

Analysis of the Challenges in Government-Enterprise Collaboration in Emergency Supply Reserve Management During Major Disaster Scenarios

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ABSTRACT

Against the backdrop of global climate anomalies and frequent extreme disasters, government-enterprise joint reserves have become the core approach to strengthening China's emergency material supply system. Under the "comprehensive security and emergency response" governance framework, multiple models-including government physical reserves, corporate contractual storage agreements, and capacity-based flexible reserves-are implemented concurrently. However, during major disasters, collaborative reserve mechanisms often face practical challenges such as supply misalignment, insufficient corporate participation, and unclear delineation of responsibilities. Drawing on multi-stakeholder game theory and principal-agent theory, and analyzing typical major disaster cases like floods and heavy rainfall, this paper systematically examines the operational challenges of government-enterprise joint reserves across five dimensions: interest alignment, information communication, incentive mechanisms, management systems, and emergency coordination. It analyzes the underlying causes of these difficulties and provides theoretical foundations and practical guidance for designing sustainable incentive mechanisms and optimizing collaborative reserve strategies.

KEYWORDS

Major Disasters; Emergency Supplies Reserves; Government-Enterprise Collaboration; Collaborative Challenges; Emergency Governance.

1. INTRODUCTION

In recent years, global climate change has intensified, leading to a trend of increasing frequency, scale, and complexity in major sudden disasters such as extreme rainfall, floods, and typhoons. Issues arising from these disasters-including material shortages, delayed response capabilities, and supply-demand mismatches-have become significant bottlenecks hindering the development of China's public safety governance and emergency response systems. The 20th National Congress of the Communist Party of China explicitly emphasized "prioritizing safety and prevention, and establishing a comprehensive security and emergency framework"^[1], shifting the focus of public safety governance from post-disaster reactive responses to proactive prevention, thereby charting a clear direction for reforming and optimizing China's emergency material support system. The "14th Five-Year Plan for Emergency Material Support" further advocates innovating reserve models by promoting market-oriented approaches such as government-enterprise joint reserves, production capacity reserves, and contractual storage agreements, aiming to build a modern emergency material reserve system characterized by "integration of disaster preparedness and response, government-enterprise collaboration, and efficient resource utilization." Government-enterprise collaborative

reserves have now emerged as a key approach to addressing shortcomings in traditional emergency mechanisms and enhancing disaster response capabilities^[2].

For a long time, China's emergency material reserves have primarily relied on a government-led physical storage model, which offers strong reliability and stability. However, prolonged implementation has revealed several structural shortcomings^[3]: the government-built storage infrastructure incurs high costs; the routine rotation mechanism for supplies is inflexible, leading to significant expiration losses and resource waste; additionally, government reserves suffer from fixed storage capacities and insufficient production flexibility, making them inadequate for meeting sudden, large-scale demands during major disasters or complex emergency scenarios. In contrast, market-driven enterprises possess specialized storage resources, flexible production capabilities, robust logistics networks, and competitive operational advantages. Government-enterprise collaborative reserves effectively integrate public security functions with corporate market strengths, achieving cost efficiency in daily operations and rapid supply replenishment during crises-effectively addressing the limitations of traditional models and representing an essential upgrade for modern emergency material management systems^[4].

A review of existing academic research reveals that scholars worldwide have conducted extensive studies on emergency material reserve models, reserve decision-making, subsidy policies, and dispatch optimization, providing substantial theoretical support for the development of government-enterprise collaborative reserves. However, most current research focuses primarily on technical aspects such as single-reserve model optimization, subsidy policy design, and material dispatch route planning^[5], with limited attention paid to specific scenarios involving major disasters. There is a lack of systematic, end-to-end analysis of the practical challenges, underlying causes, and governance shortcomings in government-enterprise collaborative reserve operations, particularly regarding core coordination issues including multi-stakeholder interest conflicts, information barriers, fragmented responsibilities, and imbalance between incentives and constraints.

