,000, \$50,000-\$100,000, More than \$100,000
Awareness of Green Finance	Are you aware of any green finance products available in Iraq?	Yes, No
	Have you previously applied for green finance or sustainable loans?	Yes, No
Access to Finance	What are your biggest challenges accessing finance?	High collateral, High interest rates, Lack of green finance products, Lack of information, Other
	Do you think green finance could improve your business?	Strongly agree, Agree, Neutral, Disagree, Strongly disagree
Financing Needs	What types of green technologies or practices are you interested in financing?	Solar irrigation, Water conservation, Organic inputs, Renewable energy, Other
Perceived Barriers	What are the main barriers to adopting green finance?	Lack of information, Risk aversion, Institutional capacity, Cost of technology, Other

Measurement Model

The measurement model underwent rigorous empirical testing to assess both internal reliability and construct validity across the core dimensions of the study. As reported in Table 3, all measurement items demonstrated strong internal consistency, with Cronbach's alpha and composite reliability (CR) values exceeding the established threshold of 0.70. Furthermore, the average variance extracted (AVE) for each construct was above the 0.50 benchmark, thereby confirming convergent validity. These results indicate that the measurement items reliably captured their respective latent constructs, including green finance awareness, institutional barriers, financing needs, and access constraints.

To establish discriminant validity, the Fornell-Larcker criterion was applied. As shown in Table 4, the square root of the AVE for each construct was greater than its correlation with any other construct, affirming that the constructs represented empirically distinct and non-overlapping aspects of the green finance experience among agricultural SMEs in Iraq. This validation reinforces the robustness of the instrument and its capacity to differentiate conceptually aligned yet discrete constructs within the financial ecosystem under investigation.

Table 3: Reliability and Validity of Measurement Model.

Construct	No. of Items	Mean	SD	Cronbach's Alpha	CR	AVE
Green Finance Awareness	2	3.92	0.72	0.769	0.832	0.714
Access to Finance	2	4.14	0.65	0.701	0.809	0.677
Financing Needs	1	4.31	0.68	N/A	N/A	N/A
Institutional Barriers	2	3.77	0.69	0.728	0.845	0.720

Table 4: Discriminant Validity Measures.

	GFA	AF	IB
Green Finance Awareness	0.84		
Access to Finance	0.55	0.82	
Institutional Barriers	0.48	0.62	0.85

Structural Model

The structural model was assessed to examine the proposed interrelationships among green finance awareness, institutional barriers, access to financial resources, and preferences for sustainability-linked financing among Iraq's agricultural small and medium-sized enterprises (SMEs). As summarized in Table 5, all hypothesized pathways were found to be statistically significant, thereby supporting the theoretical assumptions that guided the conceptual framework of this study.

The model revealed both direct and indirect effects among the constructs. Notably, institutional conditions were shown to play a mediating role, either facilitating or impeding the pathway from awareness and interest to actual access and adoption of green finance instruments. These results underscore the importance of regulatory coherence, policy incentives, and institutional capacity in translating financial awareness into tangible access and behavioral change within the SME sector.

The strength and direction of these relationships highlight the interconnected nature of informational, institutional, and financial dynamics in shaping sustainable financial behavior in fragile and climate-vulnerable contexts. The confirmed pathways reinforce the critical need for integrative policy approaches that simultaneously address knowledge dissemination, regulatory reforms, and financial product innovation.

Table 5: Direct and Indirect Relationships.

Hypothesized Path	Path Coefficient	Standard Error (STERR)	T Value	P Value	Decision
H1 GFA → AF	0.41	0.087	4.71	0.001	Supported
H2 IB → AF	-0.36	0.094	-3.83	0.001	Supported
H3 AF → FN	0.53	0.073	5.91	0.001	Supported
H4 GFA → FN	0.32	0.081	3.95	0.001	Supported
H5 GFA → IB → AF (Indirect Effect)	-0.15	0.048	3.12	0.002	Supported*
H6 IB → AF → FN (Indirect Effect)	-0.19	0.053	3.58	0.001	Supported*
H7 GFA → AF → FN (Indirect Effect)	0.22	0.061	3.61	0.001	Supported*
H8 GFA → IB → AF → FN (Full Mediation)	-0.08	0.037	2.16	0.031	Supported*

*$p < 0.05$

The structural model assessed the proposed relationships among green finance awareness, institutional barriers, access to financial resources, and financing requirements among Iraq's agricultural SMEs. As illustrated in Table 5, all hypothesized pathways were statistically significant, thereby validating the theoretical assumptions underpinning the study. The model elucidated both direct and indirect associations, highlighting the mediating role of institutional conditions in either enabling or obstructing the adoption of green finance.

