

Disaster Gastronomy in Earthquake-Prone Contexts: A Three-Phase Framework for Culinary Higher Education and Emergency Feeding

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Abstract- Earthquakes can disrupt food access, water supply, transport, storage, food preparation and the institutional routines that support mass feeding. The 2023 Kahramanmaraş earthquakes in Türkiye exposed the operational complexity of emergency nutrition and showed the value of coordinated kitchens, qualified food-service personnel and locally anchored supply networks. Gastronomy and culinary arts programs already teach several capabilities that become critical in this setting, including high-volume production, food safety, menu planning, resource control and kitchen organization. Their potential role in disaster preparedness and emergency feeding requires a dedicated conceptual structure. Building on emerging work on disaster gastronomy and disaster-oriented culinary education, this paper develops an institution-level framework linking culinary higher education with disaster preparedness, emergency feeding and post-disaster learning. A conceptual framework development approach combines the disaster phase literature, tourism and hospitality crisis management, emergency food-supply research, higher-education disaster risk reduction research and evidence from the 2023 Türkiye earthquake response. The resulting model contains three connected phases: pre-disaster preparedness, disaster-response feeding and post-disaster recovery and learning. Four capabilities run across the three phases: food safety and nutrition, logistics and resource readiness, inter-organizational coordination and trained human capacity. The framework positions gastronomy departments as potential preparedness infrastructure within universities and local disaster systems. It also translates the model into curriculum modules, simulation exercises, activation protocols and assessment indicators. The paper provides an empirically assessable structure for pilot implementation in culinary higher education and establishes an agenda for evaluating operational feasibility, nutritional performance, coordination quality and institutional learning.

Keywords- disaster gastronomy; emergency feeding; gastronomy education; disaster preparedness; higher education; earthquake; food logistics

I. INTRODUCTION

Disaster response quickly becomes a food problem. People need safe water, adequate energy, suitable meals, reliable distribution and food that can be prepared under unstable conditions. A damaged road network can isolate suppliers. Power failures can interrupt refrigeration. Water disruption can compromise hygiene. Population displacement can change the number, location and dietary profile of people requiring meals within hours. Emergency feeding therefore combines food production with logistics, sanitation, nutrition, communication and coordination.

Türkiye offers a strong setting for examining this problem because seismic exposure intersects with a large higher-education system and a substantial hospitality and gastronomy education sector. The earthquakes of 6 February 2023 affected eleven provinces directly and placed exceptional pressure on local food systems and emergency feeding operations. Research conducted after the earthquakes has documented nutritional gaps, food-safety concerns, coordination problems and supply constraints. Tezel and Tanyaş describe disaster nutrition logistics as a coordinated field involving public agencies, humanitarian organizations and operational supply networks [1]. A rapid assessment in Malatya found shortfalls in several nutrients and identified weaknesses across food provision, preparation, safety and dining conditions [2]. Güldemir and Hızlı-Güldemir examined the operation of a disaster kitchen in Hatay and reported both large-scale meal production and constraints related to supply and menu diversity [3]. More recent evidence from Kahramanmaraş and Hatay links food access, perceived food safety and nutritional status among earthquake survivors [4]. These studies make the central operational point clear: emergency feeding requires more than available food. It requires prepared people and organized systems.

Gastronomy and culinary arts programs possess capabilities that fit this operational problem. Students and instructors work with food-safety procedures, production planning, recipe scaling, menu design, procurement, storage, kitchen workflow and team coordination. Professional kitchens also cultivate time-sensitive decision making under resource constraints. Chef professionalism also encompasses ethical judgement, responsibility for production quality, staff conduct and relationships with suppliers [18]. Within disaster gastronomy, these professional responsibilities extend to food safety, resource use and coordinated culinary decision making under emergency conditions. These skills can acquire a second public function during emergencies when they are connected to disaster governance and field logistics.

Practice already offers examples of culinary expertise entering disaster response. World Central Kitchen mobilizes chefs, restaurants, field kitchens and local supply networks to provide freshly prepared meals after crises [5]. Its Chef Corps formalizes a network of culinary professionals who can connect local knowledge and food-service capacity with rapid response operations [6]. Mercy Chefs similarly uses professional chefs, mobile kitchens and community kitchens for emergency and

longer-term feeding [7]. Florida International University has moved this connection into higher education through an emergency feeding logistics program that covers field kitchens, food safety, volunteer management, menu scaling, Incident Command System coordination and optional field simulation [8]. A 2026 FIU disaster exercise also brought hospitality students into a multi-agency response simulation [9]. These cases show an operational pathway from culinary competence to disaster feeding.

