PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

POLICY ASSESSMENT ON FOOD LOSS & WASTE IN WEST JAVA, INDONESIA

Prepared by Dr. Tammara Soma MCIP RPP (IIED)
In partnership with MWA Consulting

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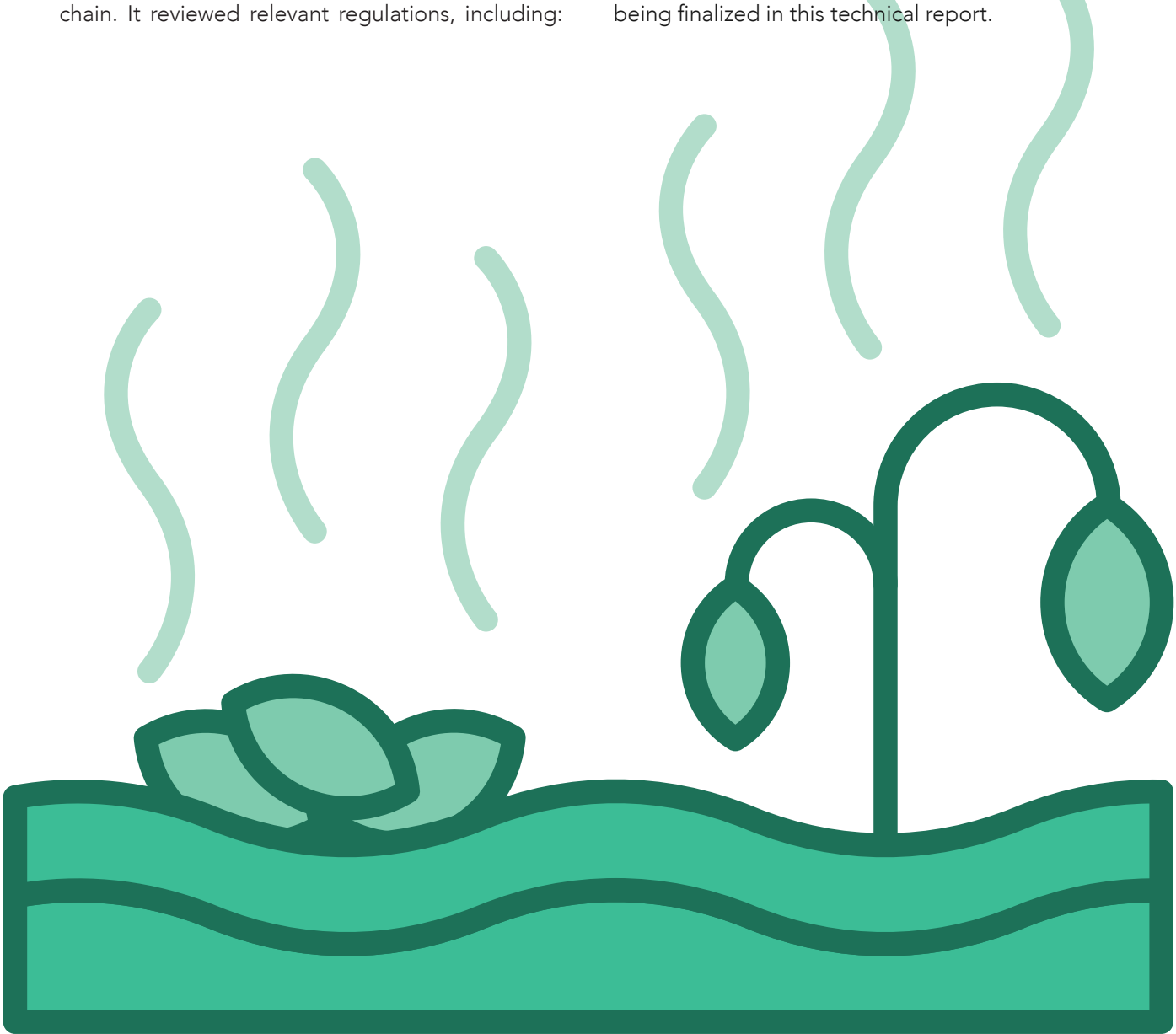
Executive Summary

Indonesia is one of Asia's largest agricultural economies. As the fourth most populous country in the world, Indonesia's plan to feed its population of 262 million people requires the balancing of multiple priorities such as addressing issues around yield, loss of prime agricultural farmland due to rapid urbanization, the declining number of farmers, and the need to take into account climate change and better management of scarce natural resources. Indonesia's population is projected to reach 319 million people by 2045 (BPS, 2018a) with the middle-income group projected to represent 70% (223 million people) of the population by 2045 (National Development Planning Agency [BAPPENAS], 2019). Ensuring food security is particularly important as Indonesia faces what has been termed the "triple burden of malnutrition," where malnutrition and undernutrition occur alongside overnutrition (IIED, 2019). It is estimated that 26 million Indonesians face food insecurity and are living below the poverty line as of 2018 (Asian Development Bank, 2019; Arifin et al., 2018). In the period between 2014-2019, the government of Indonesia celebrated the achievement of increased rice production, noting that in 2018, a total 2.8 million tonnes of surplus rice was produced (GOI, 2019). While this may address the overall policy push to increase the production of rice and address the governments' commitment to SDG 2 Zero Hunger, it is unclear whether surplus rice translates to increased food access and food security. Without effective utilization or post-harvest management, surplus rice may simply lead to further losses, which also leads to losses of natural resources (e.g water) and increased use of inputs (e.g. pesticides, fertilizers).

Against this context of nutrition transition and undernutrition, an estimated 115-184 kg of food was lost and wasted per capita annually in Indonesia between 2000 and 2019, according to the National Development Planning Agency (2021). The economic impact of this waste is approximately 213-551 trillion Rupiah per year. As a category, food waste contributes 7.3% of GHG emissions every year in Indonesia, with an estimated 1702.9 Mt CO_2 generated between 2000 and 2019 (BAPPENAS, 2021). As the country struggles with food insecurity, the amount of food that is lost and wasted in Indonesia could have fed approximately 29-47% of Indonesia's population (61-125 million people). The province of West Java is the most populous province in Indonesia, with over 49 million people. West Java is also regarded as the "rice barn" of Indonesia, as it is the third largest producer of rice in Indonesia. The province of West Java has been identified as an important priority for food loss and waste (FLW) reduction as it is committed to becoming a "green province" by 2025 through efforts to invest in a green economy and reduce greenhouse gas emissions. Second, the province has expressed its commitment to the UN Sustainable Development Goals under its subnational action plan entitled the Regional Action Plan on Sustainable Development Goals.

Reducing FLW is critical as it contributes to climate change inducing greenhouse gas (GHG) emissions, water scarcity, loss of biodiversity, economic losses, food insecurity, and natural resource exploitation (FAO, 2019). As a key supporter of the United Nations Sustainable Development Goals (UN SDGs) and a signatory to the Paris Climate Convention, addressing FLW has become an important priority for the Government of Indonesia (GOI). Under the UN Partnership for Action on Green Economy (PAGE), Indonesia's Ministry of National Development Planning (BAPPENAS) has identified the need to analyze the potential roles and impacts of policies and regulations on FLW prevention, reduction and generation in Indonesia, and particularly in the province of West Java.

To understand the direct and indirect impacts of policies (including fiscal policies) on FLW reduction in West Java, this study undertook a comprehensive analysis of national and regional policies that may contribute directly or indirectly to food loss and waste across the food supply chain. It reviewed relevant regulations, including: laws (*Undang-Und*ang), government regulations (*Peraturan Pemerintah*), presidential regulations (*Peraturan Presiden*), ministerial regulations (*Keputusan Menteri*) and regional regulations (*Peraturan Daerah*) at the provincial, regency and municipal levels. A review of local and international academic literature was also conducted. At the food loss level, our analysis focuses only on rice as this is one of the most wasted foods at national level (BAPPENAS, 2021) and is West Java's key food commodity. Meanwhile, the analysis of food waste covers the retail sector, food services (hotels and catering) and households. The report also maps out the institutional framework that will help relevant stakeholders reduce FLW. Key informant interviews with experts, relevant stakeholders and a focus group were conducted with representatives from regional authorities (province, regency and municipality) and agri-food stakeholders in West Java. Key findings and recommendations from this study were discussed with regional stakeholders at a Roundtable in West Java on July 1st 2021 before being finalized in this technical report.



Key Findings and Recommendations

1. **Update the presidential regulation and ministerial regulations on greenhouse gas emissions reduction and sustainable development goals (SDGs) to explicitly include food loss and waste on the agenda, and include SDG Target 12.3 as an indicator in the national and regional medium-term and long-term development plan.** While multiple laws and regulations at the national and regional levels seem at first glance to provide the overall directive to address all of the SDGs, in reality, only some of the SDG targets have been selected for prioritization. FLW (SDG Target 12.3) is currently not included as one of the priority areas. Within the body of the Ministerial regulations, selected targets were provided with budgetary allocation and/or indicators to track achievement. It is therefore critical to update the regulations as well as the National Medium Term Development Plan (RPJMN) and Regional Medium Term Development Plans (RPJMP) to include FLW reduction as a target and SDG 12.3 as an indicator.

2. **Include support for food loss and waste reduction in both the state budget and regional budget for the implementation of the National and Regional Action Plans on sustainable development goals, National and Regional Action Plans GHG emissions reduction.** West Java has a high capacity to implement fiscal policies (a 'fiscal capacity' score of 4.676), yet there is currently a lack of clear direction and priority setting that identifies FLW reduction as a line item in both the national and regional budgets. Addressing FLW with sufficient fiscal support can be done by embedding FLW reduction in the National and Regional Action Plans on the Sustainable Development Goals (RAN-TPB and RAD-TPB), the National and Regional Action Plans on GHG emissions reduction (RAN-GRK and RAD-GRK).

3. **Increase budget allocation for post-harvest infrastructural investment and agricultural extension support to improve rice quality, reduce losses, increase efficiency in food production and support marketing for farmers.** A comprehensive review of laws and regulations at the national level and at the regional level made it very clear that both the national and regional governments have focused on increasing food production without a similar emphasis on reducing losses, improving the quality of the rice sold by farmers or marketing support. Findings noted the gap in post-harvest infrastructure support, such as drying machines, and the lack of sufficient agricultural extension support on how to reduce losses or better market the product. The resulting impacts of these policies are poor rice quality and losses. By focusing on increasing production through reducing losses and improving the quality of the rice produced, stakeholders noted that this will result in better prices for farmers per unit of rice and reduce the need to focus on boosting chemical inputs (e.g fertilizers) to increase production.