Based on this, drawing on China's unique emergency management context and the ongoing development of major disasters, this paper employs principal-agent theory and multi-stakeholder game theory to systematically examine the comprehensive challenges in the coordinated operation of government-enterprise emergency reserves, deeply analyze the underlying mechanisms behind these challenges, address the fragmented nature of existing research, and provide robust theoretical support and practical guidance for optimizing government-enterprise collaborative reserve strategies, establishing long-term incentive mechanisms, and improving the modern emergency supply system.

2. THE CORE ENTITIES AND OPERATIONAL LOGIC OF COLLABORATIVE EMERGENCY RESERVE MANAGEMENT BETWEEN GOVERNMENT AND ENTERPRISES DURING MAJOR DISASTERS

2.1. Composition of Collaborative Entities and Core Functional Roles

The government-enterprise emergency reserve coordination system is a composite governance framework involving multiple stakeholders, with its core participants comprising two key entities: government regulatory authorities and market-based collaborative enterprises. However, constrained by the unique external conditions of major disasters, these entities exhibit significant differences in functions, objectives, and demands, giving rise to distinct behavioral patterns that form the underlying basis for subsequent coordination challenges.

2.1.1. Government Entities

The government framework comprises emergency management departments at national, provincial, municipal, and county levels, working in coordination with supporting agencies including

development and reform, finance, industry and information technology, and transportation. These entities serve as the coordinating authorities, rule-makers, regulatory supervisors, and policy enforcers for government-enterprise collaborative reserve systems. Specifically, emergency management departments oversee emergency supply reserve planning, establish government-enterprise storage standards, issue disaster warnings, and coordinate unified material distribution during emergencies; finance departments handle reserve subsidy disbursements, compensation for post-disaster losses, and project funding support; industry and information technology departments select qualified storage enterprises and monitor their production capacity reserves and operational qualifications; transportation departments ensure cross-regional logistics and facilitate green channel operations for relief supplies. The core objective of this governance structure is to safeguard public safety, maximize disaster response capability^[6], guarantee adequate supply, equitable allocation, and efficient response mechanisms, with public benefit maximization as the fundamental principle – reflecting strong public service orientation and social responsibility.

2.1.2. The Enterprise Entity

Enterprise entities primarily consist of three core market players: emergency supply manufacturers, specialized warehousing and logistics companies, and civilian commerce distributors, serving as the primary implementers and resource providers for government-enterprise joint reserve systems. Manufacturing enterprises are responsible for maintaining emergency material production capacities, ensuring regular supply generation, and expanding production capacity for post-disaster replenishment; warehousing companies manage routine storage, categorized storage management, periodic rotation, and inventory maintenance of stored materials; logistics and distribution firms handle material outbound operations, transportation, delivery, and final distribution. Leveraging their specialized storage capabilities, flexible production capacities, and mature logistics supply chains, enterprises complement government reserve resources. As market-oriented entities, their primary objectives are economically-driven, focusing on reducing additional costs associated with warehouse management, material rotation, and emergency allocation^[7], while seeking stable policy subsidies, tax incentives, and support measures while mitigating economic losses and operational risks arising from disaster-related emergency requisitions.

2.1.3. External Disaster Environment

Major extreme disasters such as severe floods, heavy rainfall, and typhoons create unique external scenarios for government-enterprise collaboration and represent a key factor distinguishing them from routine material reserves. These disasters are characterized by sudden onset, short warning windows, abrupt surge in material demand, supply-demand imbalances, frequent communication and transportation disruptions, strong cross-regional coordination needs, and stringent requirements for maintaining material quality and timeliness, significantly increasing the challenges associated with material storage, allocation, and replenishment. While this external environment does not directly participate in collaborative operations, it comprehensively constrains government-enterprise cooperation models, decision-making processes, and implementation efficiency, amplifying inherent management gaps and systemic shortcomings, thereby serving as a critical external trigger for conflicts in government-enterprise collaboration and governance failures.