Prior research has already positioned disaster gastronomy within culinary higher education through a proposed disaster-kitchen management course [20]. The remaining gap concerns institutionalization: existing work has yet to specify how curriculum, kitchen assets, trained personnel, activation rules, external agreements, response operations and post-event learning can be integrated at department level. The present framework addresses this gap by treating the gastronomy department as the unit of analysis and by linking educational capacity to operational preparedness across the disaster cycle. The existing research streams approach adjacent units of analysis. Disaster studies organize preparedness, response and recovery [10]. Tourism and hospitality crisis research develops organizational crisis frameworks and emphasizes proactive planning, response and post-crisis learning [11]. Emergency food-supply research addresses supply chains, coordination, nutrition and system design [12], [13]. Disaster risk reduction education research examines curriculum, institutional capacity, simulation and practitioner engagement [14], [15]. Each stream supplies part of the architecture. A gastronomy department needs a model that integrates these elements at the level of curriculum, staff and student preparedness, kitchen capacity and local coordination.

This paper develops that model. It defines disaster gastronomy as the organized use of culinary knowledge, food-service infrastructure and gastronomy education capacity across disaster preparedness, emergency feeding and recovery. The framework treats a university gastronomy unit as an educational institution with a potential operational function. Its educational function develops competencies before a crisis. Its operational function can support controlled feeding activities through pre-arranged protocols. Its learning function converts field experience into revised training, procedures and partnerships.

The paper asks how disaster-management, emergency-food and disaster-education concepts can be translated into an empirically assessable framework for gastronomy programs, with curriculum, simulation, coordination and assessment mechanisms suitable for pilot implementation.

II. CONCEPTUAL FOUNDATION

A. Disaster Phases as an Organizing Logic

Disaster management commonly uses preparedness, response, recovery and mitigation to organize action and responsibility. Neal's analysis treats these categories as practical analytical tools with overlapping boundaries [10]. Preparedness can continue during response, and recovery decisions can feed directly into the next cycle of training and mitigation.

This paper adapts that logic to a gastronomy department. Mitigation and preparedness are grouped under pre-disaster preparedness, where curriculum, staff readiness, inventories, kitchen procedures, training and agreements can be managed. Disaster-response feeding covers activation, production, safety, prioritization and coordination. Post-disaster recovery and learning cover transition, review, protocol revision and curriculum learning.

The three phases function as an organizing grammar. They give administrators, instructors and students a shared sequence for planning and training. The model also includes a feedback loop from recovery to preparedness. This loop reflects Neal's emphasis on overlap and iteration [10]. The sequence therefore supports administrative clarity and cumulative learning within the same structure.

Tourism and hospitality crisis research strengthens this choice. Casal-Ribeiro et al. reviewed 36 studies and identified fourteen crisis-management frameworks across tourism and hospitality [11]. Their synthesis shows recurring attention to pre-crisis planning, crisis management and post-crisis recovery, together with risk assessment, contingency plans, communication, evaluation and review. Several frameworks in that literature use cyclic or dynamic structures, and the review highlights proactive preparation as a recurring requirement. Gastronomy education belongs to the same broad service domain, with a more specific operational focus on food production and feeding. The transfer is therefore conceptually close enough to guide phase design and preserves room for food-specific capabilities.

B. Emergency Feeding as a Systems Problem

Emergency feeding operates as a system of interdependent tasks. Liu et al. developed a multidisciplinary emergency food-supply framework through a modified Delphi process and organized the problem around supply, management and professional coordination [12]. Their work shows that food availability, transport, storage, nutritional quality, stakeholder roles and information flow interact during emergency supply. A systematic review by Perdana et al. likewise treats food supply chains as critical infrastructure under disaster conditions and identifies resilience, food security, food safety and humanitarian supply as core concerns [13].

