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# **Policy Brief for Food tech in Indonesia**

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## **- Knowledge Product - Enabling System Work**

**RE:harvest-ASEIC**

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## I. Issue and Context

### ☐ Introduction

Food Loss and Waste (FLW) has emerged as one of the most pressing challenges to sustainable development, with serious implications for food security, environmental sustainability and economic efficiency.

Indonesia, as the largest food waste contributor in Southeast Asia, has recently enlarging its efforts to address FLW. This policy brief outlines the current FLW landscape and regulatory responses in Indonesia, while introducing key policy lessons from South Korea, a global leader in FLW management to provide actionable implications for future policy directions.

### ☐ Food Loss & Waste

Globally, approximately one-third of all food produced is lost or wasted, exceeding one billion tonnes annually. The global economic burden of FLW (Food Loss and Waste) is estimated at around USD 1 trillion per year with its environmental impact accounting for 8-10% of annual global greenhouse gas emissions<sup>1</sup>).

Within Southeast Asia, Indonesia is the largest FLW contributor, averaging 20.94 million tonnes annually with estimated ranging from 23-48 million tonne<sup>2</sup>). The total household food waste in Indonesia has reached more than 14,700 tons in the year of 2023<sup>3</sup>), recording the highest among the Southeast Asian countries.

### ☐ Policy & regulatory response

Indonesian government has implemented a range of policies and initiatives in response to these significant challenges.

The new Presidential Regulation specifically focused on the handling and

management of FLW and addressed FLW as the key priority in the national development.

It is anticipated to mandate specific policies and strategies for local governments, as well as outlining clear obligations for both governmental bodies and businesses involved in the food supply chain.

Indonesian government is in progress of establishing various regulatory systems to tackle the challenges and adopt the state of the art technologies in the industry.

This policy brief will assist the regulatory system in Indonesia, by introducing successful policy cases for the Food Loss & Waste management and Food tech incubation in South Korea.

## II. Policy for FLW management

### ☐ South Korea's best practice in FLW management

South Korea stands out as a global leader in combating food loss and waste (FLW), demonstrating a comprehensive and highly effective approach to food waste management through policy, regulation, and technology.

As the FLW is becoming an increasingly pressing global issue with its contribution to the greenhouse gas emissions (GHGs) and the inefficient use of resources, South Korea's strategies can offer valuable lessons for other nations.

**(Case 1.: Volume-based waste fee system and Smart waste technology)** One of the most significant milestones in South Korea's FLW policy is the implementation of a volume-based waste fee system, often referred to as the "pay-as-you-throw" model. Introduced nationally in 2013 according to the Waste Control Act, this system requires

residents to dispose of food waste using one of three “pay-as-you-throw” methods<sup>4</sup>):

- ① Prepaid standard bags
- ② Sticker-tagged bins
- ③ Radio Frequency Identification(RFID) enabled smart bins with card readers

By directly linking waste generation to cost, this model incentivize households and businesses to reduce the amount of food they discard. The result has been a remarkable reduction in food waste generation, by more than 30% in less than a decade<sup>5</sup>).

For the RFID smart bins, technology plays a crucial role. In major cities like Seoul and Incheon, where the waste emission rates are high, the smart bins with RFID sensors record each resident’s food waste weight and automatically charge their account accordingly.

This introduction of RFID-based volume rate waste disposal system has resulted in a reduction of food waste ranging from 20% to 40%, depending on the region<sup>6</sup>). This digital tracking not only promotes accountability but also provides data for better policy planning and resource allocation.

**(Case 2: Landfill ban and resource recovery infrastructure)** South Korea has banned the direct landfill of food waste since 2005, marking a major shift in waste treatment practices. Instead of being buried in landfills, food waste should be diverted to resource recovery facilities, where it is converted into compost, animal feed, or bio-gas<sup>7</sup>).

Since 2022, the Ministry of Environment has been supporting the development of “integrated bio-gas facilities” that co-process two or more types of organic waste. The government plans to expand

the number of such facilities to over 150 by 2030<sup>8</sup>). As of recent reports, over 95% of South Korea’s food waste is recycled, one of the highest rates in the world<sup>9</sup>).