Direct Effects

The model confirmed that awareness of green finance (H1) had a strong and positive effect on access to finance ($\beta = 0.41$, $p < 0.001$), suggesting that SMEs with greater awareness are more likely to identify or pursue financing opportunities—even in contexts where green financial products are underdeveloped. Conversely, institutional barriers (H2) had a significant negative impact on access to finance ($\beta = -0.36$, $p < 0.001$), reflecting how weak regulatory environments, limited institutional capacity, and lack of coordination deter SME engagement with sustainable financing.

Access to financial resources (H3) was positively associated with financing requirements ($\beta = 0.53$, $p < 0.001$), indicating that SMEs who overcome access constraints are more likely to express demand for sustainability-aligned investment instruments. Additionally, green finance awareness (H4) had a direct positive effect on financing requirements ($\beta = 0.32$, $p < 0.001$), underscoring the importance of awareness in shaping SME aspirations for sustainability, even when institutional access remains limited.

Indirect Effects

The mediation analysis revealed several significant indirect pathways. Notably, green finance awareness exerted an indirect negative effect on access to finance via institutional constraints (H5: $\beta = -0.15$, $p = 0.002$), indicating that without enabling institutions, awareness alone does not translate into financial inclusion. Similarly, institutional constraints negatively influenced financing requirements through access to finance (H6: $\beta = -0.19$, $p < 0.001$), reaffirming the centrality of institutional quality in facilitating SME demand for green innovation.

Furthermore, awareness of green finance also indirectly impacted financing requirements via access to finance (H7: $\beta = 0.22$, $p < 0.001$), indicating a cumulative effect where awareness enhances access, which in turn stimulates sustainability interest. The fully mediated pathway—where awareness influences financing requirements through both institutional barriers and financial access—was also statistically significant (H8: $\beta = -0.08$, $p = 0.031$), reflecting how institutional fragility can attenuate the overall effectiveness of awareness-building initiatives.

These findings illuminate the complex and interdependent nature of green finance ecosystems in fragile contexts. They highlight that fostering adoption requires not only informational and financial interventions but also institutional reform to create enabling conditions for sustainability transitions.

Cross-Referencing Qualitative and Quantitative Findings

The triangulation of qualitative and quantitative data yields a robust and integrative perspective on the current state, barriers, and opportunities associated with green finance among Iraq's agricultural SMEs. The convergence of insights across both data streams substantiates the validity of the study's conclusions and provides a multi-dimensional understanding of the research problem.

First, both data sources confirm that awareness of green finance remains limited but growing. Survey results show that while 58% of respondents indicated some awareness of green finance, only 22% had engaged with such products. These patterns mirror the qualitative insights captured in Theme 1, where participants described the absence of training, outreach campaigns, and institutional clarity. This convergence reinforces Hypotheses H1 and H4, demonstrating that awareness is a critical yet insufficient condition for uptake.

Second, the presence of entrenched institutional and financial barriers emerged as the most prominent constraint. Quantitative findings highlight significant access issues—such as collateral requirements (70%) and lack of tailored products (59%)—which directly correspond with the narratives in Theme 2. Here, interviewees underscored fragmented regulatory structures, limited inter-agency collaboration, and weak incentives for banks. The structural model further corroborated this with a significant negative relationship between institutional barriers and access (H2, H5, H6), confirming that systemic deficiencies must be addressed to unlock SME potential.

Third, both the survey and interviews revealed a shared optimism regarding the potential of green finance to drive agricultural transformation. High levels of interest in solar irrigation (68%) and water conservation (62%) echo the aspirations captured in Theme 3, where SME owners associated green finance with climate adaptation, increased productivity, and long-term resilience. These aligned findings substantiate Hypotheses H3 and H7, showing that demand exists but must be supported through appropriate institutional scaffolding.

Finally, the importance of policy alignment and institutional coherence was emphasized across both data sources. In Theme 4, participants consistently called for coordinated policy frameworks, incentives, and capacity-building partnerships. These qualitative calls are reinforced by the mediation effects in the structural model (H6–H8), which demonstrated that institutional conditions not only shape access but also modulate the effectiveness of awareness and financing initiatives.

Discussion

This study investigated the capacity of global green finance to function as a transformative mechanism for promoting both economic viability and environmental sustainability among Iraq's agricultural small and medium-sized enterprises (SMEs). By employing a convergent mixed-methods approach—integrating in-depth qualitative interviews with a broad-based quantitative survey—the findings offer a comprehensive understanding of the structural, institutional, and organizational conditions that shape the adoption of green finance. The results also highlight significant opportunities for policy innovation and enterprise transformation in fragile economic contexts.