Evidence from the 2023 earthquakes provides a concrete test of these system requirements. Tezel and Tanyaş identify coordination and logistics as central features of the Türkiye disaster nutrition system [1]. The Malatya assessment by Kalyoncu Atasoy et al. found nutritional and environmental weaknesses across thirteen locations, including deficiencies in protein, fat, fibre, vitamin C, calcium and iron, along with elevated sodium in many settings [2]. Their qualitative assessment also identified issues in foods and beverages, preparation, food safety, dining areas and facilities. Güldemir and Hızlı-Güldemir report an emergency kitchen experience in Hatay that served approximately 15,000 people and encountered limitations in supply and storage that affected menu variety [3]. Çakır et al. later documented food-safety perceptions, access concerns and broad nutrient inadequacies among 209 earthquake survivors in Kahramanmaraş and Hatay [4].

These findings support four capabilities that remain relevant across all phases of the proposed model. The first is food safety and nutrition. Emergency meals require hygiene control, safe water, suitable storage, adequate energy and nutrient planning. The second is logistics and resource readiness. Production depends on ingredients, fuel, equipment, storage, transport

and supplier continuity. The third is inter-organizational coordination. Kitchen capacity becomes useful when it connects with the official disaster system, humanitarian organizations and local distribution points. The fourth is trained human capacity. Skilled production and safe service depend on people who understand their roles before activation.

The four capabilities also explain why gastronomy education has analytical relevance. Culinary programs already work with the first and fourth capabilities as part of normal professional training. They also teach elements of procurement, costing, stock management and production flow that feed into logistics. The central institutional task is formal connection with disaster coordination. The proposed framework makes that link explicit through pre-event agreements, communication protocols and activation criteria.

C. Higher Education as Preparedness Infrastructure

The Sendai Framework calls for disaster-risk knowledge to enter formal and professional education and emphasizes preparedness, governance, capacity and recovery [16]. Higher education can therefore contribute through teaching, training, research and institutional partnerships. Scolobig and Balsiger's review of disaster risk reduction and climate adaptation in higher education identifies interdisciplinary teaching, practitioner engagement, practice orientation and institutional anchoring as important features of contemporary programs [14]. Their analysis also points to fragmentation across departments and uneven institutional support, which makes program-level design especially important.

Guo et al. reviewed 95 studies on disaster preparedness education and identified models, frameworks and innovative educational approaches as major themes [15]. Simulation appears repeatedly across preparedness education because it creates a controlled environment for practicing communication, role allocation and response procedures. The educational principle matters for gastronomy. Culinary learning already relies heavily on applied practice. A disaster-feeding simulation can therefore be integrated into an established pedagogical culture based on kitchens, production tasks and supervised performance.

FIU provides a current institutional example through an emergency feeding program that combines incident feeding, logistics, nutrition, sanitation, volunteer management and field simulation [8], [9]. The example aligns with the higher-education emphasis on practitioner engagement and practice-oriented preparedness [14].

The higher-education dimension expands the meaning of preparedness. A gastronomy program can prepare its own people, map its facilities, define activation procedures and teach transferable emergency-feeding competencies. It can also act as a knowledge node that links culinary practice with public institutions, humanitarian organizations and community food systems. This role fits the Sendai emphasis on education, capacity building and cross-sector collaboration [16].

D. Defining Disaster Gastronomy

Building on prior use of disaster gastronomy within culinary education [20], the concept is operationalized here as an applied field concerned with the planning, preparation, production, distribution and institutional learning processes through which culinary knowledge, educational infrastructure and trained human capacity support safe, nutritionally adequate and culturally appropriate feeding across the disaster cycle. Within this framework, its distinctive analytical focus is the conversion of routine culinary competencies and educational kitchen assets into pre-arranged emergency-feeding capacity through training, governance, resource mapping and inter-organizational coordination.

The definition contains three levels. The first level is culinary. It includes production, hygiene, menu design, sensory acceptability, dietary adaptation and service. The second level is operational. It includes supply, equipment, staffing, communication, distribution and coordination. The third level is educational. It includes curriculum, simulation, competency development, reflective learning and institutional memory.

This framing also gives gastronomy a public-service dimension grounded in its own professional knowledge. Disaster gastronomy uses the discipline's existing technical core and extends its application to an emergency environment. The framework therefore remains recognizably gastronomic and interacts with nutrition, logistics, disaster management and public administration.

III. METHOD

A. Conceptual Framework Development

The study adopts a theory-synthesis approach to conceptual framework development, integrating concepts from multiple research streams to construct an explanatory and operational architecture for gastronomy higher education. Following established guidance for conceptual research, the design makes explicit the source domains, the role of each literature and the logic through which concepts are translated into framework components [21], [22]. The source set was purposive and theory-building in function, with selection driven by conceptual relevance and convergence across distinct evidence domains. The evidence base consists of published research and official organizational documents. The output is a model for later pilot testing.