4. **Improve the accessibility of the farmers' insurance program to protect farmers against losses due to increasing climate and economic uncertainties and of the people's credit program to support farmers and small-to-medium food enterprises to invest in FLW reducing tools and equipment.** Existing fiscal policies to support farmers, such as an 80% subsidy on agricultural insurance premiums, were found not to be helpful. This is because most of the farmers in West Java are *gurem* farmers (small farmers with a lack of land ownership) and covering the remaining 20% of the premium is difficult. While this fiscal policy does not directly address reduction in food loss, food loss often happens due to factors outside of the control of the farmers (e.g weather, pests, climate risks). Insurance can help farmers cover their losses and maintain their livelihoods. The regional government should also take steps to increase the accessibility of the insurance and the People's Credit Program (KUKR) to build farmers' and small-to-medium food enterprises capacity through low interest loans on agricultural machinery, tools and infrastructure (e.g drying machines, better storage) that would enable them to reduce post-harvest losses. Currently, the People's Credit Program requires collateral from borrowers, which is a significant barrier for small farmers and vendors. Accessibility can be improved by supporting and partnering with associations that can serve as guarantors and provide daily payment as collateral rather than lump sums.

5. **Shorten the food supply chain by improving distribution logistics and good warehouse practices (particularly *Bulog* rice procurement and storing practices), improving storage infrastructure at the agri-food terminal and traditional markets, and strengthening direct farm to market relationships.** Indonesia's food supply chain, particularly when it comes to rice, is plagued with long-distance and complex inefficiencies whereby the product may exchange numerous hands with inadequate storage spaces and practices, resulting in wastage across the system and high price markups for consumers. Improvements in food distribution logistics include investment in appropriate storage facilities that can better support direct trade between farmers and traditional markets/retail.

6. **Incentivize food waste reduction and disincentivize food waste generation across the food supply chain and ensure accurate food loss and waste measurement.** Almost every law and regulation to address waste reduction includes language around incentivizing waste reduction and creating disincentives to waste. On the ground, these regulations are not implemented. "Business as usual" (e.g dumping of food) is seen by stakeholders as too easy and convenient, and there is a lack of alternatives. The regional government must identify and implement clear fiscal incentives and disincentives to achieve the regional waste reduction targets of 30%. This can take the form of tax credit/reduction for not wasting food, increasing the waste disposal fees for contamination and fines for the wasting of edible food or poor food waste management.

7. **Support advocacy, education, and research in food loss and waste reduction.** Ministry of Finance Regulation No. 153/ 2020 on the Granting of Reduction of Gross Income for Research Activities Article 2 noted that taxpayers who carry out certain research and development activities in Indonesia may be given a gross income tax reduction of a maximum of 300% (three hundred percent) of the total costs incurred for certain Research and Development activities in Indonesia. These types of fiscal incentives can be prioritized for FLW R&D to spark innovation and cross-sectoral collaboration.

8. **Raise consumer awareness on food waste reduction through food diversification and better nutrition via the National and Regional Action Plans on Food and Nutrition.** Rice consumption in West Java was 97.92kg/capita/year as of 2019 according to the Food Security and Livestock Service Office of West Java. The potential for the overconsumption of rice and therefore food wasting is high. Both the *National Action Plan on Food and Nutrition* managed by the Ministry of National Development and the *Regional Action Plan on Food and Nutrition* managed by the Regional Planning Agency mandates the "Aspired Food Pattern Score" (*Skor Pola Pangan Harapan*). This score is a relevant awareness tool to reduce consumer food waste as it promotes diversification of food and nutrition and stifles rice consumption by providing guidance on appropriate food portion sizes.

9. **Integrate food system planning considerations to plan closed loop, circular food economies, communities, neighborhoods and regions that shorten the food supply chain.** The lack of food system planning consideration has created a disconnect between food production and food consumption, thus severing natural ecosystem processes and complicating the local food supply chain. Food system planning is a type of land use planning and development that centers a systems approach to better connect food production to consumption and farmers to consumers, while also facilitating the recycling of nutrients back to the land. Food system planning is particularly useful in the process of building a regenerative closed loop food system and a circular food economy. In West Java's City of Bandung, the integrated circular urban agriculture program *Buruan Sae* is still nascent. Finding ways to better integrate food production locally (including in urban centers), such as through supporting urban and peri-urban farming, could support the shortening of food supply chains, create more spaces to better recycle nutrients from food waste and connect farmers with consumers.

Table of Contents

List of Acronyms

3R	Reduce, Reuse, Recycle
APBD	Anggaran Penerimaan dan Belanja Daerah (Regional Budget)
APBN	Anggaran Penerimaan dan Belanja Negara (National Budget)
APPSI	Asosiasi Pedagang Pasar Indonesia (Indonesian Traditional Markets Association)
APRINDO	Asosiasi Pengusaha Ritel Indonesia (Retail Association of Indonesia)
Bappeda	Badan Perencanaan Pembangunan Daerah (Regional Planning and Development)
Bappelitbang	Badan Perencanaan Pembangunan, Penelitian dan Pengembangan (Development Planning, Research and Development Agency)
BKP	Badan Ketahanan Pangan (Department of Food Security)
BPS	Badan Pusat Statistik (Central Statistics Agency)
Bulog	Badan Urusan Logistik (Logistics Agency)
BUMD	Badan Usaha Milik Daerah (State Owned Enterprise)
DKP	Dinas Ketahanan Pangan (Department Food Security Service)
DKPP	Dinas Ketahanan Pangan dan Peternakan (Department of Food Security and Livestock)
HET	Harga Eceran Tertinggi (Highest Retail Price)
HKTI	Himpunan Kerukunan Tani Indonesia (Farmers Association Indonesia)
HOREKA	Hotel, Restoran, Katering (Hotel, Restaurant and Catering)
HPP	Harga Pembelian Pemerintah (Government Purchase Prices)
Kangpisman	Kurangi, Pisahkan, Manfaatkan (Reduce, Separate, Utilize)
LCDI	Low Carbon Development Indonesia
Pemda	Pemerintah Daerah (Regional Government)
Perbup	Peraturan Bupati (Regent Regulation)
Perda	Peraturan Daerah (Regional Regulation)
Pergub	Peraturan Gubernur (Governor Regulation)
Permen	Peraturan Menteri (Ministerial Regulation)
Perpres	Peraturan Presiden (Presidential Regulation
Perwal	Peraturan Walikota (Mayoral Regulation)
PHRI	Persatuan Hotel dan Restoran Indonesia (Association of Hotel and Restaurants Indonesia)
PP	Peraturan Pemerintah (Government Regulation)
RAD – GRK	Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca (Regional Action Plan- GHG Emissions Reduction)
RAD- TPB	Rencana Aksi Daerah Tujuan Pembangunan Berkelanjutan (Regional Action Plan- Sustainable Development Goals)
RAD- PG	Rencana Aksi Daerah Pangan dan Gizi (Regional Action Plan- Food and Nutrition)
RAN – GRK	Rencana Aksi Nasional Penurunan Emisi Gas Rumah Kaca (National Action Plan- GHG Emissions Reduction)
RAN- TPB	Rencana Aksi Nasional Tujuan Pembangunan Berkelanjutan (Regional Action Plan-Sustainable Development Goals.
RAN-PG	Rencana Aksi Nasional Pangan dan Gizi (National Action Plan- Food and Nutrition)
RENJA	Rencana Kerja (Work Plan)
RKP	Rencana Kerja Pemerintah (Government Work Plan)
RPJMD	Rencana Pembangunan Jangka Menengah Daerah (Regional Medium Term Development Plan)
RPJMN	Rencana Pembangunan Jangka Menengah Nasional (National Medium Term Development Plan)
SDG's	Sustainable Development Goals
TPA	Tempat Pemrosesan Akhir (Final disposal site)
TPS	Tempat Penampungan Sementara (Temporary collection site)
UMKM	Usaha Mikro, Kecil, Menengah (Small medium enterprise)
UU	Undang-Undang (Law)

List of Figures

List of Tables

1. Introduction

Growing concern around the environmental, economic and social impacts of food loss and waste (FLW) has led to numerous initiatives to address this global issue. FLW is a complex problem with far reaching impacts including climate change inducing greenhouse gas (GHG) emissions, water scarcity, loss of biodiversity, economic losses, food insecurity and natural resource exploitation (FAO, 2019). Addressing this issue has become an urgent priority globally.

A new study by the National Development Planning Agency (BAPPENAS, 2021) found that an estimated 115-184 kg of food per capita is lost and wasted annually. The economic impact of this waste is approximately 213-551 trillion Rupiah per year with an estimated 1702.9 Mt CO_2 generated between 2000 and 2019. As a category, food waste contributes 7.29% of Indonesia's GHG emissions every year, contributing to global warming (BAPPENAS, 2021). The amount of food that is lost and wasted between 2000 and 2019 could have fed 61-125 million people (approximately 29-47% of Indonesia's population). Should Indonesia continue business as usual, it is estimated that FLW generation may reach 344 kg/capita/ year by 2045 (BAPPENAS, 2021).

The Government of Indonesia has recently embarked on several initiatives and studies to address the issue of FLW. Mobilized by the United Nations (UN) Sustainable Development Goal (SDG) target 12.3 to halve per capita global food waste and reduce food losses by 2030 as well as the launch of its Low Carbon Development Initiative (LCDI) to reduce greenhouse gas (GHG) emissions, the Government of Indonesia recognizes the importance of FLW prevention and reduction in contributing towards a more sustainable, equitable, and resilient food system.

1.0 Objectives of this study

Due to limited comprehensive primary data on FLW across the food sector for the entire archipelago, the sheer size of the population and the complexity of Indonesia's food supply chain, a better understanding of how the policy and regulatory landscape that directly or indirectly impacts the generation of FLW is needed. This technical report contributes to this overall goal through the Partnership for Action on Green Economy (PAGE) initiative's partnership with the Government of Indonesia. PAGE is an initiative developed in 2013 bringing together five UN agencies to support countries that aspire toward a greener and inclusive economy. The Government of Indonesia under the leadership of the Ministry of National Development Planning (BAPPENAS) is committed to integrating green economy principles in its *National Medium-Term Development Plan* (RJPMN1) (2020-2024) and *Long-term Development Plan* (RJPN2) (2005-2025). To help achieve these overall principles and goals, this report will identify and analyze national and regional policies that may contribute directly or indirectly to FLW across the food supply chain with a focus on the province of West Java.