**(Case 3: Public education and awareness campaigns)** Another key factor in the country’s success is public education and awareness campaigns. These programs such as the Third Basic Plan for Dietary Education(2020-2024) by the Ministry of Agriculture, Food and Rural Affairs, are embedded in school curriculum and community initiatives, promoting a culture of mindful consumption and environmental sustainability<sup>10</sup>). Citizens are encouraged to reduce portion sizes, re-purpose leftovers, and shop more intentionally.

## □ Adoption for Indonesia

South Korea’s comprehensive approach to FLW combining strict regulations, economic incentives, technological innovation, and public engagement has proven highly successful.

As countries worldwide seek sustainable strategies to address FLW, South Korea’s model offers a compelling example of how comprehensive policy design and community participation can yield transformative results.

Drawing lessons from Korea’s cases, below are the implications considering the conditions to adopt in Indonesia.

**(Phased Technology adoption)** Rather than nationwide deployment, Indonesia should begin with municipal-level pilot programs in cities like Jakarta, Surabaya or Bandung to test prepaid food waste bag system for households and commercial sectors. This way would also expected to gradually build public awareness and policy support.

For the smart bin trials using RFID, Indonesia should target priority areas

such as traditional markets, large resident complexes, food courts. These pilots can be embedded into the ongoing smart city programs of Indonesia and serve as testbeds for future expansion.

**(Region-Specific FLW Recovery Infrastructure)** Indonesia can prioritize investment in small-to-medium scale food waste treatment facilities in provinces with high urban density and agricultural production. Composting and biogas production models should reflect local waste characteristics and market demand with technology support from international partners, including South Korea.

**(Integrated education into Community)** Leverage community-based education channels, such as schools, local mosques and neighborhood groups, to disseminate FLW awareness. Messages should align with cultural values and food-sharing traditions.

**(Implication)** Indonesia's efforts to reduce food loss and waste will be most effective when global best practices are thoughtfully adapted to local conditions including infrastructure, governance capacity and cultural values. With the right mix of policy commitment and innovation, Indonesia can significantly reduce its FLW footprint and move toward a more resilient and sustainable food system.

### III. Policy for Food tech industry

#### □ Ecosystem for the Food technology

The food sector has high potential to be the major momentum for nation's growth and competitiveness. Recently, food technology has emerged as a key sector in addressing FLW issues, driven

by increasing environmental concerns and growing consumer interest in value consumption.

Despite its rapid advancement, the industry still faces challenges in regulatory clarity which are essential for harmonizing innovation with public interest.

Reflecting this global trend, the Indonesian government has begun to foster partnerships with the private sector to leverage food technology for scalable FLW solutions.

As policy direction and regulatory support will play a critical role in building a sustainable and competitive food tech ecosystem, following case study is to introduce and draw out possible suggestions from the development strategies for food tech industry in Korea.

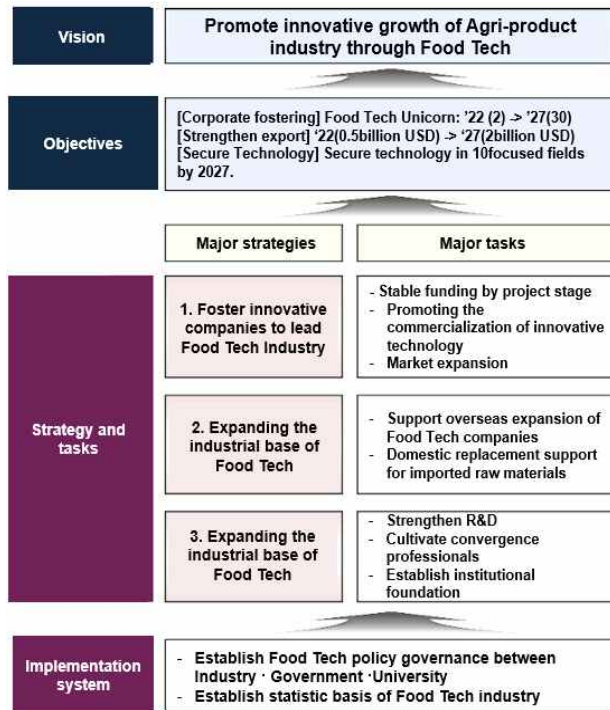
#### □ Food Tech Industry Development Plan

In 2022, the Korean government announced 'Food Tech Industry Development Plan' as a comprehensive roadmap to foster innovation in the agri-food sector. The goal is to position food technology as a new engine of economic growth, while also addressing critical issues such as food security, environmental sustainability, and FLW reduction.