The design followed three steps. Step one established the temporal architecture. Neal's disaster-phase analysis [10] supplied the general phase logic, and the tourism and hospitality crisis-management synthesis by Casal-Ribeiro et al. [11] supplied a sectorally close pattern of pre-crisis, crisis and post-crisis organization. These sources informed the three-phase structure.

Step two identified cross-phase operational capabilities. Liu et al. [12] and Perdana et al. [13] supplied concepts related to emergency food systems, supply continuity, coordination, safety and professional roles. Evidence from the Türkiye earthquake response [1]-[4] was then used to specify operational problems with direct relevance to mass feeding, including nutritional adequacy, menu diversity, food access, storage and coordination.

Step three translated the resulting concepts into an educational institution. Scolobig and Balsiger [14], Guo et al. [15] and the Sendai Framework [16] informed the curriculum, simulation, practitioner engagement and institutional-capacity elements. FIU provided a documented practice example for emergency feeding education and simulation [8], [9]. World Central Kitchen

and Mercy Chefs were used as practitioner examples for chef mobilization, local culinary networks, field kitchens and community-oriented feeding [5]-[7].

B. Source Verification and Inclusion Logic

Sources were verified through publisher pages, PubMed, DOI records, institutional repositories and official organizational pages. Program-specific and case-specific claims were retained when the cited source described the feature directly.

A candidate component was retained when at least two distinct evidence domains converged on the same functional requirement. Convergence was assessed at the level of the proposed framework component, and Table I records the evidence domains, recurring problem and resulting institutional translation for each retained component. This rule creates a visible chain from source concept to institutional action.

C. Conceptual Mapping

Table I summarizes the derivation logic. Each model component is connected to a problem observed in the literature and to a proposed educational or operational response.

TABLE I
CONCEPTUAL DERIVATION OF THE DISASTER GASTRONOMY FRAMEWORK

Framework component	Supporting evidence domains	Recurrent requirement	Framework translation
Three-phase architecture	Disaster-phase literature [10]; hospitality crisis frameworks [11]	Temporal organization and iterative learning	Preparedness → response → recovery/learning
Food safety and nutrition	Emergency-food systems [12], [13]; earthquake evidence [2]-[4]	Safe and nutritionally adequate feeding	Safety controls and menu standards
Logistics and resource readiness	Emergency-food systems [12], [13]; earthquake evidence [1], [3]; practice examples [5]-[9]	Supply continuity and operational capacity	Inventories, supplier maps and activation resources
Inter-organizational coordination	Emergency-food research [1], [12]; practice examples [5]-[9]	Multi-actor coordination	Agreements, communication and activation rules
Trained human capacity	Higher-education DRR [14], [15]; culinary disaster education [20]; practice examples [8], [9]	Role readiness	Curriculum, simulation and trained roster
Institutional learning	Disaster phases [10]; crisis management [11]; higher education [14], [15]	Feedback and adaptation	After-action review and protocol revision

The mapping yields one central proposition: a gastronomy department can become a more useful disaster-response partner when culinary competence, kitchen resources, external agreements and training are organized before activation. The proposition provides the conceptual core for the model presented in the next section.

IV. THE THREE-PHASE DISASTER GASTRONOMY FRAMEWORK

A. Model Architecture

The framework consists of three phases and four cross-phase capabilities. The phases are **preparedness**, **response feeding** and **recovery and learning**. Food safety and nutrition, logistics and resources, coordination and trained human capacity operate throughout the cycle. Figure 1 presents the basic structure.