The main purpose of this study is to conduct a content analysis of policies (including fiscal policies) at the national and regional level to understand the potential impact of diverse policies and institutional frameworks on FLW in West Java. West Java has been identified as a regional case study for several reasons. First, the Provincial Regional Body for Planning and Development (BAPPEDA) is committed to becoming a "green province" by 2025. Second, the province has expressed its commitments to contribute to the UN Sustainable Development Goals under its Regional Subnational Action Plan for Sustainable Development Goal (*Rencana Aksi Daerah* (RAD) *Tujuan Pembangunan Berkelanjutan* (TPB)[RAD TPB]. Third, the province of West Java is also known as the third largest producer of rice in Indonesia and as the "breadbasket" or "rice barn" of Indonesia. Finally, West Java is also the most populous province in Indonesia with over 49 million people.

In light of limited quantitative FLW data for the entire food supply chain and commodities in West Java, and Indonesia more broadly, this study draws from extensive literature and document review (including local and international academic literature), as well as qualitative data from interviews and two focus groups with diverse stakeholders across the food sector and policy makers in West Java. The policy review focuses on relevant regulations, including: Laws (*Undang-Und*ang), government regulations (*Peraturan Pemerintah*), presidential decrees (*Peraturan Presiden*), ministerial decrees (*Keputusan Menteri*) and regional regulations (*Peraturan Daerah*) at the provincial, regency and municipal levels. At the food loss level, our analysis focuses on rice, with sectoral focuses on food waste in the retail sector, food services (i.e., hotels and catering) and households. We review relevant institutional frameworks to help determine the roles that stakeholders need to play in support of a sustainable food system transition. The report also briefly identifies the policies, infrastructure and fiscal support needed to implement the overall objectives of preventing and reducing FLW. Recommendations from this technical report will inform the Government of Indonesia and the regional government of West Java on potential policy interventions (including fiscal policies) to prevent and reduce FLW at the national and regional levels.

This technical report focuses on policies and regulations at all levels of government that may have a direct or indirect impact on FLW. There are multiple drivers that result in FLW, which means diverse interventions at all levels of government across the food supply chain and in multiple sectors are needed to reduce FLW. Identifying contextually appropriate opportunities and solutions to prevent, reduce and divert FLW from landfills (i.e. open dumpsites) will play a key role in Indonesia's ongoing efforts to reduce greenhouse gas emissions and strengthen the sustainability of its agricultural systems. This report outlines why addressing FLW matters in the context of Indonesia is a priority and explores relevant policies at the national level and regional level. It also provides an overview of potential ways FLW considerations can be inserted within regional institutional arrangements and reviews global best practices for their relevance in the context of Indonesia. The report concludes with 9 recommendations.

1.1 Social, Environmental and Economic Impacts of Food Loss and Waste

In 2011, a report by the FAO established one of the first global baselines on FLW quantification and estimated that approximately one-third of annual food (1.3 billion tons/year) produced for human consumption globally is wasted (Gustavsson et al, 2011). The report further estimated that, on a per-capita basis, more food is wasted in industrialized countries than in low-income countries, with an estimated per capita food waste of 95-115kg/year in Europe and North America and only 6-11kg/year in Southeast Asia (Gustavsson et al, 2011). Numerous studies have highlighted the dichotomy that food waste is mainly an issue in industrialized countries and food loss is mainly an issue in lower income countries (Parfitt et al., 2010; Schuster and Torero, 2016; World Bank, 2020). This framing has implications with respect to the types of data collected and what interventions are recommended in which sectors in different countries. However, the recent UNEP (2021) *Food Waste Index Report* has diverged from this original framing of the problem by noting that per capita household food waste is generally similar across countries ranging from high to lower-middle income. The assumption that consumer food waste is a non-issue in developing countries has been challenged with studies noting that countries such as Indonesia have rapidly urbanizing megacities and a growing middle-class population (Soma, 2018; Soma, 2017b). As of 2019, it is generally acknowledged that the initial FLW quantification prepared by Gustavsson et al (2011) for FAO was "very rough" and "widely cited due to a lack of information in this field" (FAO, 2019, v).

The issue of FLW is particularly harrowing when taking into consideration the context of a global hunger crisis and the pressure to produce food sustainably for a projected population of 10 billion by 2050 (Willett et al., 2019). This challenge arises within the context of an agricultural production and food consumption system that is wasteful and exploitative, contributing to the degradation of the environment and climate change through methane emissions, extensive water use, pollution from agricultural inputs such as fossil-fuel based pesticides and fertilizers, poor animal welfare and loss of biodiversity (Kummu et al., 2012). While we already produce more than enough food to feed more than 10 billion people (Holt-Giménez et al., 2012), the focuses of most agricultural programs globally, and particularly in Indonesia, have been on intensification and increasing yields (ADB, 2019), neglecting efforts to reduce losses, improve food distribution, and support food access, particularly for the poor.

In light of the impact of the COVID-19 pandemic on the global food supply chain, issues of growing food insecurity amidst increasing global FLW become even more critical. For example, within the first month of the pandemic, food waste increased due to restaurant closures, changing food demands and impacts on global food supplies resultant of lockdown related travel disruptions (Sharma et al., 2020). On the other hand, estimates indicated that between 83 to 132 million additional people have been added to the number of people facing food insecurity and acute hunger directly due to the pandemic (FAO et al., 2020). In Indonesia, COVID-19 has also impacted FLW and food prices, leaving many farmers with unharvested produce and an inability to recoup the cost of production. In West Java, farmers were not able to afford the cost of harvesting and transporting their produce, and thousands of kilograms of vegetables were left to rot and or dumped (Gunawan, 2021). However, the issue of food pricing existed prior to COVID-19. One farmer interviewed in West Java said he hoped that the government could support with price controls so that farmers are not left with the burden of dealing with price crashes and the inability to recoup the cost of production, as well as the resulting food wastage (Gunawan, 2021). The pandemic has also highlighted the vulnerability of global value chains and the importance of localized agroecological food systems for resilience and food security (Swiderska and Ryan, 2021).

Even before the pandemic, the food system was generally reliant upon the precarious labor of small farmers, peasants, and migrant farm workers, many of whom are at a severe disadvantage in the global economy, particularly when faced with an agriculture system based on speculation and financialization which results in risky fluctuations in global commodity prices (Clapp & Isakson, 2018). Land for food production is also becoming more difficult to access by small-scale farmers due to "land grabs" (Schoenberger & Vandergeest, 2017). As these social phenomena become more common, an already vulnerable food system will become even more precarious for populations that are already at a disadvantage, and FLW exacerbates many of these problems. According to Mourad (2020), it is important to consider how to strengthen/re-localize food production while at the same time managing waste closer to the source of its production.

From an environmental lens, preventing and reducing FLW has been identified as one of the top three means to address climate change by Project Drawdown (2020) and is also key to stymying over-exploitation of natural resources. When food waste is dumped in landfills, it generates the methane, which is 25 times more potent than carbon dioxide in contributing to climate change (FAO, 2013). Currently, FLW is estimated to be responsible for 8 percent of global GHG emissions, with FAO noting that if food waste were a country, it would be the third largest greenhouse gas emitter after China and the United States (FAO, 2013). Addressing the inefficiency, vulnerability and injustice of the global food system should be a global priority (Clapp and Moseley, 2020). Preventing the wastage of edible food and tackling the problem at its root cause is key to achieving better economic, social and environmental outcomes.

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1.2 The Need to Reduce Food Loss and Waste in Indonesia, and Why Policy Matters

As the fourth most populous country in the world, Indonesia's plan to feed its population of 262 million people requires the balancing of multiple priorities, such as addressing issues around yield, loss of prime agricultural farmland due to rapid urbanization, the declining number of farmers and the need to take into account climate change and better management of scarce natural resources. Indonesia's population is projected to reach 319 million people by 2045 (BPS, 2018a) with the middle-income group projected to reach 70% (223 million people) by 2045 (National Development Planning Agency [BAPPENAS], 2019). Ensuring food security is particularly important as Indonesia faces what has been termed the "triple burden of malnutrition," where malnutrition and undernutrition occur alongside overnutrition (IIED, 2019). It is estimated that 26 million Indonesians face food insecurity and are living below the poverty line as of 2018 (Asian Development Bank, 2019; Arifin et al., 2018). Meanwhile, the role of agriculture in Indonesia's economy has seen a continuous decline from 30% in 1975 to 13.1% in 2017. This is also reflected in the decline in the number of agricultural laborers from 62% in 1975 to 29.7% in 2017 (ADB, 2019). It is also important to note that a sizable population of Indonesian farmers are what is called "*petani gurem.*" *Gurem* farmers are also known as non-land-holder farmers, or peasant farmers who own land of less than 0.5 hectares. In West Java, the number of *gurem* farmer households according to the 2018 census is 2,499,172, or 77.6% of farmers (BPS, 2018b). Food and agriculture related policies in Indonesia that aim to address FLW must also consider these marginalized stakeholders.

In 2018, Indonesia ranked 111th in the Global Food Security Index out of 113 countries globally on matters of natural resources and sustainability in agriculture (The Economist, 2018). Accordingly, Indonesia has a lot of room for improvement. With the focus on reducing FLW, it is possible for Indonesia to improve its global standing as FLW reduction is an important aspect of conserving natural resources and improving the sustainability of both food production and consumption.

As a signatory to the Paris Climate Agreement, the Government of Indonesia has committed to reduce GHG emissions by 29% by 2030 (Wijaya et al., 2017). Initiatives to prevent and reduce FLW can play an important role in achieving this while also supporting Indonesia's Low Carbon Development Initiative (LCDI) and an inclusive green economy. This is of particular importance considering that in 2015, Indonesia was included in the top six GHG emitting economies with respect to food systems, contributing an estimated 1.6 Gt CO_2e or 8.8% of global food system related emissions, more than the GHGs emitted by the food systems of the United States (8.2%), Brazil (7.4%), the European Union (6.7%), and India (6.3%) (Crippa et al., 2021).

Beyond the environmental case for prevention and reduction of FLW, there are other factors that make the issue of FLW particularly important in Indonesia. From a consumer food waste angle, numerous transitions have impacted diets and consumption patterns, as well as food provisioning practices. First, the middle-class population has grown, resulting in food consumption patterns similar to those in the developed countries (Soma, 2018). However, FLW studies often aggregate food waste data from urban and rural areas, combining food waste metrics of rural agrarian towns with the generation of food waste in industrialized megacities like Jakarta (Soma, 2018; Teng and Trethewie, 2012). Another changing aspect is Indonesia's retail landscape, which has undergone a supermarket revolution (Reardon and Timmer, 2012). While modern supermarket chains have grown by 15% per year on average – by 2005, 30% of food in Indonesia was purchased from supermarkets – traditional wet markets have generally declined (Rangkuti and Wright, 2013; Suryadarma et al., 2010). Moreover, more traditional food practices, such as "buy today, eat today", wherein food is purchased in small amounts to be consumed within the day, have been replaced with practices such as food stockpiling and less frequent grocery shopping (Soma, 2019). One study of 323 households conducted in the City of Bogor, West Java found statistically significant association between the amount of food waste generated and where consumers shop – 75.9% of respondents who reported that they waste a "significant amount" of food also shopped at modern supermarkets (Soma, 2019). The same study observed a statistically significant positive correlation between household food waste and income (Soma, 2019).