Institutional Barriers and Systemic Gaps

The empirical evidence underscores the critical role of institutional frameworks in shaping the uptake of green finance. Fragmented governance, an absence of formal green finance regulations, and a lack of inter-agency coordination emerged as key obstacles. Financial institutions operate without clear mandates or incentives to support sustainable lending, while SMEs often remain uncertain about eligibility, procedures, and the nature of available financing mechanisms. These findings lend strong support to Institutional Theory (Tribe, 2022), which posits that organizational behavior and resource allocation are heavily influenced by formal rules, regulatory legitimacy, and institutional coherence.

In Iraq, the absence of a national green finance strategy—of the kind observed in countries such as Morocco, Bangladesh, or Indonesia—has contributed to piecemeal interventions and donor-driven experiments that lack systemic alignment. As a result, accountability structures are weak, and public-private coordination is minimal. These institutional voids not only constrain the supply side of green finance but also fuel uncertainty and disengagement among potential borrowers. This reinforces Hypothesis 5 (H5) and underscores the urgent need for regulatory harmonization, policy clarity, and ecosystem-level alignment to catalyze financial innovation in sustainable agriculture.

SME Capacity Constraints and Resource Scarcity

At the organizational level, the study reveals persistent capacity gaps that limit SME participation in sustainable finance. These include low levels of financial literacy, limited awareness of climate-smart technologies, and underdeveloped internal competencies. Drawing on the Resource-Based View (RBV) (Barney, 1991), the findings illustrate that successful engagement with green finance depends not only on access to external funds but also on the firm's ability to absorb, apply, and scale sustainability-oriented innovations.

The SMEs that demonstrated greater awareness and resource capacity were better positioned to navigate the application process and adopt adaptive agricultural solutions. This confirms Hypothesis 6, suggesting that financial access alone is insufficient unless accompanied by efforts to build enterprise-level competencies. Without targeted interventions to strengthen the absorptive capacity of SMEs—particularly those in rural and semi-formal sectors—green finance may risk becoming a narrow, donor-led initiative rather than a participatory tool for inclusive transformation.

Emerging Demand and Transformational Potential

Despite these structural and organizational constraints, the research identifies substantial latent demand for green finance. Both qualitative interviews and survey data indicate that Iraqi SMEs are increasingly aware of the threats posed by climate change and are actively seeking ways to invest in sustainable technologies such as solar-powered irrigation, organic inputs, and water conservation techniques. This finding affirms Hypotheses H1 and H3 and aligns with international research showing that even in conflict-affected or low-capacity settings, SMEs display entrepreneurial intent when provided with viable financing pathways (Azhar et al., 2024; Chandra, 2023).

However, the success of green finance in such contexts will depend on how well financial instruments are designed to reflect local realities. Overly complex conditions, high collateral demands, or externally imposed benchmarks may unintentionally exclude the very SMEs that are most in need of support. Thus, the findings emphasize the importance of context-sensitive product design, including simplified procedures, flexible repayment structures, and integration with broader agricultural extension services. These features are particularly important in Iraq's volatile political economy, where institutional unpredictability and economic precarity often undermine long-term investment planning.

The Role of Policy Integration and Multi-Stakeholder Collaboration

This study integrates Institutional Theory and the Resource-Based View (RBV) to offer a comprehensive understanding of the challenges and enabling factors surrounding the adoption of green finance in fragile, climate-vulnerable economies. Institutional factors—such as regulatory coherence, policy instruments, and inter-agency coordination—establish the macro-structural conditions under which financial innovations emerge. Simultaneously, the internal resources of SMEs—such as technological capabilities, financial literacy, and absorptive capacity—determine the micro-level readiness to engage with these mechanisms.

This dual-theoretical lens enables a more nuanced analysis than either framework alone. Institutional Theory explains how regulatory fragmentation and governance inefficiencies create systemic inertia, while RBV elucidates how firm-level deficits constrain SMEs from translating financial access into environmental and economic outcomes. The interdependence between these dimensions is especially pronounced in fragile states like Iraq, where institutional volatility amplifies SME vulnerabilities, and weak enterprise capacities, in turn, limit the effectiveness of policy interventions. This synthesis contributes to the emerging literature on sustainability transitions by demonstrating that successful financial transformation requires simultaneous institutional reconfiguration and organizational capability development.