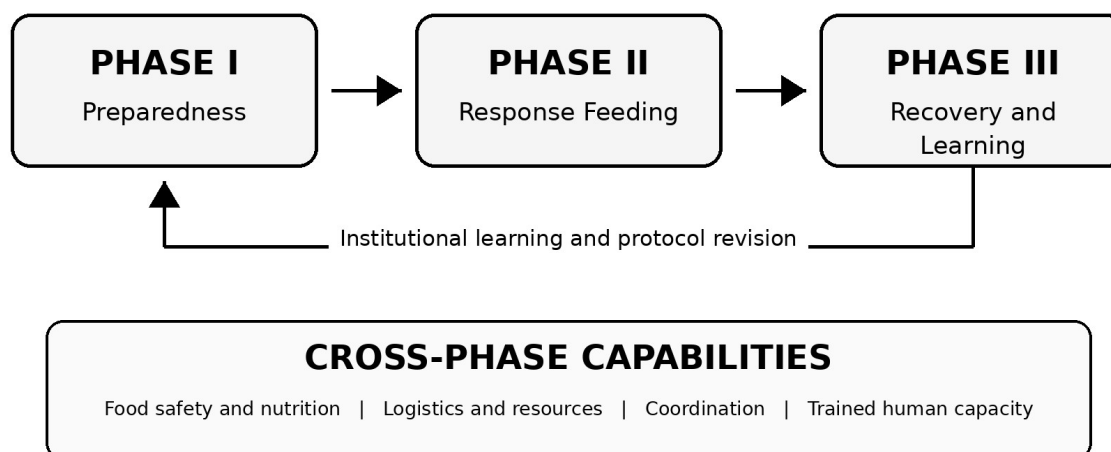


Fig. 1. Three-phase disaster gastronomy cycle: Preparedness → Response Feeding → Recovery and Learning → Preparedness. Cross-phase capabilities: food safety and nutrition; logistics and resources; coordination; trained human capacity.

The cycle starts during routine academic life. Preparedness builds the competencies, inventories, agreements and decision rules required for activation. Response feeding uses those prepared assets within the official or locally authorized disaster system. Recovery and learning review performance, support medium-term community feeding where appropriate and revise the next preparedness cycle. Because the framework is developed for earthquake-prone contexts, activation begins with post-event facility-safety clearance and rapid reassessment of water, electricity, refrigeration, transport access and aftershock-related operating risk. These earthquake-specific constraints determine the timing and scale of kitchen activation, while the underlying phase architecture may also be examined in other hazard contexts.

B. Phase I: Pre-Disaster Preparedness

Phase I converts ordinary educational capacity into planned emergency capacity. The phase has four components: curriculum integration, simulation, resource mapping and institutional agreements.

Curriculum integration gives students a basic emergency-feeding competence before a disaster occurs. A concise module can be embedded within existing courses such as food safety, quantity food production, menu planning, kitchen management and food-service operations. Prior work in disaster gastronomy has translated disaster-related kitchen requirements into course objectives for gastronomy and culinary arts education [20]. Complementing this educational perspective, competency-based research in culinary studies shows how an emerging professional requirement can be structured into explicit knowledge, skill and competency domains [19]. Drawing on these two strands, disaster-feeding requirements can be translated into defined learning outcomes and assessable competencies within culinary education. The present framework extends this curricular logic by connecting learning outcomes with simulation, institutional resources, activation procedures and external coordination. The same competency logic allows disaster feeding requirements to be translated into explicit learning outcomes within culinary education. The content can cover emergency kitchen organization, water and sanitation, safe storage during power interruption, high-volume recipe scaling, allergen and special-diet management, culturally appropriate menu design, waste control and communication within a response hierarchy. This approach fits the Sendai call for disaster-risk knowledge in professional education [16] and the higher-education emphasis on practice-oriented DRR curricula [14].

Simulation translates knowledge into coordinated performance. An annual exercise can assign students and instructors to a scenario with limited time, limited ingredients, a defined population, a disrupted utility environment and a distribution requirement. The exercise can include a changing information stream such as a refrigeration failure, a water restriction, an increase in meal demand or the arrival of a group with specific dietary needs. Assessment can focus on food safety, production flow, portion consistency, communication and documentation. Simulation also creates a space for debriefing, which turns mistakes into institutional learning [15].

Resource mapping identifies what the department can actually provide. The inventory should record production capacity, large equipment, portable equipment, refrigeration, dry storage, water access, generator access, transport options, serving equipment, packaging, sanitation supplies and available staff competencies. Supplier mapping should identify local wholesalers, producers, bakeries, water suppliers, fuel sources and transport partners. The purpose is operational realism. A response plan becomes credible when capacity is quantified before a crisis.

Institutional agreements connect the department with the wider disaster system. Universities can define internal links among the gastronomy unit, rectorate, emergency coordination office, health unit, procurement office and facilities management. External protocols can involve AFAD units, municipalities, the Turkish Red Crescent, local NGOs, food banks or authorized community organizations according to local governance arrangements. The agreement should state activation

authority, communication channels, volunteer status, liability, food-safety responsibility, supply ownership and distribution responsibilities. Tezel and Tanyaş's findings on disaster nutrition logistics make coordination a core design requirement [1].