2.2. Logic and Operational Mechanisms for Full-Cycle Collaborative Operations

The collaborative reserve system for emergency supplies between government and enterprises is not a short-term collaboration at a single stage, but rather a dynamic operational framework spanning the entire lifecycle—from routine pre-disaster stockpiling and emergency allocation during disasters to comprehensive post-disaster evaluation. Each phase has distinct operational objectives, collaborative responsibilities, and defined authority boundaries, forming a complete closed-loop mechanism for government-enterprise coordination.

2.2.1. Pre-disaster Routine Reserve Cooperation Phase

The primary objective of this phase is to strengthen the foundation of material reserves, achieving "constant availability during normal times and rotation based on demand," thereby establishing a robust preliminary safeguard for disaster emergency response. The government develops an annual emergency material reserve plan tailored to regional disaster risk characteristics, population size, and emergency demand standards, specifying key requirements such as product categories, reserve volumes, quality specifications, and rotation cycles. Through public selection processes and qualification reviews, partner storage enterprises are identified; standardized government-enterprise storage cooperation agreements are signed, and enterprises receive regular fiscal subsidies and policy support corresponding to their reserve levels. Enterprises fulfill contractual obligations by procuring emergency supplies, managing storage, conducting periodic quality inspections, and rotating stock batches, ensuring adequate reserves while maintaining flexible production capacity to maintain stable inventory levels and meet quality standards. This phase features a collaborative model centered on routine compliance, daily oversight, and information reporting, emphasizing long-term stable cooperation.

2.2.2. Emergency Response Coordination Phase During Disasters

The primary objective of this phase is to respond swiftly to disaster needs by achieving "instant dispatch, rapid supply, and precise matching," thereby minimizing delivery delays. Upon issuance of a major disaster warning or official disaster occurrence, government emergency management authorities initiate tiered emergency responses ^[8]based on disaster severity, affected areas, and material shortages, issuing supply allocation orders to partner enterprises under storage agreements. Enterprises must unconditionally cooperate with emergency coordination efforts, promptly completing inventory checks, outbound shipments, and loading operations, while utilizing their own logistics networks or coordinated green channels with transportation authorities to deliver relief supplies precisely to affected locations. In extreme scenarios with significant shortages, the government collaborates with manufacturers to activate emergency production expansion mechanisms, mobilizing flexible production capacities to continuously replenish relief supplies and address acute shortages. This phase of government-enterprise collaboration is characterized by urgency, compulsion, and high dynamism, operating under a framework of centralized government coordination and full corporate cooperation.

2.2.3. Post-disaster Long-term Review and Collaboration Phase

The core objectives of this phase are to quantify losses, implement compensation, conduct post-disaster reviews and optimizations, and establish a sustainable collaborative mechanism. Upon completion of disaster response efforts, the government, in collaboration with financial and audit authorities as well as partner enterprises, jointly assess various emergency expenditures-including quantities of supplies allocated during the disaster period, material losses, storage losses, expedited logistics costs, and production expansion costs. In accordance with policy standards and contractual agreements, they process fund compensation and subsidy settlements for enterprises to safeguard their legitimate rights and interests. Concurrently, government and enterprises jointly conduct post-disaster reviews of emergency reserves, identifying issues such as insufficient supply reserves, delayed allocation, and supply-demand mismatches identified during the disaster response collaboration. This enables dynamic optimization of reserve planning, storage standards, and cooperation mechanisms for subsequent phases, facilitating iterative upgrades to the government-enterprise collaborative reserve system and establishing a virtuous cycle of "reserves → allocation → review → optimization."

3. FOUR MAJOR CORE CHALLENGES IN GOVERNMENT-ENTERPRISE COLLABORATIVE RESERVE OPERATIONS UNDER MAJOR DISASTER SCENARIOS

3.1. The Heterogeneity of Core Objectives Creates Dilemmas in Interest Competition, Fostering Corporate Free-riding and Speculative Behaviors.