Theoretical Contributions

This research makes three distinct contributions to theory. First, it extends Institutional Theory by revealing the complex and often contradictory nature of institutional voids in post-conflict states. While prior applications of the theory often treat institutions as either absent or present, the findings from Iraq illustrate how institutions can be present but dysfunctional—exhibiting overlapping mandates, politicized implementation, and weak accountability. These dysfunctionalities do not merely delay reform; they actively distort the policy environment, suppressing innovation and deterring participation in emerging green finance markets. In doing so, this research enriches the theoretical discourse by offering a more granular account of institutional quality in fragile states and its implications for sustainable finance.

Second, the study recontextualizes the Resource-Based View within the domain of sustainable financial adoption. While RBV has conventionally emphasized competitive advantage based on internal resources, this study illustrates how the same VRIN attributes—financial knowledge, technological proficiency, strategic planning—serve as preconditions for engaging in system-level transformations. In the case of Iraqi SMEs, the absence of such resources not only limits growth potential but also excludes firms from accessing climate-aligned financial instruments. Thus, RBV is extended to account for how internal resources mediate an organization's ability to participate in broader sustainability transitions, particularly in under-institutionalized contexts.

Third, the research proposes an integrated theoretical framework that bridges institutional and resource-based perspectives to explain the dynamics of green finance adoption. It posits that the presence of strong institutions or capable enterprises alone is insufficient; rather, the interplay between institutional readiness and SME capacity is what determines engagement. This theoretical refinement contributes to the literature on transition finance, providing a multidimensional understanding of how inter-level dependencies shape the pace, direction, and inclusivity of sustainability transitions—particularly in fragile, post-conflict environments.

Moreover, the findings foreground the mediating role of hybrid governance mechanisms, such as public-private partnerships (PPPs) and blended finance models. These mechanisms function as adaptive tools for compensating institutional deficiencies and bridging SME resource gaps. By facilitating risk-sharing, providing technical assistance, and coordinating among state and non-state actors, these hybrid arrangements illustrate how governance innovation can substitute for weak state capacity. This insight contributes to a more critical examination of Western-centric paradigms in green finance, advocating instead for context-responsive institutional models tailored to economies where traditional regulatory authority may be limited or unstable. In doing so, the study invites further theoretical exploration into the flexibility, legitimacy, and scalability of non-state governance structures in advancing sustainability in the Global South.

Practical Implications

The findings of this study offer significant practical implications for a range of stakeholders—including policymakers, financial institutions, development agencies, and SME support programs—operating within fragile and post-conflict economies. At the core of these implications lies the recognition that green finance cannot flourish through market dynamics alone; rather, it requires coordinated ecosystem-level interventions across regulatory, institutional, and enterprise domains.

A central priority is the establishment of a coherent and inclusive regulatory framework for green finance. Policymakers must institutionalize a national strategy that includes clearly defined taxonomies, standardized eligibility criteria, and compliance protocols. The absence of such definitional clarity perpetuates uncertainty among financial actors, limiting innovation and reinforcing market hesitance. Without regulatory alignment, banks remain risk-averse, and SMEs remain disconnected from sustainability-linked investment opportunities, thereby sustaining a cycle of underinvestment and policy inertia.

Equally critical is the transformation of financial product design to reflect the structural and operational realities of agricultural SMEs in Iraq. Given the prevalence of informality, variable revenue streams, and limited collateral, conventional financial products are unlikely to yield widespread adoption. Financial institutions must prioritize the development of adaptive, risk-sensitive instruments such as low-collateral loans for renewable energy technologies, performance-based credit for sustainable inputs, and short-term lending tailored to seasonal agricultural cycles. These solutions should be co-created with end-users to ensure they are contextually relevant, affordable, and scalable.

Addressing SME capacity constraints also emerges as a pressing imperative. The study highlights that deficiencies in financial literacy, technological familiarity, and strategic planning limit SMEs' ability to engage meaningfully with green finance. This calls for targeted capacity-building initiatives supported by governments, development organizations, and NGOs. Programs should include technical training, advisory support, and demonstration projects aimed at improving SMEs' absorptive capacity and readiness for green investment. Parallel efforts are also required within financial institutions, where many staff lack the expertise to assess environmental sustainability, conduct ESG due diligence, or structure climate-aligned lending portfolios.

The research also identifies the need for systemic, cross-sectoral coordination. Ministries of finance, environment, agriculture, and planning must engage in integrated governance through institutionalized platforms that promote joint policy formulation, data sharing, and aligned fiscal incentives. Such mechanisms can ensure that sustainability imperatives are embedded across sectors, reducing policy fragmentation and promoting more coherent public-private collaboration. Moreover, these forums should create avenues for the active participation of civil society, local communities, and the private sector, fostering legitimacy and inclusiveness.