A designated disaster gastronomy coordinator can manage the phase at department level. The role can remain within normal academic governance and receive support from a small preparedness committee. The coordinator maintains the volunteer roster, annual training schedule, resource inventory, partner contacts and after-action records.

C. Phase II: Disaster-Response Feeding

Phase II begins when the university and relevant disaster authorities authorize activation. Its logic is disciplined implementation under changing conditions. The department uses capacities prepared in Phase I and works within the local coordination structure.

The first component is activation and role assignment. The coordinator confirms facility safety, staff availability, utilities, transport access and official demand. Volunteers are assigned to production, sanitation, receiving, storage, packaging, documentation and distribution support according to prior training. A short operational briefing sets meal targets, service locations, dietary priorities, shift times and reporting lines.

The second component is safe production under constraint. Emergency kitchens operate with greater uncertainty in water, power, storage and supply. Food-safety controls therefore require visible operational status. Water source, cooking temperatures, hot and cold holding, cross-contamination controls, hand hygiene, waste removal and cleaning schedules should be documented in simplified field forms. The framework gives food safety equal status with production volume because increased output loses value when contamination risk rises.

The third component is nutrition and menu control. Evidence from Malatya, Hatay, Kahramanmaraş and other affected areas shows the importance of energy, protein, micronutrient quality, menu diversity and food access [2]-[4]. A response menu therefore needs a defined nutritional logic. The first days may require simple, high-throughput menus built around safe and available ingredients. As operations stabilize, menu planning can increase variety and incorporate fresh items where supply and storage permit. Nutrition criteria and medically relevant diet protocols should be established or validated with qualified nutrition and health professionals, while gastronomy teams translate these requirements into feasible menu design, production and service under emergency conditions.

The fourth component is logistics and supply visibility. Incoming food should be recorded by product, quantity, source, storage requirement and usable period. A simple consumption forecast can estimate daily requirements from planned meal numbers. Supplier diversity matters because a single disrupted route or supplier can quickly narrow the menu. Güldemir and Hızlı-Güldemir's experience in Hatay illustrates the practical connection between procurement constraints and menu variety [3]. The emergency food-supply literature similarly treats supply continuity and system coordination as core design areas [12], [13].

The fifth component is coordination and distribution. The kitchen should receive demand information from the recognized local coordination mechanism and report production capacity in return. This reduces duplicated service and improves coverage across service locations. Distribution planning should include travel time, food temperature, packaging, collection points and vulnerable groups. Kitchen decisions become part of a wider response chain, which gives information flow the same importance as cooking capacity.

D. Phase III: Post-Disaster Recovery and Learning

Acute feeding can continue for days or weeks, and community food needs can persist much longer. Phase III manages the transition from emergency production to recovery-oriented support and institutional learning.

The first component is transition planning. The department and partner agencies review whether meal demand is declining, moving geographically or changing in composition. Production can shift from a centralized emergency-kitchen mode toward community kitchens, local restaurant partnerships, targeted feeding or training support. The objective is continuity with local ownership. The Iwate case studied by Ito et al. shows how a food-support partnership and cooking activities contributed to local capacity, social connection and continued community-led activity after the Great East Japan Earthquake [17].

The second component is after-action review. Within a defined period after demobilization, the department records what occurred. The review should cover demand estimates, production volume, safety incidents, menu performance, supplier reliability, volunteer attendance, equipment problems, coordination delays, distribution issues and communication quality. The review can use shift logs, stock records, temperature forms, volunteer notes and partner feedback. The result is a concise operational learning report.

The third component is curriculum and protocol revision. After-action findings return to Phase I. A recurring storage problem may lead to new equipment planning. Handover gaps may lead to a revised shift form. A special-diet problem may lead to a new teaching module. A distribution delay may lead to an updated external protocol. This feedback function gives the model its cycle structure and makes recovery a source of preparedness knowledge [10].

The fourth component is community capacity support. Recovery offers a setting for gastronomy programs to contribute through training, safe food preparation guidance, community kitchen organization, local-product menu development and food-service entrepreneurship where local authorities and communities identify such needs. Ito et al. demonstrate how cooking activities and food-support partnerships can build social connections and local capability over time [17]. This function aligns culinary education with community resilience and keeps the university within an educational and technical support role.