Studies have also identified urbanization as a driver of food waste; with long distance food supply chains increasing, there are higher risks of waste and spoilage due to increased intermediaries (Parfitt et al., 2010). Another key issue when it comes to addressing the issue of food waste in Indonesia is that solid waste management is generally poor (Damanhuri et al., 2014) and largely reliant on disposal in unmanaged dumpsites (Mediana and Gamse, 2011). With the exception of sporadic pilot composting programs in several neighborhoods, there is currently no official program to sustainably manage food waste at the municipal and regional levels (Pasang, Moore and Sitorus, 2007). When food waste generates combustible GHGs such as methane in the open dumps, this can intensify landfill fires, impact the stability of the open dumps and harm the health of waste workers and collectors (Soma, 2017a; Lavigne et al., 2014). In the City of Bandung, 147 waste pickers and their families died when the dumpsite at Leuwigajah landfill exploded due to methane, resulting in a waste tsunami that buried the workers and a village 1 km away (Lavigne et al., 2014).

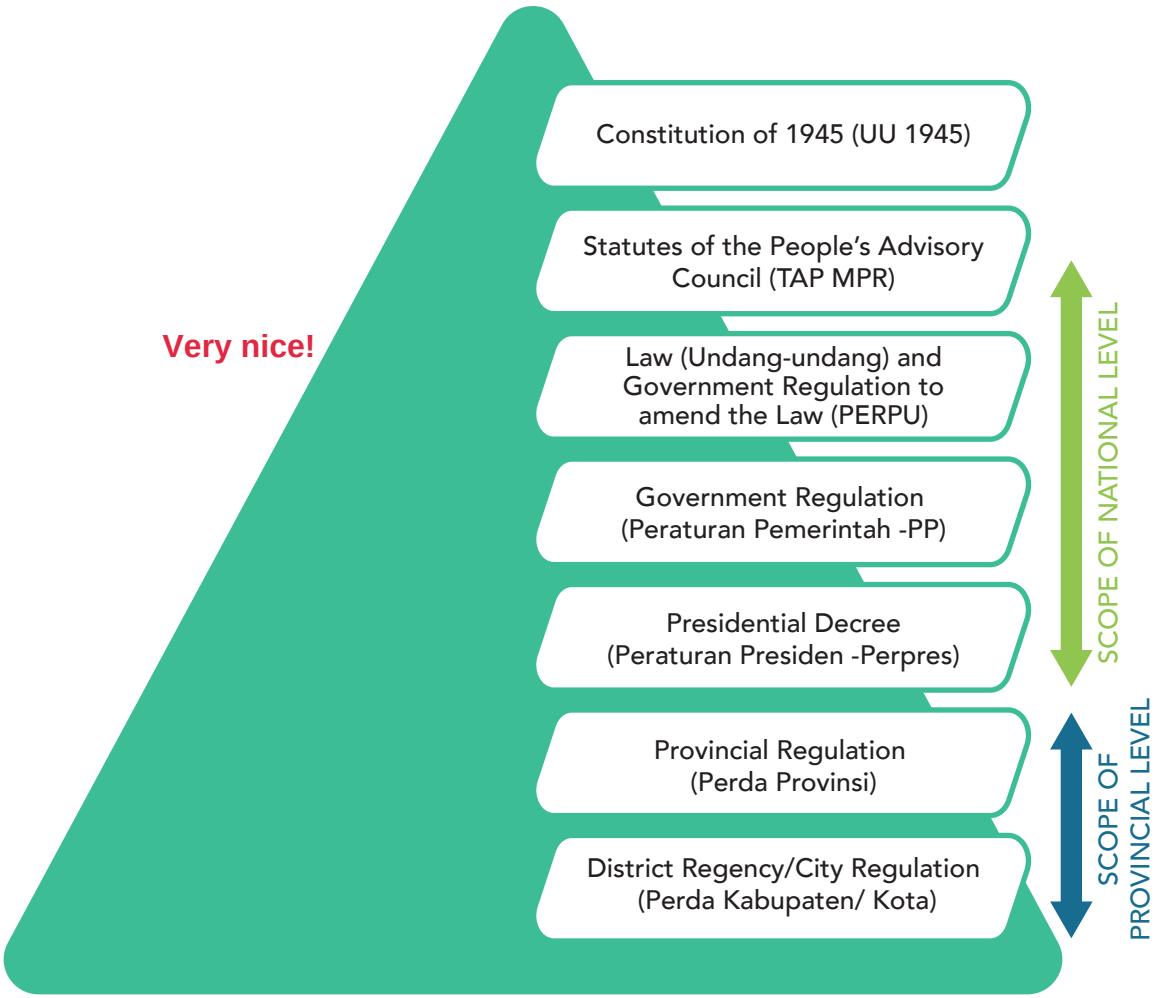
Reducing FLW can also help address issues of food security and food self-sufficiency as it enables better resource and domestic food supply management. Historically, price policy instruments in Indonesia have had a direct impact on the profitability of a particular crop. Common agricultural price policy instruments have covered various types of input subsidies (e.g on high yielding varieties, pesticides, fertilizer and credit programs) to increase production of important crops such as rice. For example, through the fiscally oriented BIMAS program (*'Mass Guidance for Food Self-Sufficiency'*), INMAS (*'Mass Agricultural Intensification for Food Self Sufficiency'*) and technical guidance programs on rice intensification implemented in the late 1960s, various input subsidies were implemented, which also served to increase adoption of new agricultural technologies for rice production (Timmer, 1989). While food self-sufficiency was often equated directly to rice self-sufficiency, in a diversified agricultural economy, the notion of self-sufficiency should also recognize the need to invest in other crops beyond rice which are needed for nutrition and resilience. The government of Indonesia provides significant subsidies for crops such as rice, and while there are some benefits, it is also important to consider the potential impact of overproduction.

In 2014, the Government of Indonesia developed the 2014-2019 *Nawa Cita* national development agenda, a vision that includes food sovereignty for the country as an important policy outcome. This effort was continued under a different 5-point plan for the period of 2019 to 2024 (Agus et al., 2020; Wihardja, 2019). *Nawa Cita's* goal 7 on "promoting economic independence by developing domestic strategic sectors" is supported by the Medium-Term National Development Plan (Chapter 6.7) and includes a focus on food that is connected to SDG 2 (Zero Hunger) and SDG 12 (Responsible Production and Consumption) (UNDP, 2015). *Nawa Cita* also includes emphasis on increasing on-farm production, supporting financial and capital access for farmers and increasing investment in post-harvest technology to improve value added opportunities for farmers (Wihardja, 2019). In addition to the *Nawa Cita*, there are many other national agricultural and food policies relevant to FLW that will be addressed in more detail in Section 3.

From a policy perspective, scholars such as Wihardja (2019) have identified the importance of collecting high-quality data and designing ministerial budgets and programs using the best evidence. Without clear data and enforcement, this may lead to poor and reactive policies and even contradicting policies (Wihardja, 2019). Similarly, it is important to note that efforts to reduce FLW require better and consistent data monitoring to serve as a baseline for measuring improvements. Within the category of upper middle-income countries such as Indonesia, it has been noted that most data is available only at the household level and data on food waste in the food service and retail sectors is generally insufficient (UNEP, 2021). Despite this context of many data uncertainties, there is sufficient evidence in peer reviewed literature that FLW is a problem in Indonesia that results in negative environmental, economic, and social impacts (Soma, 2019).

To better understand how existing policies (including fiscal policies) may directly or indirectly impact FLW, it is important to understand the policy and regulatory hierarchy in Indonesia – see Figure 1.

Figure 1. Types of Regulation and Hierarchy of Regulations



In Indonesia, policies and regulations are developed as follows (based on Law No.12/ 2011 on the Establishment of Legislation):

1. **Law (Undang-Undang):** Put forward by the President or the house of representative.
2. **Government Regulations to amend the Law (*Perpu*)**: At the same level of a Law, the President can directly establish *Perpu*. Such regulations need to be reviewed and passed by the House of Representative.
3. **Government Regulation (PP)**: Developed by the President to implement the Law.
4. **Presidential Regulation (Perpres)**: Developed by the President and contains directives to implement Government Regulation (PP).
5. **Provincial Regulations (Perda Provinsi):** This regulation is developed by the regional government and by the head of the regional government after obtaining approval from the Regional People's Representatives Council (DPRD).
6. **District Regency/ City Regulation (Perda Kabupaten/ Kota):** To facilitate the implementation of higher-level regulations, the head of the regional governments can publish Governor's Regulation (*Peraturan Gubernur*), Regent's regulation (*Peraturan Bupati*), and Mayor's regulation (*Peraturan Walikota*)

In addition to the regulations above, this report also includes analysis of Ministerial regulations (at the national level), Departmental/Institutional policies (*Kelembagaan*), State and Regional Budgets, Government Work Plans for the reduction of Greenhouse Gas Emissions at national and regional levels, the National Medium-Term Development Plan and Regional Medium-Term Development Plan (West Java).