The fundamental root of conflicts in government-enterprise collaborative reserve systems lies in inherent structural disparities between the value objectives and interest demands of governments and enterprises. The inherent conflict between public welfare attributes and market-driven profit motives continuously leads to disorderly interactions among multiple stakeholders under conditions of imperfect information and contractual frameworks. Government emergency material reserves prioritize public safety, aiming to maximize social benefits while minimizing disaster losses—a mission characterized by public welfare and mandatory nature. In contrast, enterprises as market entities incur various costs associated with storage, rotation, and emergency production when participating in reserves, while also facing hidden risks such as material depletion and loss of business opportunities; insufficient compensation further weakens their willingness to participate. This goal divergence creates a prisoner's dilemma across both routine reserves and disaster response phases: During routine reserves, many companies falsify inventory levels to cut costs, simplify maintenance procedures, and fulfill obligations perfunctorily, fostering a free-rider mentality that relies on government and peer enterprise reserves rather than proactive investment. During disasters, when supply-demand tensions arise and prices surge, some enterprises engage in speculative practices—prioritizing high-priced civilian markets, delaying government allocation orders, and inflating relief supplies prices. If routine subsidy standards remain inadequate, disaster-related loss compensation is absent, and penalties for breaches are insufficient, reduced reserve investments, passive cooperation, and profit-seeking become optimal corporate choices, ultimately undermining the effectiveness of government-enterprise collaborative reserves in disaster prevention and relief efforts.

3.2. The Comprehensive Information Asymmetry Dilemma Significantly Undermines the Precision of Coordinated Disaster Response Scheduling.

The government-enterprise emergency reserve mechanism operates under a classic principal-agent relationship characterized by information asymmetry. Enterprises possess exclusive knowledge of inventory levels and production capacities, while disasters are inherently sudden and dynamic, creating fragmented information across demand, supply, and disaster scenarios – a key obstacle to inefficient and inaccurate resource allocation. On one hand, disaster needs cannot be accurately predicted; grassroots units lack intelligent assessment tools, making it difficult to precisely identify material shortages in different regions and time periods, leading to overly broad reserve and distribution orders that often result in either excess or shortage of supplies. On the other hand, corporate supply information lacks transparency: most companies fail to update inventory, production capacity, and logistics data in real time, with some deliberately concealing issues like insufficient stock or expired materials, leaving government oversight and disaster response planning without reliable data support. Furthermore, disasters frequently disrupt communications and transportation networks, causing delays in transmitting real-time disaster updates and delivery progress information, which leads to redundant shipments, material accumulation, and supply gaps in critical affected areas, significantly compromising the precision and efficiency of emergency response efforts.

3.3. The Incentive and Constraint Mechanism Exhibits a Two-way Imbalance, with a Lack of a Sustainable Collaborative Framework between Government and Enterprises.

The current emergency reserve system for government and enterprises relies heavily on administrative control, while market-based incentive mechanisms remain inadequate. This creates a dual imbalance characterized by insufficient positive incentives and weak negative constraints, making it difficult to establish a stable, long-term collaborative framework. In terms of positive incentives, funding relies solely on standardized annual fiscal subsidies without differentiated allocations based on disaster risks, reserve levels, or relief contributions. Subsidies only cover routine maintenance costs, lacking dedicated support for additional expenses such as emergency production, logistics, and material depletion. Post-disaster compensation approval processes are cumbersome, fund disbursement is slow, and comprehensive supporting policies-including tax reductions, recognition programs, and credit incentives-are insufficient, resulting in low corporate engagement motivation. Regarding negative constraints, there are no stringent penalties for violations like false reserves, delayed allocation, or breach of commitments; only flexible measures like interviews and written reminders are employed, with minimal penalties for non-compliance. Moreover, routine reserves and emergency incentives lack tiered design, failing to reward proactive capacity expansion or excess supply during disasters. This has led to a persistent pattern of passive compliance during normal times and passive waiting during crises.

3.4. The Boundaries of Authority and Responsibilities are Unclear, Resulting in a Fragmented Collaboration Across Multiple Levels and Departments.

