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Editorial Note

Food Securing Pathways: Balancing Progress and Rising Inequalities

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The global struggle against hunger has reached a pivotal moment. For the first time since 2019, progress has been recorded: between 638 and 720 million people faced hunger in 2024, representing 8.2% of the global population—a slight decrease from 8.5% in 2023 and 8.7% in 2022. This decline is welcome, yet progress is uneven. Gains have been made in Southern Asia, Southeastern Asia, and South America, while hunger remains critically high in Africa, affecting more than one-fifth of the population, and continues to rise in Western Asia, where it reached 12.7% in 2024. Projections indicate that by 2030, 512 million people will still be chronically undernourished, underscoring the difficulty of achieving SDG 2 on zero hunger (UNICEF, 2025).

Beyond headline figures, systemic challenges remain daunting. In 2024, nearly 2.3 billion people were moderately or severely food insecure, and more than 2.6 billion could not afford a healthy diet. Nutrition outcomes reveal mixed trends: Child stunting declined to 23.2% in 2024, down from 26.4% in 2012, and exclusive breastfeeding rose to 47.8% in 2023 (UNICEF 2025). However, child obesity remains largely unchanged. Meanwhile, adult obesity is rising, affecting 15.8% of the global population, and anemia among women of reproductive age has increased to 30.7% (Yuan et al., 2024). The introduction of minimum dietary diversity as a global indicator in 2025 highlights that only one-third of children and two-thirds of women achieve adequate dietary quality (Aboagye, et al. 2021).

Economic pressures amplify these challenges. Global food inflation surged from 2.3% in late 2020 to 13.6% by early 2023, eroding affordability and forcing households to shift toward cheaper, less nutritious foods. These trends underscore the vulnerability of food systems to external shocks, such as climate change, market volatility, and geopolitical disruptions (Anderl and Caporale, 2025).

Taken together, the 2025 hunger report conveys both optimism and warning. Encouraging stunting reductions and breastfeeding improvements demonstrate that targeted, evidence-based policies can yield measurable gains. However, the persistence of hunger in Africa, the growing prevalence of obesity and anemia, and widespread dietary inadequacy indicate that systemic barriers remain unresolved (Otekunrin, 2024; Njangang, 2024).

Moving forward, three priorities stand out. First, fiscal and trade policies that stabilize food prices and protect vulnerable households must address affordability (Whulanza et al., 2025a). Second, nutrition policies must tackle the double burden of malnutrition and address both undernutrition and rising obesity through integrated strategies (Taqdissillah et al, 2025). Finally, with investments in sustainable agriculture, regional supply chains, and climate adaptation,

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resilience must underpin food security efforts (Whulanza et al., 2025b). The future of food security depends on whether nations can transform recent incremental progress into sustained, equitable outcomes. Without urgent and coordinated action, the vision of ending hunger by 2030 will remain beyond reach.

This issue

This editorial seeks to broaden the discourse on how emerging economies can move beyond technology adoption toward actively steering innovation. The contributions explore the intersections of design methods, new material studies, advanced manufacturing and industrial processes, and digital intelligence with societal needs. Together, they illustrate the convergence of industrial practice with sustainable development.

Sajak et al.'s second study presents a comprehensive LoRa-based IoT real-time soil monitoring system for oil palm plantations. This study integrates temperature, pH, moisture, and tilt—into a LoRa communication framework to remotely monitor soil conditions. The prototype effectively analyzes and visualizes soil data via the ThingSpeak platform. This finding supports farmers' efforts to improve soil quality and crop productivity (Sajak et al., 2025).

Akbar et al.'s third study presents a clustering methodology for narrow-domain scientific texts using unsupervised topic modeling and text similarity-based approaches. This study experiments with preprocessing techniques to optimize topic discovery through non-negative matrix factorization (NMF). The proposed pipeline improves clustering accuracy from 71.1% to 80.7% within a university faculty corpus (Akbar et al., 2025).

Napthaleni and Asrol presented the design of a sugarcane yield and productivity prediction model using SVR and RF techniques. This study identified key vegetative growth indicators from plantations in Malang and Madiun to develop accurate forecasting models. This demonstrates that SVR effectively supports the digital transformation of Indonesia's sugar industry (Napthaleni and Asrol, 2025).

The fourth study, written by Firmansyah et al., presents an improved ultra-wideband (UWB)-based 3D localization system for indoor drones using anchor auto-calibration (AAC) and convolutional neural networks (CNN). This study addresses the challenges in GPS-denied environments by combining antenna delay correction with GPS-denied environments. The proposed method significantly improves accuracy and robustness over conventional multilateration techniques (Firmansyah et al., 2025).