1.3 Definition of Food Loss and Waste and Barriers to Quantification

There are varying definitions of food loss and waste. According to the FAO (2011), food waste is any edible material that was produced for human consumption that, instead of being eaten, is discarded, lost, degraded or consumed by pests. While this definition does not include, for example, food that is diverted to animal feed, anaerobic digestion and others as "food waste", Lee and Soma (2016) define food waste as any discarded organic matter that was intended for consumption by humans, regardless of its ultimate fate. Other definitions of food waste include overnutrition, i.e. consumption of additional food beyond an individual's caloric need (Smil, 2004). A study conducted in Indonesia noted that income, cultural preferences and class may also influence what is considered "food" and "waste" (Soma, 2017a). In general, FLW is a decrease in quantity or quality of food along the food supply chain (FAO, 2019). To further unpack the different terms and definition, WRAP (2009) has categorized food and drink waste by how avoidable the waste was prior to being disposed. Table 1 provides an overview of the definitions commonly used in FLW literature:

Table 1. Definitions of Food Loss and Waste

Terms	Definition
Category: Food Loss	**Occurring along the food supply chain from the point of harvest up to, but not including the retail level (FAO, 2019)**
Food loss	Refers to any food that is discarded along the food supply chain from the point of harvest, slaughter or catch, but excluding the retail level. However, food for productive uses such as animal feed would not be considered food loss (FAO, 2019).
Category: Food Waste	**Occurring at the retail all the way to the consumer level (FAO, 2019)**
Avoidable food waste (sometimes referred to as edible food waste)	Food that was at some point edible prior to disposal. Food is thrown away because it is no longer wanted or has been allowed to go past its best (e.g moldy bread or sour milk). The category of "avoidable" includes foods or parts of food that are considered edible by the vast majority of people (WRAP, 2009).
Potentially avoidable food waste:	Food and drink that some people eat, and others do not, or that can be eaten when prepared in one way but not in another (e.g. orange rind). Potentially avoidable waste is composed of material that was, at some point prior to disposal, edible (WRAP, 2009).
Non-avoidable food waste (sometimes referred to as inedible food waste)	Food waste that under normal/ general circumstances would not be edible. Non-avoidable food waste is usually the result of food preparation (e.g. avocado skin and seed, eggshells, bones from meat) (WRAP, 2009).

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Globally, according to the food waste index, an estimated 17% of food is wasted by households, retail and food service industries, totaling 931 million tonnes a year (570 million tonnes occurring at the household level); the global average of food wasted is 74kg per capita, regardless of whether countries are lower-middle income or high-income (UNEP, 2021). From the post-harvest level up to but not including the retail level, it is estimated that 14% of the food produced is lost each year (FAO, 2019). Nevertheless, even with available quantitative data on specific commodities and regions to measure losses, there are varying estimates of losses. For example, on-farm losses of fruit and vegetable in sub-Saharan Africa range from 0 to 50 percent (FAO, 2019).

As noted by UNEP (2021), thus far, accurate quantitative data on FLW has been limited due to a reliance on data extrapolation from a limited subset of countries and use of old data. In fact, new calculations both through the Food Loss Index (FAO, 2019) and Food Waste Index (UNEP, 2021) found that there are still many information gaps, data ambiguities and insufficient data, particularly for upper middle-income countries to low-income countries. The gap in measurements also exists with the quantification of food loss. Johnson et al (2018) found numerous issues with how national and global food loss data have been calculated. For example, the United States based Rethink Food Waste through Economics and Data (ReFED, 2016) reported over 9.2 billion kilograms of food lost at the farm level annually. However, this massive statistic was based only on 16 grower interviews on farms averaging less than 5.7 hectares (Johnson et al.,2018; Berkenkamp and Nennich, 2015). Most importantly, the seminal report by Gustavsson et al. (2011) which noted that 20% of fruit and vegetables in North America are lost at production stage was based on other studies that were not based on field measurements and were for the most part several decades old (Cappellini and Ceponis, 1984; Golumbic, 1964; Harvey, 1978).

There are also cases of underestimation when calculation relies on visual estimates for quantifying losses. A critical review of global FLW data highlighted challenges in FLW quantification due to numerous data inconsistencies. The study found that, out of a total of 202 publications on FLW, more than half of those containing FLW measurements were based on secondary data (Xue et al., 2017). Another common issue is that food waste estimates are often based on self-reported data rather than food waste audits (Elimelech et al., 2019), and in some cases, waste audits may not be conducted in a standardized way. As such, comparison may be difficult due to the use of different definitions and methodologies (Hebrok and Boks, 2017; Bellemare et al., 2017; Chaboud and Daviron., 2017). To address the challenges around measurement, the World Resources Institute developed the *Food Loss and Waste Accounting and Reporting Standard* to assist countries, companies and other relevant stakeholders (Hanson et al., 2016).

1.3.1 Drivers of food loss and waste

There are multiple factors that interact to generate food loss at the production stage. While some of the factors and drivers have been discussed often in literature, such as stringent aesthetic standards (Neff et al., 2018), precarious labour (Janousek et al., 2018), weather-related issues (Soma et al., 2021) and gaps in and/or lack of post-harvest infrastructure (FAO, 2019), there are other issues that are less commonly mentioned. Food loss may also be a result of unfair trading practices in contract negotiations between buyers and suppliers (e.g. farmers) (Piras et al., 2018), price fluctuation (Johnson et al, 2018), policies on food aid and food dumping (Gille, 2012; Clapp, 2012) and the lengthening of the food supply chain that has resulted in more intermediaries and more complexities around the food supply chain (Mena et al., 2011; Chauhan et al., 2021). Unfair trading practices that result in FLW include short-notice cancellations on perishable foods, payment that is later than 30 days for perishable agricultural and food products and transfer of the risk of loss and deterioration to the suppliers (Piras et al., 2018). A recent systematic review of 152 peer-reviewed articles on the drivers of food waste in the food supply chain identified several key factors which are outlined in Table 2 below (Chauhan et al., 2021):

Table 2. Factors responsible for food loss and waste in the supply chain (not including the consumer level) adapted from Chauhan et al., (2021) Systematic review (n=152 peer reviewed articles)

Factors responsible for FLW in the supply chain (not including the consumer level)	
1.	Stakeholder attitude
2.	Food aesthetics and stringent quality standards
3.	Buyer-supplier agreements
4.	Supply chain interruptions
5.	Improper packaging
6.	Large travel distances
7.	Lack of skilled labour
8.	Food management (Poor sorting, mishandling and quality errors leading to spoilage)
9.	Lack of scientific techniques
10.	Too many mediators (intermediaries)
11.	Poor preservation
12.	Poor road infrastructure
13.	Limited/lack of cold storage facilities
14.	Unhygienic market environment
15.	Lack of regulations
16.	Limited innovations

There may also be indirect factors resulting in FLW. These may include policy support for food production subsidies (including input subsidies) and food systems that focus on overproducing and externalizing environmental costs (Carolan, 2013). The term "vastogenic regimes" has been coined to describe food systems that regularly produces waste, are waste dominated and even profit through generating waste (Cloke, 2020). From a consumer food waste angle, there are also key FLW factors or drivers. An extensive review conducted by the National Academies of Science (2020) for their consensus study *A National Strategy to Reduce Food Waste at the Consumer Level* identified 160 drivers that contribute to food waste that can be categorized into 11 main summative drivers (See **Table 3**).

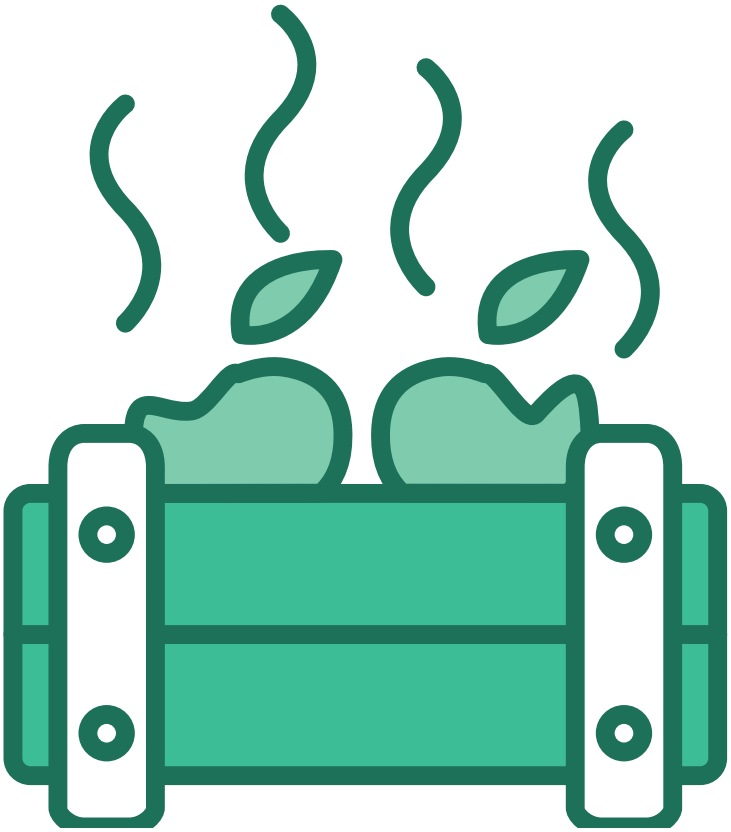
Table 3. Summative drivers of consumer food waste

Summative Drivers of Consumer Food Waste (Adapted from the National Academy of Science 2020 *A National Strategy to Reduce Food Waste at the Consumer Level* consensus study)	
1.	Consumers' knowledge, skills and tools;
2.	Consumers' capacity to assess risks associated with food waste;
3.	Consumers' goals with respect to food and nutrition
4.	Consumers' recognition and monitoring of their food waste;
5.	Consumers' psychological distance from food production and disposal;
6.	Heterogeneity of consumer food preferences and diets;
7.	The convenience or inconvenience of reducing food waste as part of daily activities;
8.	Marketing practice and tactics that shape consumers' food behaviors;
9.	Psychosocial and identity-related norms related to food consumption and waste;
10.	Factors in the built environment (including in household and retail environments) and the food supply chain; and
11.	Policies and regulations at all levels of government

1.3.3 Identifying opportunities to prevent and reduce food loss and waste in Indonesia

- While the issue of FLW has just recently emerged in popular consciousness and on the agenda of some policymakers and ministries in Indonesia, a growing number of initiatives and projects across the country have emerged to address this issue across the food supply chain. Diverse stakeholders are operating national initiatives and informal projects to prevent, reduce and manage food waste more sustainably. For example:
- The organization Garda Pangan collects surplus edible food from restaurants, catering, bakeries, hotels, farms, events and individual donations to be redistributed to low-income communities in the area of Surabaya (Garda Pangan, 2018).
- The Association of Wet markets in Indonesia (APPSI) developed an informal initiative called *Jumat Berkah* or "Blessed Friday" to transform unsold produce at the traditional wet markets into fruits and vegetable juices or fried vegetable fritters (*bakwan goreng*) to be distributed freely to community members.
- Commercial companies like Magalarva (see: https://magalarva.com) divert food waste from the landfills to create fish feed through the rearing of black soldier flies that consume food waste. Such companies have signed partnerships with several supermarkets to take on their food waste (which would have otherwise been landfilled) as feedstock for their black fly larva.
- Educational and awareness campaigns through social media, such as the #BerkahPiringKosong (*blessings of a clean plate*), a campaign led by several groups (e.g Zero Waste Indonesia, Gifood.id) which encouraged individuals to share the before and after photo of their plates on Instagram (April Group, 2020).