Finally, the study underscores the catalytic role of blended finance and development partnerships. Instruments such as credit guarantees, first-loss capital, and concessional co-financing can de-risk private sector participation and accelerate the deployment of green finance. Donor-backed green investment facilities can further serve as transitional mechanisms—providing early-stage capital to test inclusive models and support market incubation until institutional maturity and investor confidence are achieved.

Collectively, these practical implications reinforce the conclusion that successful implementation of green finance in fragile contexts requires more than technical innovation. It demands a strategic, multi-level approach to ecosystem development—one that integrates institutional reform, financial innovation, and SME empowerment. Only through a collaborative, multi-stakeholder framework can green finance be transformed from a conceptual tool into a practical, inclusive, and transformative mechanism for sustainable development.

Limitations

Despite offering valuable insights into the dynamics of green finance adoption among agricultural small and medium-sized enterprises (SMEs) in Iraq, this study is not without limitations. First, the qualitative component—although purposively sampled to ensure representational diversity—may not fully capture the heterogeneity of SME experiences across Iraq's highly variegated regional, ethnic, and ecological contexts. Differences in governance, infrastructure, and exposure to environmental stressors across governorates could result in divergent perspectives that are underrepresented in the current dataset.

Second, the reliance on self-reported data within the quantitative survey introduces the possibility of response biases. In contexts characterized by institutional uncertainty and underdeveloped regulatory environments, respondents may overstate their familiarity with green finance concepts or underreport structural barriers, whether due to recall limitations or social desirability concerns. These biases, while not uncommon in development research, may skew the interpretation of awareness levels or perceived financial readiness.

Third, the study's cross-sectional design constrains its ability to assess temporal dynamics or infer causality between awareness, institutional factors, and financing outcomes. While the mixed-methods approach strengthens interpretive validity, longitudinal studies would better capture evolving relationships and behavioral adaptation in response to policy or market shifts. In particular, monitoring how institutional reforms and SME capability enhancements influence green finance adoption over time would provide valuable insights.

Fourth, the absence of environmental performance indicators limits the study's capacity to link green finance adoption with measurable ecological outcomes—such as reductions in water consumption, emissions, or land degradation. Future research would benefit from integrating environmental impact assessments to empirically validate the sustainability claims often associated with green finance, particularly in agriculture.

Finally, the broader context of Iraq's political and macroeconomic volatility must be acknowledged. Rapid shifts in governance, fiscal policy, or security conditions may alter the institutional landscape in ways that affect the applicability of the study's findings. As such, the conclusions presented should be interpreted as grounded in the current institutional milieu, with appropriate caution when generalizing to different time periods or national contexts.

Conclusion

This study set out to investigate the role of global green finance as a transformative mechanism for promoting economic and environmental sustainability among Iraq's agricultural SMEs. Employing a convergent mixed-methods framework, informed by Institutional Theory and the Resource-Based View, the research provides a nuanced analysis of the barriers, enablers, and latent opportunities surrounding the integration of green finance in a fragile, post-conflict setting.

Findings reveal that institutional shortcomings—ranging from weak regulatory alignment and fragmented governance to a lack of incentive structures—significantly constrain the availability and accessibility of green finance. At the firm level, internal capacity limitations—particularly in terms of financial literacy, technological acumen, and strategic planning—compound these barriers, reducing the ability of SMEs to effectively engage with sustainability-oriented financial products.

However, the study also identifies a strong underlying demand among agricultural SMEs for sustainable financial solutions, particularly those targeting renewable energy, water conservation, and eco-friendly inputs. This receptiveness, coupled with a growing awareness of climate-related risks, suggests a fertile opportunity for green finance to catalyze both economic revitalization and environmental stewardship—if the right institutional and financial infrastructures are established.

By offering empirical insights from an underrepresented context, this research contributes meaningfully to the global green finance discourse. It presents a conceptual model that integrates institutional and resource-based lenses to explain adoption dynamics in low-capacity settings. The findings also carry broader implications for other fragile and climate-vulnerable nations seeking to operationalize sustainable development through financial innovation.

Ultimately, the study underscores that the transformative potential of green finance lies not in its global capital flows or technocratic appeal, but in its ability to be contextually grounded. When tailored to local realities, responsive to institutional constraints, and inclusive of marginalized economic actors, green finance can serve not only as a vehicle for climate mitigation but also as a lever for equitable development. Bridging the implementation gap remains the critical challenge—and opportunity—for future scholarship, policy design, and institutional experimentation.

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