The management of major disaster relief supplies constitutes a systemic project spanning multiple administrative levels, departments, and stakeholders. Currently, there exist ambiguous delineations of responsibilities among vertical tiers, horizontal departments, and both government and enterprises, leading to fragmented collaborative governance and frequent buck-passing or procedural bottlenecks during disaster response. Vertically, inconsistent reserve management standards and dispatch authority across central, provincial, municipal, and county levels, coupled with varying daily supervision requirements, increase operational burdens for enterprises. Cross-regional allocation processes face unclear division of responsibilities between superior and subordinate governments as well as neighboring authorities, while grassroots units lack effective capacity to coordinate supply resources. Horizontally, departments such as emergency management, finance, industry and information technology, and transportation operate in silos without coordinated mechanisms: emergency agencies manage dispatch but lack financial authority; finance departments handle subsidies without access to frontline needs; routine qualification reviews and subsidy approvals take prolonged periods; disaster-era transport green channels and emergency resource mobilization lack rapid coordination mechanisms, delaying critical rescue timelines; and government-enterprise storage agreements contain vague provisions regarding allocation timelines, loss distribution, liability penalties, and post-disaster compensation, resulting in undefined responsibilities and mutual buck-passing during shortages, delivery delays, or economic losses – further exacerbating governance failures.

4. ANALYSIS OF THE INTERNAL MECHANISMS BEHIND THE FORMATION OF DIFFICULTIES

The four major collaborative dilemmas identified earlier-interest conflicts, information asymmetry, imbalance between incentives and constraints, and fragmented authority and responsibilities-are not isolated surface-level issues; rather, they represent the concentrated manifestation of multiple deep-seated contradictions within China's government-enterprise collaborative reserve system for

emergency disaster relief supplies, spanning its structural framework, institutional design, governance logic, and scenario adaptability. By applying principal-agent theory, evolutionary game theory, and public governance theory, we can systematically analyze the underlying mechanisms of these dilemmas from four dimensions: structural differentiation of stakeholder interests, information barriers in principal-agent relationships, misalignment between institutional incentives and constraints, and fragmented hierarchical governance, thereby clarifying the causal pathways and transmission mechanisms behind various collaborative failures.

4.1. Structural Differentiation of Principal Interests

The collaboration between government and enterprises in emergency reserve management spans two distinct domains: public emergency governance and market-oriented operations. The fundamental differences in their respective roles determine that their objective functions cannot fully align, which constitutes the root cause of all collaborative challenges. As the primary actor in public governance, the government prioritizes social safety as its core mission, emphasizing the public welfare, fairness, stability, and emergency responsiveness of supply systems while minimizing economic cost constraints. In contrast, enterprises, as market-driven entities, focus on profit maximization and risk minimization. Their participation in emergency reserves entails persistent costs including storage, maintenance, capital allocation, material depletion, and emergency response coordination. Moreover, major disaster relief services exhibit significant positive externalities, making it difficult for enterprises to obtain equivalent returns through market mechanisms. Without a robust interest-balancing mechanism, corporate social responsibility motivations prove weaker than profit-driven incentives. Consequently, behaviors such as passive compliance, false reserve reporting, reduced investment during routine reserves, speculative profit-seeking, and inadequate cooperation during emergencies become rational market choices, ultimately creating a game-theoretic dilemma characterized by conflicting objectives and behavioral divergence between government and enterprises.

4.2. Information Barriers in Principal-Agent Relationships

The government-enterprise emergency reserve mechanism represents a classic multi-task principal-agent relationship: the government acts as the principal, responsible for policy formulation, subsidy distribution, and overall coordination; while enterprises serve as agents, tasked with material storage, maintenance, and emergency supply – inherently creating an information asymmetry. Enterprises possess exclusive knowledge of actual inventory levels, material quality, rotation schedules, production capacity, and logistics capabilities, holding a clear informational advantage. Conversely, governments lack comprehensive, real-time monitoring of enterprises' routine reserve practices, material management standards, and actual storage capacities, placing them at an informational disadvantage. Under conditions of incomplete contracts, opaque information, and inadequate oversight, this framework easily gives rise to moral hazards and adverse selection issues: less qualified or unwilling enterprises may deliberately conceal deficiencies to fraudulently obtain storage credentials; partner companies exploit information gaps to lower reserve requirements and evade responsibilities. These dynamics ultimately lead to regulatory failures, compromised reserve quality, inaccurate disaster response planning, and severe information barriers coupled with supply-demand mismatches.