In general, Indonesians are aware that it is culturally and spiritually wrong to waste food (Soma, 2019). A study in Bogor, West Java found that parents and individuals in households would often encourage children to eat all their food, using the cultural saying (*pepatah*) "finish every single grain of rice or else the rice will cry." Some would invoke the religious saying of *mubazir* to avoid wasting food (Soma, 2016). Despite cultural knowledge and awareness of the drivers of FLW identified in Tables 2 and 3, this alone is not sufficient to reduce FLW. For example, a study on household food waste with 323 households in the City of Bogor, West Java found that even though individuals recognized the value of composting and know how to compost their food waste (59.7% of upper income, 43% of middle income, 26.6% lower income), over 92% do not compost their food waste for various reasons (e.g., lack of land, inconvenience, lack of time, etc.) (Soma, 2019). Thus, despite the underlying cultural and in some cases religious understandings that it is not good to waste food, other contextual and systemic factors, including the infrastructure, regulations and policies, pricing, marketing practices and other drivers, must be addressed to create an environment that reduces waste.



2. Methodology

2.1 Research design

This technical report relied on both primary data and secondary data. Primary data was collected through 12 semi-structured key informant interviews with associations and individual experts (both local and global), and a focus group with 47 regional agri-food stakeholders and experts. A short questionnaire was also distributed to government representatives in the province of West Java, the regency of Bogor and the city of Bandung. The technical report also relied on extensive secondary research through review of academic peer-reviewed articles and grey literature, as well as a content analysis and policy review of national, provincial (West Java), regency (Bogor Regency) and municipal regulations (City of Bandung) that are relevant to FLW. Bogor Regency was selected in the province of West Java as it is the regency with the highest population at 5.43 million people. The choice of the City of Bandung is connected to the national baseline study conducted by Waste4Change, which included a food waste audit in the city. The City of Bandung is also the capital of West Java and the third largest city in Indonesia with approximately 2.5 million people.

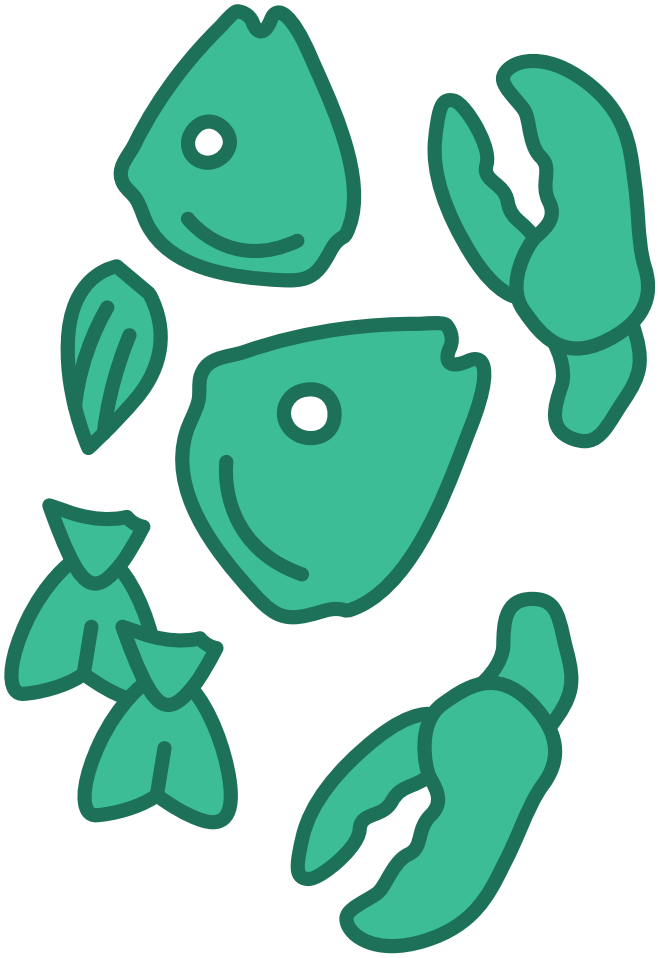
Stakeholders interviewed for this technical report included farmers' associations, traditional wet market associations, retail associations and policymakers in West Java, the hospitality and service sector, academics, and food-related civil society organizations. A full list of interviewees is included in the appendix. The findings from this draft report were shared with 42 relevant stakeholders at a roundtable in West Java, to assess the applicability and relevance of the policy and fiscal recommendation proposed as well as potential trade-offs. The comments from the stakeholder's roundtable are integrated in this report and inform the recommendations.

The main body of this report focuses on synthesizing and connecting the results of the policy review and content analysis with the issues identified through the focus groups and key informant interviews. The purpose is to try and assess the direct and indirect impacts of policies (including fiscal policies) on FLW. At the production level, food loss is focused on rice as a commodity.

2.2 Limitations

Unfortunately, while national quantification of food loss in Indonesia has recently been conducted, these numbers cannot be extrapolated regionally to West Java. It is also important to note that the national food loss quantification is not based on actual field measurements. As such, this technical report relied on self-reporting estimates from farm associations and estimates from the regional ministry of agriculture. Although food waste quantification was conducted in the City of Bandung by the Waste4Change team, there are still data gaps in certain sectors such as retail (i.e. supermarkets and mini markets). There are also gaps in quantitative data for the food processing and distribution sectors. As there is a lack of accurate regional food loss data based on actual field measurements, estimates from the regional farm associations and the regional Ministry of Agriculture provided basic insights to support the analysis in this report.

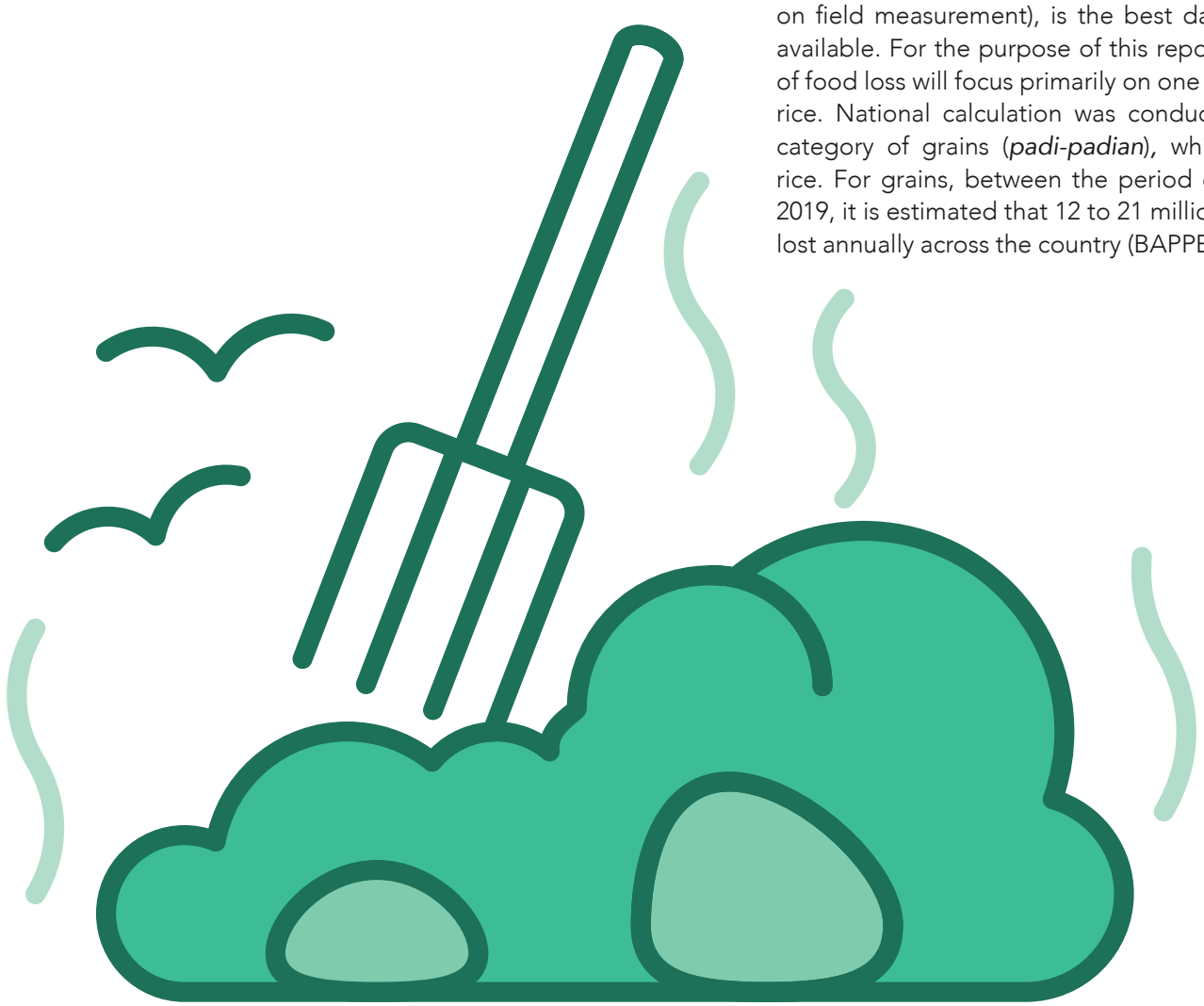
Another limitation hindering our ability to make directed fiscal policy recommendations is the lack of specificity and detail in the regional budgets of government departments. Due to the lack of budget specificity and quantification, it is difficult to propose precise fiscal recommendations.



3. Overview of National Policies (including fiscal policies) directly or indirectly influencing Food Loss and Waste

In this section, a synthesis of national policies relevant to both food loss and waste including legislation, presidential regulations, ministerial policies and others will be explored. Note that the policies discussed in this report are not exhaustive but represent key policies that are relevant to the core issues as identified in the drivers of FLW. A list of the full policies and regulations that may be relevant to food loss and waste from the national level to the regional level can be viewed in the Appendices A and B. It is not possible to assess the on-the-ground impact of the policies pertaining to food loss and waste without further empirical fieldwork and quantification (e.g through field measurement and waste audits) which is outside of the scope this study. Therefore, the content of this analysis highlights laws and policies that may offer opportunities or barriers to the governments' efforts to prevent and reduce FLW toward low carbon development.

At the national level, it is estimated that from 2000-2019 approximately 115-184 kg/capita/year of food was lost and wasted (BAPPENAS, 2021). This calculation of food loss is based on the FAO 2011 method which, while limited (since it is not based on field measurement), is the best data currently available. For the purpose of this report, the issue of food loss will focus primarily on one commodity: rice. National calculation was conducted for the category of grains (*padi-padian*), which includes rice. For grains, between the period of 2000 and 2019, it is estimated that 12 to 21 million tons were lost annually across the country (BAPPENAS, 2021).