E. Cross-Phase Capabilities

The four cross-phase capabilities keep the model coherent. Food safety and nutrition links curriculum, production and recovery. Logistics and resource readiness links inventory, procurement and supply adaptation. Coordination links university governance with external response systems. Trained human capacity links teaching with real-world role performance.

Table II translates the phases into operational actions and observable indicators.

TABLE II
PHASES, ACTIONS AND PROPOSED INDICATORS

Phase	Revised proposed indicators
Preparedness	Module completion rate; simulation competency score; inventory update status; status of partner protocols; proportion of roster members with current training
Response feeding	Meal output relative to target; proportion of food-safety checks meeting protocol; menu adequacy assessment; stock variance; documented supply disruptions; on-time delivery proportion; incident frequency
Recovery and learning	After-action review completion; corrective actions adopted; partner debrief completion; curriculum revisions documented; protocol revisions documented

The indicators are proposed measurement tools. Their validity, weighting and thresholds require empirical testing. A pilot program can refine them through expert review and field application.

V. IMPLEMENTATION IN GASTRONOMY HIGHER EDUCATION

A. A Minimum Curriculum Package

The model can enter a gastronomy program through a compact curriculum package that preserves the existing degree structure. A minimum package can include five learning outcomes. Students should be able to: explain the role of food service in disaster response; design a safe high-volume menu under resource constraints; organize a temporary kitchen workflow; apply food-safety controls under disrupted utility conditions; and work within a multi-agency coordination structure.

These outcomes can be distributed across existing courses. Food safety can address emergency water, temperature and sanitation scenarios. Quantity food production can address recipe scaling and throughput. Menu planning can address nutrition, cultural appropriateness and special diets. Purchasing and cost control can address supplier disruption and inventory visibility. Kitchen management can address roles, shifts, incident communication and field documentation. This distributed model treats disaster gastronomy as a competency thread across the curriculum.

B. Simulation Design

Simulation should resemble actual operational pressure under educational control. A useful annual drill can begin with a scenario card describing a local earthquake, damaged transport routes, intermittent electricity and an initial request for a specified number of meals. Student teams receive roles in procurement, production, sanitation, packaging, documentation and liaison. Instructors observe performance using a standardized rubric.

The scenario can evolve during the exercise. A supplier may report a delivery delay. A refrigeration unit may fail during the exercise. Meal demand may increase. A shelter may report a group requiring a modified menu. These changes test adaptability and communication. The exercise should end with a structured debrief that separates technical errors, coordination errors and planning errors. The debrief then produces two or three concrete revisions for the next training cycle.

The educational value lies in integration. Students connect food science, culinary technique, management and service in a single problem. The exercise also reveals the practical limits of the department's kitchen and staffing capacity before any emergency activation.

C. Governance and Activation Boundaries

A university kitchen can support disaster feeding only within clear governance arrangements. Institutional leadership retains authority over facility activation. Public disaster authorities and authorized humanitarian actors determine broader response priorities. Food production should follow applicable food-safety regulation and institutional risk procedures. Student participation requires defined supervision, training and duty limits. Student participation should be restricted to supervised roles matched to prior training, facility-safety status and institutional authorization. Eligibility, supervision, withdrawal and reassignment procedures should therefore be defined within the preparedness protocol before any activation.

These boundaries belong inside the model because they shape feasibility. The department should know who can authorize activation, who can request meals, who controls procurement funds, who accepts donated food, who supervises volunteers and who approves distribution destinations. Written answers reduce improvisation during the response phase.

A tiered activation system can help. Level 1 uses the gastronomy unit for campus support and training. Level 2 supports a local partner with staff, expertise or limited production. Level 3 activates sustained mass feeding through formal university and disaster-management authorization. Each level can have predetermined staffing, production and reporting requirements.

D. Pilot Evaluation

The framework should advance through pilot testing before wider institutional adoption. A first pilot can be completed as a simulation-based study in one gastronomy department. Baseline measures can assess student knowledge, perceived preparedness and practical competence. The simulation can generate process data on production time, food-safety compliance, communication errors, stock accuracy and role performance. A post-exercise debrief can collect qualitative feedback from students, instructors and external disaster professionals.