The fifth study, written by Hien et al., investigates the impact of digital infrastructure on creative innovation and the competitive capacity of small and medium enterprises (SMEs) in Vietnam. Using structural equation modelling on survey data from 900 managers across six major cities, the study identifies five critical factors affecting innovation and competitiveness. This demonstrates that technology and digital infrastructure are the most influential drivers of Vietnam's SME innovation ecosystem (Hien et al., 2025).

The sixth study, written by Lomakin et al., presents a hybrid cyber-physical stock exchange trading bot that integrates a deep learning model (Random Forest) to enhance decision-making under volatile market conditions. This study enables real-time trading by combining historical candlestick data predictive analytics with bid/ask-based fuzzy logic. It shows promise for algorithmic trading applications (Lomakin et al., 2025).

The seventh study, written by Hassan et al., presents a hybrid deep learning framework for rice leaf disease detection using DenseNet121 optimized by a modified parrot optimization algorithm (mPOA). This study integrates transfer learning with advanced metaheuristic optimization techniques to enhance hyperparameter tuning and classification accuracy. It demonstrates superior performance over traditional models, and it is a scalable solution for precision agriculture and food security (Hassan et al., 2025).

The eighth study, written by Rovianto et al., presents a robust Sequential Quadratic Programming (SQP) optimization technique for tuning PID controllers in boost converters driving

BLDC motors. This study addresses voltage instability in renewable energy applications by enhancing the response time, reducing overshoot, and improving system stability through precise parameter tuning. The SQP-PID method outperforms conventional and metaheuristic-based approaches (Rovianto et al., 2025).

Siregar et al. presented a leakage inductance reduction technique for high-frequency toroidal transformers using a 1-layer interleaved winding configuration. This study develops a mathematical model and verifies it through finite element analysis (FEA) to evaluate the effects of winding arrangements and frequency on leakage magnetic field distribution and energy storage. The interleaved winding technique significantly enhances transformer efficiency for high-power applications (Siregar et al., 2025).

The next study, written by Jigeeri et al. explore the role of physical and digital financial infrastructure in promoting sustainable development across 79 Russian regions. This study employs panel and order logistic regression models to assess the influence of infrastructure quality on ESG performance. Targeted improvements in either infrastructure type can yield optimal sustainability outcomes and guide regional policy decisions (Jigeeri et al., 2025).

Lomakin et al., introduces a cognitive modeling framework that combines a random forest deep learning model with fuzzy logic to assess strategic partnerships within the Russian confectionery industry. This study forecasts company profitability using artificial intelligence and enhances partner selection by incorporating financial risk metrics and performance indicators. The proposed methodology reliably identifies stable and efficient partner enterprises under market uncertainty (Lomakin et al., 2025).

The twelfth study, written by Petukhov et al. presented an efficient technique for removing acid gases from natural gas using a hollow fiber-based membrane-assisted gas absorption (MAGIC) unit. This study combines the benefits of chemical absorption with membrane technology to enhance CO_2 and H_2S removal efficiency under varying flow and concentration conditions. The MAGIC unit achieves high acid gas removal rates and reduced energy consumption (Petukhov et al., 2025).

Azwani et al. presented a biomaterial characterization of decellularized human amniotic membrane (dehAM) seeded with fetal human cardiac fibroblasts (fHCFs) for cardiac tissue engineering. This study evaluated the ultrastructure, chemical groups, vimentin expression, and cell viability of dehAM to determine its potential as a regenerative scaffold. It highlights the promising application of dehAM in cardiac repair (Azwani et al., 2025).

Putri et al. introduced a novel method for producing activated carbon from tea twigs through carbonization followed by arc plasma-assisted physical activation. This innovative approach significantly reduces the activation time while achieving a high CO_2 adsorption capacity. The effects of varying activation temperatures (600°C–800°C) on pore development and surface area suitable for CO_2 adsorption applications have been highlighted (Putri et al., 2025).

Rahmayeni et al. reported the green synthesis and characterization of magnetic nanocomposites composed of hydroxyapatite and Co-doped $ZnFe_2O_4$ ($HA/Co_{0.1}Zn_{0.9}Fe_2O_4$). The resulting nanocomposites exhibit superparamagnetic behavior, high surface area, and photocatalytic properties responsive to visible light. These results highlight the composite's potential as a reusable, eco-friendly material for wastewater treatment applications (Rahmayeni et al., 2025).

The sixteenth study, written by Wisudawaty et al. investigated the synthesis and performance of copper nanoparticle–reduced graphene oxide–polyaniline (CuNP-rGO-PANI) nanocomposites as conductive inks for printed sensor applications. This study combines $NaBH_4$ chemical reduction, in situ polymerization, and screen-printing methods to fabricate and evaluate nanocomposite-based sensors across various substrates. This highlights the composite's promise for low-cost, flexible sensor technologies (Wisudawaty et al., 2025).