4.3. Misalignment between Institutional Incentives and Constraints

China's current governance of government-enterprise emergency reserve systems remains rooted in traditional administrative control frameworks. Institutional designs prioritize administrative mandates over market principles, emphasizing mandatory obligations while neglecting incentive mechanisms, resulting in a severe mismatch between incentives and constraints. On one hand,

incentive mechanisms are homogenized, universalized, and static; no differentiated dynamic incentive system has been established linked to enterprises' reserve contributions, emergency response efforts during disasters, or disaster risk levels, failing to compensate for routine reserve costs and additional operational losses during crises, thereby undermining long-term motivation for corporate participation in collaborative reserves. On the other hand, constraint mechanisms are lax, penalty standards are ambiguous, and default costs are minimal-there are no stringent penalties for violations such as false reporting of reserves, delayed allocation, or refusal to comply, rendering institutional constraints ineffective. Insufficient incentives lead enterprises to "shirk responsibilities," while inadequate constraints encourage violations-a dual systemic flaw that hinders the establishment of sustainable government-enterprise collaboration mechanisms.

4.4. Fragmentation of Multi-level Governance Structures

The provision of disaster relief supplies constitutes a complex public affair spanning multiple administrative levels, departments, and regions, demanding exceptional integrity, coordination, and unified governance. However, the current emergency management system suffers from significant vertical fragmentation and horizontal departmental isolation: there is no uniformity in reserve standards, allocation authority, or evaluation criteria between different government tiers; jurisdictional boundaries remain ambiguous; and cross-regional resource coordination lacks clear accountability frameworks and compensation mechanisms. Horizontally, functional departments-including emergency management, finance, industry and information technology, and transportation-operate independently with insufficient collaboration, resulting in lengthy approval processes, ineffective resource allocation, and pronounced departmental silos. Furthermore, government-enterprise storage agreements feature vague terms and unclear responsibilities, lacking detailed provisions for performance standards, loss liability, breach penalties, and post-disaster compensation in extreme disaster scenarios. The absence of unified regulatory frameworks for routine management and emergency response has ultimately led to fragmented coordination, operational bottlenecks, and widespread buck-passing among stakeholders.

In summary, the challenges in government-enterprise collaborative resource allocation stem from a combination of multiple factors: fundamental contradictions among stakeholders, information barriers as a prerequisite, institutional misalignment at the core, and fragmented governance frameworks as supporting conditions. Relying solely on single-dimensional process improvements or minor policy adjustments cannot fundamentally resolve these coordination failures. Systematic reforms across four dimensions-redefining stakeholder interests, establishing integrated information systems, optimizing incentive mechanisms, and restructuring accountability frameworks-are essential to transform government-enterprise collaboration from passive cooperation to proactive synergy, and from superficial coordination to substantive co-governance.

5. COLLABORATIVE OPTIMIZATION PATHS AND RECOMMENDATIONS

Building on the analysis of various challenges and underlying mechanisms in government-enterprise collaborative disaster preparedness outlined earlier, and based on China's practical experience in emergency management, this study proposes actionable improvement strategies focused on aligning interests, enhancing information sharing, refining institutional frameworks, and clarifying responsibilities, thereby establishing a comprehensive optimization framework.

5.1. Establish a Hierarchical, Differentiated Dynamic Incentive Contract to Coordinate the Interests between Government and Enterprises

To address issues of corporate speculative behavior and perfunctory performance stemming from divergent objective goals, homogeneous incentives, and inadequate disaster compensation, a two-

way contractual framework comprising "regular basic incentives + special disaster-specific incentives + differentiated penalties" has been established. Daily subsidies are granted on a tiered basis according to enterprise reserve scale, material categories, and performance quality, with prioritized support allocated for critical materials and high-priority supplies; dedicated compensation mechanisms have been introduced for disaster-related production expansion, cross-regional assistance, and material depletion, accompanied by streamlined claim approval procedures; multiple incentive measures-including tax benefits, credit score enhancements, and project prioritization-are integrated to boost corporate participation motivation. Simultaneously, incentive parameters have been optimized to dynamically align subsidy standards and incentive levels with disaster risks and corporate contributions, providing a solid design foundation for the game-theoretic incentive model.