Indonesia's policies are complex, and numerous studies have documented challenges with respect to the implementation and translation of policies from the national-level to more local levels and on the ground (Wihardja, 2019). In some cases, the directive of one policy may be in contradiction to another policy; in other cases, policies may be rolled out from the national level without the necessary supporting infrastructure or resources at the regional level. Another issue is the challenge of enforcing policies on a largely informal sector with a large number of Indonesia's farmer being petani *gurem* as noted above. To support the Low Carbon Development Initiative (LCDI), it is critical for the government to ensure sufficient fiscal taxation capacity to fund development priorities. However, Indonesia's fiscal capacity has been identified as one of the major barriers to achieving the goals of the Medium-Term National Development Plan (2020-2024) (*Rencana Pembangunan Jangka Menengah Nasional*/RPJMN). The government has identified that the receipt of tax (i.e., tax ratio) in relation to Indonesia's overall gross domestic product (GDP) is very low. In fact, it is amongst the lowest tax ratios compared to countries in the same income category (GOI, 2019). One of the root causes of the low tax ratio is an insufficient tax system and a weak tax administration that does not have capacity to optimize tax collection and tax administration (GOI, 2019). Furthermore, tax compliance in the country is also low, which further limits fiscal capacity to properly fund needed development, such as the low carbon development initiative.

To reach the targeted economic growth of 5.7-6% per year as planned by the National Development Plan, it is estimated that Indonesia requires approximately Rp, 35.212,4 trillion to Rp 35.455,6 trillion each year in investment for the National Medium-Term Development Plan period from 2020-2024, of which 8.4-10.1% will be sourced from the government, 8.5-8.8% coming from state-owned enterprises (*Badan Usaha Milik Negara*/BUMN) and the rest from either the private sector or the public (GOI, 2019). For the agriculture, forestry and fisheries sector, a modest medium-term economic growth projection is estimated from 3.7-3.8% in 2021 to 4.0-4.1% in 2024. However, the contribution of the agricultural, forestry and fisheries sector to GDP is projected to decline from a range of 10%-12.6% in GDP contributions in 2021 to a range of 11.4%-11.5% in 2024.

Before identifying relevant policies, it is important to first identify the drivers of FLW specific to West Java as identified by the stakeholders involved in this study. Findings from the interviews and focus groups with relevant stakeholders (including government) identified several drivers and factors resulting in FLW in West Java, many of which are comparable to the findings from the academic literature (Chauhan et al., 2021). In the table below (Table 4), the findings on the drivers from the regional study in West Java have been merged with the findings from a recent national level FLW study (BAPPENAS, 2021). For the purposes of this report, the interventions will be focused on drivers that can be addressed through policy, with a particular focus on highlighting fiscal interventions where appropriate.

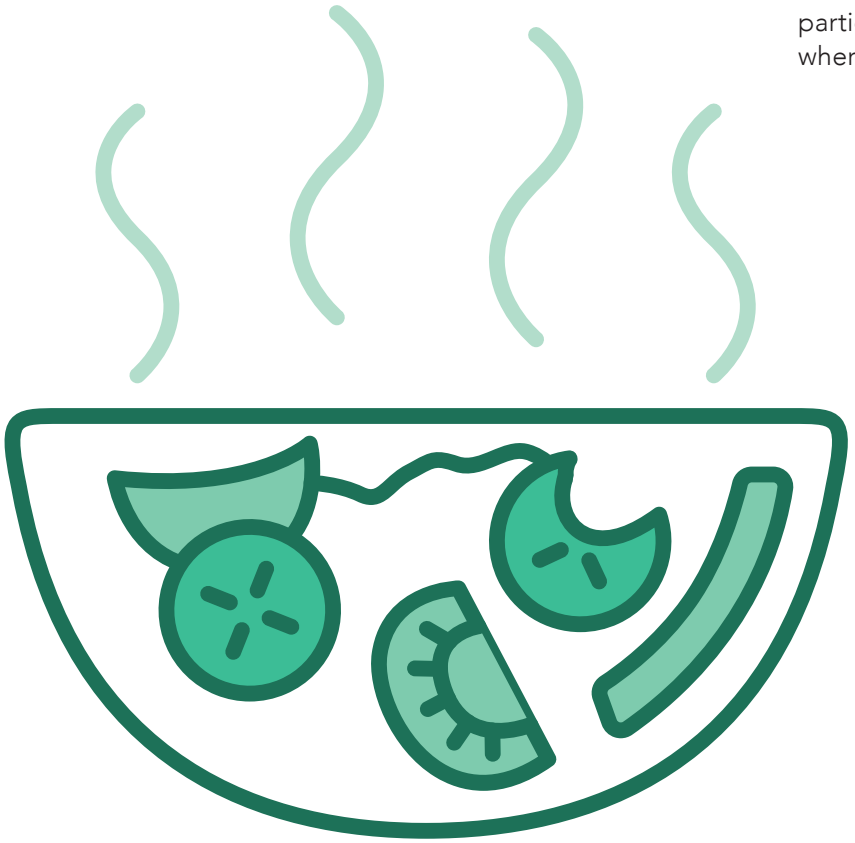


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Table 4. Drivers of Food Loss and Waste in West Java consolidated from the National Study and regional focus group and interviews.

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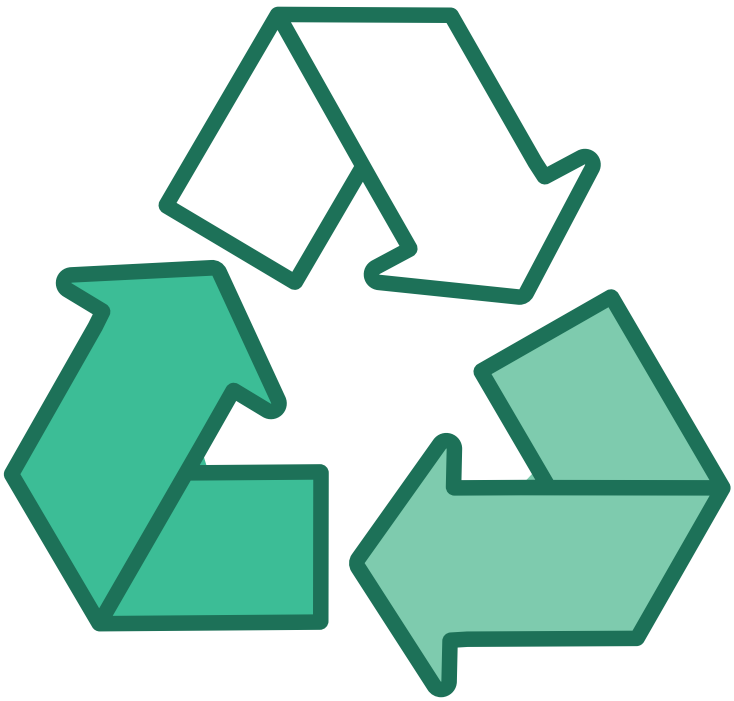
Drivers of Food Loss and Waste in West Java	Stages in the food supply chain	Examples of Potential Interventions
Poor harvesting techniques and handling practices (Gap in agricultural extension support for farmers)	Production → consumption (Food loss and waste)	Strengthening agricultural extension services to support post-harvest management
Environmental factors (Weather, pest, land transition)	Production (Food Loss	Agricultural insurance; support incentives for diversification; Climate smart agriculture
Gap in understanding and perspectives (mindset)	Production and distribution (Food loss)	Awareness and education campaigns
Gap in post-harvest tools, infrastructures and machineries (e.g drying machines)	Production, post-harvest, processing (Food loss)	Support for increasing post-harvest infrastructure; Research and Development
Overproduction (Issues during bumper crop season and gaps in processing, marketing capacities)	Production, post-harvest, processing (Food loss)	Regulation on imports/quota on production/ pricing policies; Repurpose input subsidies such as fertilizer /chemical pesticides; Processing infrastructure to enable value added foods and marketing support.
Pricing issues (price crash, speculations and fluctuation, competition with imports)	Production, Distribution, Retail and marketing (Food loss)	Financial stabilization and support, tariff regulations during bumper crops season
Packaging-related issues (poor packaging such as reused sacks for rice, packaging design that makes it hard to fully utilize the food)	Production → consumption (Food loss and waste)	Research and development
Storage issues (for commodities, sanitation, electricity, and refrigeration at the consumer level)	Production → consumption (Food loss and waste)	Infrastructural investment for postharvest management
Road infrastructure and transportation logistics	Production, post-harvest, processing (Food loss)	Infrastructural investment for postharvest management
Length of food supply chain (lack of efficiency, very long supply chain)	Production → consumption (Food loss and waste)	Infrastructural investment, marketing support to shorten the food supply chain; connect farmers directly with retailers and wet markets
Stringent aesthetic standards (specs/ standard operating procedure, grading, consumer preferences)	Production→ consumption (Food loss and waste)	Awareness raising and education for consumers and retailers
Consumer preferences and purchasing; Food provisioning practices (portioning, etc)	Retail Marketing → Consumption (Food waste)	Awareness raising and education for consumers
Confusion around best before dates and expiry dates	Retail Marketing → Consumption (Food waste)	Awareness raising and education for consumers
Lack of regulations/support for food recovery or donation of surplus edible food	Production, Distribution, Retail Food Service Sector, Marketing, Consumption (Food waste)	Incentives for donation and regulations
Marketing practices and discounts (buy one get one free)	Distribution, Retail, Marketing, Consumption (Food waste)	Awareness raising and education

(This table was adapted and modified from Waste 4 Change, to also include findings from the regional study)

As part of the medium-term National Development Plan (RPJMN, 2020-2024), the government identified 41 major strategic projects, of which two (projects 1 and 4) are relevant to the agri-food sector and can potentially relate to the reduction of FLW. The first project, "**Industry 4.0 in 5 priority sub-sectors: Food and beverages; textiles and apparel; automotive; electronics; chemicals and pharmaceuticals**" seeks to increase the GDP contribution of the five industries to 21%. The government has calculated that at the national level, Rp 245.8 trillion is needed to support this project, with Rp 13 trillion coming from the State Budget, Rp 125.9 from state-owned enterprises, and Rp 106.9 from the private sector. While this budget is divided between five industries, there is room to prioritize the food sector. The second project, "**Strengthening business guarantees and 350 farmer and fishermen corporations**" seeks to increase farmers' average incomes by 5% per year and the income of fishermen by an average of 10%/ year (which is tied to the SDGs). The project also seeks to increase the productivity of commodities by 5%/ year. It is calculated that Rp. 226.4 trillion will be required to fulfill this project, with Rp 200.9 trillion coming from the State Budget and Rp. 25.5 trillion coming from the private sector. During the focus group, stakeholders representing farmers have identified challenges with making ends meet, particularly relating to the food purchase price. As the government has the goal of increasing productivity of commodities by 5%/year, reducing food loss should be an important aspect that may support this project.