The plan envisions the development of an advanced food tech ecosystem through a mix of financial support, R&D investment, regulatory reform, and human capital development, with the key components of the plan includes:

- ① Creation of a dedicated food tech investment fund and provision of financial support at various stages of business growth.
- ② Establishment of 'Food tech research support center' to foster innovation and collaboration.

- ③ Provision of market intelligence and export support for food tech companies entering global market..
- ④ Legislative efforts to ensure regulatory and institutional backing.



<Vision and Objectives of Food Tech Industry development plan>

#### □ Food Upcycling R&D support Center

In 2023, the South Korean government established the "4th Basic Plan for Food Industry Promotion(2023-2027)" to foster innovative growth in the food sector through food technology. As part of this initiative, the government introduced the "Food Tech Innovation Cluster", aimed at designating specialized regions for food tech development.

The Ministry of Agriculture, Food and Rural Affairs (MAFRA) has initiated an open call for local governments to join the program and establish Food Tech Research Support Centers. These centers are designed to create a supportive ecosystem for startups, enabling them to experiment, research, and commercialize innovative food tech ideas.



<Design draft of Naju Food tech research support center>

**(Equipment & Facilities)** The center provides state-of-the-art equipment and shared office spaces equipped with essential infrastructure such as water systems, sewage, and exhaust systems, which are crucial for food tech operations. This helps alleviate the burden on companies that would otherwise need to rely on external facilities for prototype development and demonstrations.

**(Education and Consulting)** Local universities and research institutes, as part of the cooperative network, will offer consulting and training to address technical challenges faced by companies. This collaboration ensures that companies receive expert guidance tailored to their specific needs.

**(Financial)** The center will support technology demonstration costs for the companies and support preparation for self-operation plan including future operating expenses.

#### □ Partnership's Engagement

The program is driven by a collaborative network consisting of industry players, universities, and government agencies. As part of the joint cooperation system member, RE:harvest, is working to standardize domestic food upcycling technologies and facilitate knowledge exchange within the network.



## **IV. Recommendations**

### ☐ **Financial Support and Investment**

South Korea's Food Tech Industry Development Plan emphasizes the creation of a dedicated food tech investment fund to provide financial support for business growth. For Indonesia, establishing a similar fund would be crucial to ensuring that local food tech startups have access to the necessary capital to develop, scale, and commercialize their innovations.

This financial support will help ensure food tech innovations are not just developed, but they can also be brought to the actual market, making a tangible impact on Indonesia's food sector.

### ☐ **Linkage for complementary development**

South Korea's case also emphasize the complementary development between the food tech industry and other sectors such as agriculture. In Indonesia, there is significant potential for food tech to be integrated with agriculture, ensuring that the growing demand for innovative food solutions is met with a stable and sustainable supply of raw materials from local farmers.

For instance, fostering partnerships between food tech companies and local farmers through contract farming arrangements would ensure a consistent supply of high-quality raw materials. This partnership can support food tech companies while also strengthening the agricultural sector through creating consistent demands.

The Food Tech Support Centers, as cited in the case of South Korea, could play as a facilitation for these collaborations by offering platforms for knowledge exchange,

training, and consulting services to both farmers and food tech companies.

These initiatives would complement food tech development by ensuring a continued supply of locally sourced, sustainable raw materials.

### ☐ **Implications**

Building on South Korea's experience, Indonesia can adapt and implement a similar approach to foster its own food tech ecosystem. Given the country's rising challenges in food security, agriculture and waste management, establishing a strong food tech sector can drive innovative force with sustainability and economic growth.

By integrating food tech solutions into these sectors, Indonesia can facilitate technological development while creating a sustainable and resilient food system for the future.

## V. Citation

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