Nugrahaningtyas et al. investigated the photocatalytic degradation of methylene blue using kaolinite-based catalysts embedded with transition metals. The Zn\kaolinite exhibited the highest degradation efficiency under sunlight, highlighting the synergistic effect of metal incorporation and

visible-light activity. Moreover, this study emphasizes the potential of kaolinite composites for environmentally friendly wastewater treatment applications (Nugrahaningtyas et al., 2025).

Mahmood et al., presents a numerical investigation on the impact of incorporating TiO_2 and SiO_2 nanoparticles into water-diesel emulsified fuel. This study shows that TiO_2-enhanced blends deliver higher pressure, temperature, and NO_x emissions but lower particulate matter and CO_2 emissions. These findings highlight the potential of TiO_2 nanoparticle-infused emulsified fuels in improving diesel engine performance (Mahmood et al., 2025).

The next study, written by Silalahi et al. present a comparative analysis of natural and synthetic ester oils for transformer retrofilling applications under aged mineral oil (AMO) contamination. This study examines the effects of AMO blends (7.5% and 9.5%) on dielectric strength, moisture content, viscosity, acidity, and fatty acid composition after accelerated aging for 28 days. Synthetic ester oil and natural ester oil are confirmed as viable retrofilling alternatives with distinct performance characteristics (Silalahi et al., 2025).

The twentieth study, written by Adlim et al. presented a novel immobilization method of ZnO nanoparticles on nylon monofilaments assembled into a bottle-brush model for use in a closed-flow photocatalytic reactor. This study demonstrates the enhanced degradation efficiency of rhodamine B and improved catalyst reusability with a high turnover frequency. The model's practical advantages make it promising for scalable photocatalytic wastewater treatment (Adlim et al., 2025).

Almukhtar et al.'s twenty-third study presents a numerical investigation of the aerodynamic stability of the STU.1.M UAV. This study employs three-dimensional (3D) computational fluid dynamic simulations using Ansys Fluent to evaluate and validate against NACA 0012 benchmark data. This study highlights critical insights for UAV design under turbulent flight scenarios (Almukhtar et al., 2025).

Vinh and Dung presents a flexible converter design for electric vehicle (EV) charging stations that integrates DC/DC, DC/AC, and isolated AC/DC modes. This study proposes five operating scenarios enabling the converter to dynamically manage power from photovoltaic (PV) sources, AC microgrids, and bidirectional energy flow. This study demonstrates a viable solution for solar-integrated EV infrastructure in Vietnam (Vinh and Dung, 2025).

Dewi et al.'s twenty-fifth study investigates how dynamic supply chain capabilities enhance green competitive performance in product–service systems (PSS). Using a survey of 502 official motorcycle service partners in Indonesia, the study explores the relationships among organizational learning development, supply chain integration, supply chain digitalization, green supply chain, and supply chain agility and resilience. This study contributes a novel framework for aligning environmental sustainability with operational adaptability (Dewi et al., 2025).

The twenty-fourth study, written by Cano et al., introduces an optimized child-centered textile design for a soft robotic glove tailored for pediatric rehabilitation, specifically targeting children with cerebral palsy. The glove integrates ergonomic spandex fabrics to enhance usability, comfort, and therapeutic adherence through a systematic design process. Usability assessments and ASTM-based mechanical tests confirm the technical performance and emotional acceptance of the glove among pediatric users (Cano et al., 2025).

Prasetyo and Iridiastadi's offers a comprehensive narrative review on the conceptualization and measurement of mental workload (MWL). The study identified four key elements defining MWL: cognitive processing capacity, task demands, performance and physiological indicators, and subjective experience. This review addresses current limitations and highlights the importance of standardized, real-time, and context-sensitive MWL assessment (Prasetyo and Iridiastadi, 2025).

The last study, written by Hasanah et al., offers investigates the influence of deposition pressure from a mixture of argon and liquefied petroleum gas (LPG) on the mechanical and tribological properties of diamond-like carbon (DLC) films deposited on AISI D2 steel. This study evaluates coating morphology, hardness, wear resistance, and adhesion. It confirms DLC films as cost-effective coatings for cutting tools and automotive components (Hasanah et al., 2025).

Emerging technologies and evolving scientific insights are redefining how we approach the most complex challenges in society. In a rapidly changing world, the role of innovation is not only to provide solutions but also to chart the course of progress. IJTech extends an open invitation to present your work within this dynamic landscape.

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