A second stage can compare repeated simulations across an academic year. This design would show whether revised protocols improve performance. A multi-university stage could then test contextual differences in kitchen size, staffing, regional hazard exposure and institutional partnerships. The research program can gradually move from educational validity to operational validity.

The model also supports several focused research questions. Researchers can examine whether simulation improves emergency-food competencies, which curriculum components predict practical performance, how supplier-network diversity affects menu stability, how students understand professional responsibility during disasters and which coordination structure produces the fastest and safest activation. These questions would give disaster gastronomy an empirical base grounded in measurable educational and operational outcomes.

VI. DISCUSSION

The proposed framework brings together literatures that usually operate at different levels. Disaster phase models organize time [10]. Crisis-management frameworks organize institutional action [11]. Emergency food-supply studies organize flow, resources and coordination [12], [13]. Higher-education disaster research organizes learning and institutional capacity [14], [15]. Earthquake nutrition studies show the operational consequences when food systems face severe disruption [1]-[4]. Disaster gastronomy connects these levels through a single unit of application: the gastronomy department. The framework proposes a capability-conversion mechanism: routine culinary competencies and educational kitchen assets become deployable emergency-feeding capacity when they are codified through training, resource mapping, activation rules and inter-organizational agreements. Recovery closes this mechanism by converting operational experience into revised preparedness.

The first contribution concerns unit of analysis. The framework identifies culinary higher education as a preparedness asset with observable components: curriculum, kitchen capacity, trained people, protocols and partnerships. This creates a specific research object at the intersection of gastronomy education and emergency feeding.

The second contribution concerns professional competence. High-volume production, hygiene, workflow, menu planning and resource control become response competencies when they are organized around emergency objectives. Practitioner organizations demonstrate this conversion in operational settings [5]-[7].

The third contribution concerns institutional learning. After-action review links recovery to the next preparedness cycle. Each simulation or field activation can therefore revise curriculum, procedures and partner agreements in line with the iterative logic of disaster-phase and crisis-management research [10], [11].

The fourth contribution concerns food quality within emergency logistics. Gastronomy adds preparation quality, menu acceptability, culinary adaptability and production organization to logistics. Evidence from the Türkiye earthquakes supports the importance of nutritional adequacy, food safety, access and menu diversity [2]-[4].

Several boundary conditions require empirical attention. Live operations add legal, infrastructural, ethical and psychological demands to the educational model. Kitchen scale, staff availability, student supervision and local governance also vary across institutions. Pilot studies therefore need contextual validation of activation levels and indicators.

Hazard type can change timelines, access patterns and kitchen requirements. Earthquakes create sudden disruption with minimal warning, and floods, wildfires and storms can create different activation conditions. Comparative studies can test which elements of the three-phase model remain stable across hazards.

Nutritional standards deserve a dedicated research stream. The framework currently treats nutritional adequacy as a core operational capability supported by disaster nutrition evidence [2]-[4]. Future work can develop menu standards for different phases of displacement, climates and population profiles. Collaboration among gastronomy, nutrition and public-health scholars would strengthen this part of the model.

Community recovery offers a further research line. Ito et al. show how food-related activities can strengthen social connection and local capability after disaster [17]. Gastronomy programs can examine community kitchens, local food networks and recovery-oriented culinary training within this phase.

VII. CONCLUSION

Disaster feeding depends on prepared people, safe production, reliable resources and coordinated action. Gastronomy higher education already develops many of the technical skills required for this work. The central task is to organize those skills within a disaster framework before an emergency occurs.

This paper defines disaster gastronomy and proposes a three-phase model for culinary higher education in earthquake-prone contexts. Pre-disaster preparedness integrates curriculum, simulation, resource mapping and institutional agreements. Disaster-response feeding activates trained teams, food-safety controls, menu planning, logistics and coordinated distribution. Post-disaster recovery and learning supports transition, community capacity, after-action review and revision of the next preparedness cycle. Food safety and nutrition, logistics and resources, coordination and trained human capacity connect all three phases.

The model offers a practical structure for universities and a research agenda for scholars. Its next stage is empirical. Pilot simulations can test learning outcomes and operational indicators. Repeated drills can test institutional learning. Multi-university studies can examine transferability. Carefully governed field partnerships can eventually test the framework under real response conditions. Through that progression, disaster gastronomy can develop from a conceptual proposal into an evidence-based area of culinary education and disaster preparedness.

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