5.2. Establish a Digital Information Sharing Platform to Address the Issue of Information Asymmetry

Leveraging big data and the Internet of Things, an integrated smart reserve platform for both government and enterprises has been established^[9], creating a comprehensive information channel covering demand, inventory, production capacity, and dispatch management. An intelligent disaster assessment module is implemented, utilizing historical disaster records, demographic data, and meteorological information to accurately predict material shortages and refine reserve allocation and distribution plans; enterprises are required to upload real-time inventory, production capacity, and logistics data, enabling round-the-clock dynamic government monitoring; a disaster-response coordination module has been added to synchronize disaster conditions, shortage levels, and delivery progress, eliminating information delays across regions and departments, reducing material misallocation and redundant transfers, and providing a data foundation for information verification, simulation, and quantitative analysis.

5.3. Reconstruct the Multi-level System of Authority and Responsibilities, and Standardize Contractual Constraints

To address the fragmentation of collaboration caused by hierarchical divisions, departmental barriers, and ambiguous rights and responsibilities in storage agency agreements, governance mechanisms will be streamlined through three key measures: unifying reserve standards, assessment criteria, and dispatch authority at provincial, municipal, and county levels while clarifying cross-regional allocation responsibilities and compensation rules; establishing regular coordination mechanisms among emergency management, finance, industry and information technology, and transportation departments to streamline routine approvals and establish expedited channels for disaster-related transportation and funding; revising standardized storage agency contracts by incorporating core provisions such as disaster allocation timelines, loss allocation mechanisms, liability for breach of contract, and post-disaster compensation, thereby defining clear responsibilities for both parties and providing institutional support for related research on accountability frameworks.

5.4. Improve the Integrated Disaster Prevention and Response Operation Mechanism to Enhance Emergency Adaptability and Resilience

Transform the conventional single reserve operation model to establish a disaster response conversion system featuring dynamic rotation, flexible capacity allocation, and rapid dispatch capabilities. Dynamically adjust material rotation frequencies during high-risk disaster periods while balancing reserve quality with corporate costs; implement a dual model combining physical reserves and production capacity reserves, establishing clear agreements with manufacturers regarding emergency production expansion scales, timelines, and compensation standards to address immediate material shortages during disasters; differentiate between routine management procedures and disaster

response protocols, introduce an exemption mechanism for major disaster allocation approvals, shorten emergency distribution response times, and meet stringent disaster relief requirements.

6. SUMMARY

Against the backdrop of frequent global extreme disasters, enhancing the government-enterprise collaborative emergency supply reserve system represents a key approach to implementing the concept of comprehensive security and emergency management and advancing modern emergency governance. This paper focuses on the challenges in joint government-enterprise reserve operations, identifying four core issues: imbalance in interest dynamics, information asymmetry, ineffective incentive mechanisms, and fragmented responsibilities. Drawing on theories such as principal-agent theory and multi-stakeholder interaction analysis, it examines the underlying mechanisms, clarifies how various factors interact to cause coordination failures, and addresses the lack of systematic analysis in existing research.

Research indicates that the failure of government-enterprise collaboration stems from the conflict between public welfare and market-oriented attributes, the mismatch between administrative regulation and market-based reserve mechanisms, and the inadequacy of conventional systems in addressing extreme disasters; relying solely on administrative coercion cannot address the root cause. Only by balancing public safety requirements with corporate operational needs and systematically optimizing four aspects-interest coordination, information sharing, incentive mechanisms, and division of responsibilities-can we transform superficial, ad hoc cooperation into sustained, deep collaboration between governments and enterprises, thereby establishing a modern reserve governance model that balances disaster preparedness and mitigation while sharing risks and benefits. The findings of this study provide actionable insights for domestic emergency reserve practices, enrich relevant theories on emergency collaborative governance, and advance the modernization of emergency management.

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