Based on the medium-term national development plan RPJMN 2020-2024, 26 indicators were identified to achieve the 2024 target of "Increased availability, access and quality of food consumption" (GOI, 2019). This national target can help address both food loss and food waste. However, none of the 26 indicators directly target or even mention the reduction of FLW. Reduction of food loss will increase the availability of food without the need to increase the consumption of scarce natural resources. Currently, the Global Food Security Index (GFSI) is included in the RPJMN 2020-2024 as one of the 26 indicators. The government aims to achieve the GFSI target score of 69.8 in 2024 from a baseline of 62.6 (2019). Since the government of Indonesia is committed to the UN Sustainable Development Goals at the national level and is also committed to low carbon development, it critical to include the SGD 12 Target 12.3 to halve the per capita food waste and reduce food loss as one of the indicators in the RJPMN development target moving forward.

As part of implementing the National Medium-Term Development Plan, the Food Security Agency of the Ministry of Agriculture/Secretariat of the Food Security Council (*Badan Ketahanan Pangan Kementrian Pertanian/Sekretariat Dewan Ketahanan Pangan* [BPKP]) developed the *Strategic Policies: Food Security and Nutrition* report to provide basic guidelines/reference to support central government ministries and institutions (*Lembaga*), regional governments, regency and municipal governments with the formulation of policies, programs and sufficient budgets to realize the development goals of food security and nutrition (BPKP, 2019). The elements of food security as outlined in the strategic policies of BPKP that are highly relevant to FLW include food availability, food affordability, food utilization and strengthening food and nutrition institutions (see BPKP, 2019, 46).

Box 1. FLW relevant strategies from the Food Security Agency of the Ministry of Agriculture's "Strategic Policies for Food Security and Nutrition.

FLW Relevant Strategies of the "Strategic Policies for Food Security and Nutrition"

given the space available at the bottom, I would again increase the font here, to improve readibility.

Food availability

- Encouraging the development of innovation and its application to increase productivity, production efficiency, reduce yield loss, and increase diverse food products
- Developing technological innovations to anticipate and mitigate climate change and the continuity of food production throughout the year.
- Develop product storage infrastructure
- Develop and strengthen the application of regulations, as well as "Norms, Standards, Procedures, and Criteria" [NSPK] (GAP, GHP, GMP, etc.) to ensure food safety, quality, and competitiveness

these are key messages, so it would help to make messages "pop out" a bit more, for instance by putting them in seperate boxes

Food Affordability

- Develop an effective and efficient food logistics system
- Maintain the stability of the prices of basic and staple foods
- Provision of incentives for small and medium enterprises for food distribution

Food Utilization

- Develop a food waste management system
- Strengthening Food and Nutrition Institutions
- Active participation of all stakeholders (government, local governments, legislative institutions, business actors, philanthropists, NGOs, media, academia and research institutions, as well as civil society at the central and regional levels).

3.1 National policies relevant for food loss

There currently exists a multitude of national agricultural and food- management related policies that may directly or indirectly target the issue of food loss at the national level, even though they may not necessarily use the exact term "food loss" (*susut pangan*). The number of policies and regulations identified through the content analysis represent an opportunity to integrate FLW consideration across existing regulations and policies without necessarily having to develop new ones. However, despite the existence of directly relevant policies, there still may be challenges around implementation on the ground at a regional, regency or municipal level. This section identifies both barriers and opportunities to address food loss in national policies. Themes covered by national policies that are directly and/or indirectly relevant to food loss include:

1. Policies promoting sustainable agriculture and GHG reduction.
2. Policies relevant to post-harvest management and agricultural extension support.
3. Policies relevant to the stabilization of domestic staple food prices.
4. Policies connected to fiscal matters, fiscal incentives and credit.

3.1.1. Policies promoting sustainable agriculture, SDG Goals and GHG reduction

At the national level, there are a multitude of policies that set the directive for sustainable agriculture, sustainable consumption and the reduction of agriculture related GHG emissions (See Table 5). These types of policies serve as an opportunity to indirectly reduce food loss and waste by promoting shifts towards more diversified and hence resilient and more localized food systems. The 2012 *Indonesian Food Law No 18* (Undang-Undang No 18 Tahun 2012 tentang Pangan) is a core national policy that is relevant to the overall issue of FLW. It contains the principles that are meant to shape Indonesia's food system. For example, Article 3 of the Law identifies the importance of securing an agricultural system that is equitable, fair, and ***sustainable***, based on the principles of food sovereignty and independence. The main principle of sustainability (*berkelanjutan*) as identified in the Law can help set the direction at the national level to support agricultural systems that prevent and reduce food loss.

There are also other supporting policies to set the direction of agriculture towards lower carbon practices. For example, Presidential Regulation No. 61/2012 concerning the National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK) Article 2 specifically stipulates agriculture as one of the sectors targeted for GHG reductions, and Article 6 necessitates that each Governor from the province develop a Regional Action Plan for Reducing Greenhouse Gas Emissions (RAD-GRK). As stated in Indonesia's nationally determined contribution (NDC), it may be possible to achieve a 41% GHG reduction target with international cooperation (i.e. from initiatives such as UN PAGE).

Most importantly, at the national level, there are clear directions from the President through the Presidential Regulation No. 59/2017 Implementation of the Sustainable Development Goals (SDG) for both the national government and the regional government to develop National Action Plans and Regional Action Plans for Sustainable Development Goals. At the regional level, the President mandates that the Governor, with the support of the Regent and Mayor and in collaboration with other stakeholders, prepares the 5-year annual Regional Action Plans for Sustainable Development Goals. In the case of FLW prevention and reduction and achieving SDG 12 Target 12.3, there are clear directives from the central government for this support.

Table 5.Examples of Policies promoting sustainable agriculture, SDG Goals and GHG emissions reduction

Regulation/Policy	Relevant Content
Law No. 18/ 2012 on Food	Article 3: Food administration is carried out to meet basic human needs which provides fair, equitable and sustainable benefits based on food sovereignty, independence and security.
Presidential Regulation No. 61 of 2011 concerning the National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK)	Article 1: RAN-GRK is a work plan document for the implementation of various activities that directly and indirectly reduce greenhouse gas emissions in accordance with national and regional development targets. Article 2: RAN-GRK activities include the following fields: a. Agriculture b. Forestry and peatlands c. Energy and transportation d. Industry e. Waste management f. Other support activities Article 6: To reduce GHG emissions in each province, the Governor must prepare RAD-GRK (Regional Action Plan for reducing GHG Emissions) guided by RAN-GRK and regional development priorities.
Law No. 16 /2016 concerning Ratification of the Paris Agreement on the United Nations Framework Convention on Climate Change	In the first period, Indonesia's NDC target is to reduce emissions by 29% with its own efforts and to 41% if there is international cooperation (from business as usual) by 2030, which will be achieved, among others, through the forestry sector, energy including transportation, waste, industrial process and product use, and agriculture…
Presidential Regulation No. 59/2017 Implementation of the Sustainable Development Goals (SDG)	Article 1 (3) The National Action Plan for SDGs, hereinafter abbreviated as RAN TPB, is a document containing programs and activities of a 5 (five) year work plan for the implementation of various activities that directly and indirectly support the achievement of SDGs in accordance with national targets. (4) TPB Regional Action Plan, hereinafter abbreviated as RAD TPB, is a 5 (five) year work plan document at the provincial level to carry out various activities that directly and indirectly support the achievement of TPB in accordance with regional development targets. Article 15 (1) For the achievement of the Regional TPB target, the Governor prepares a 5 year regional action plan (RAD TPB) together with the Regent/Mayor in their respective regions by involving Civil society, Philanthropy, Business Actors, Academics and other related parties.
Regulation of the Minister of National Development Planning/Head of BAPPENAS Number 7 of 2018 concerning Coordination, Planning, Monitoring, Evaluation, and Reporting on the Implementation of Sustainable Development Goals (PERMEN No. 7/2018).	**Article 18** 1) RAN TPB as referred to in Article 2 letter b aims to: a. Achieve the national targets in the National Medium-Term Development Plan that are in line with the SDG as stated in the provisions of the laws and regulations concerning the implementation of the SDG achievement. b. Implement the SDG National Road Map; c. Integrate and harmonize the planning for the implementation of national targets in the National Medium-Term Development Plan and theSDG National Roadmap through the coordination of multi-sectoral programs and activities with Ministries/Agencies, Local Governments, Stakeholders, and the Community; d. Increase the role and commitment of Ministries/Agencies, Local Governments, Stakeholders, and the Community in achieving SDG implementation; and e. Provide a reference for the Regional Government in preparing the RAD TPB.

3.1.2. Policies relevant to post-harvest management and agricultural extension support

In the period between 2014-2019, the government of Indonesia celebrated the achievement of increased rice production, noting that in 2018, a total 2.8 million tonnes of surplus rice was produced (GOI, 2019). While this may address the overall policy push to increase the production of rice and address the governments' commitment to SDG 2 Zero Hunger, it is unclear whether surplus rice translated to increased food access and food security. Without effective utilization or post-harvest management, surplus rice may simply lead to further losses, which also leads to losses of natural resources (e.g water) and increased use of inputs (e.g. pesticides, fertilizers). As we will identify in more detail in the regional section of this report, many of the directives to increase food production have neglected the need to first address efficiency and reduce losses at the field.

In terms of policy opportunities, in general, there are a sufficient number of policies at the national level that directly mention food loss and outline the importance of reducing losses during the post-harvest management phase (See Table 6). For example, as noted in Article 58 of *Law No. 22/ 2019 on Sustainable Agricultural Cultivation System*, post-harvest handling includes the need to reduce the level of loss, extend the shelf life of the food, improve usability and increase the added value of agriculture. Presidential Instruction (*Inpres*) No.7/ 2009 on Rice Policy specifically mandates appropriate ministries, agencies, governments including regents and mayors to help facilitate the reduction of post-harvest rice loss.

Table 6. Policies relevant to post-harvest management and agricultural extension support

Regulation/Policy	Relevant Content
Law No. 16 of 2006 on Agricultural, Fisheries and Forestry Extension Systems	Article 3: One of the objectives of the extension system is to strengthen the development of advanced and modern agriculture, fisheries and forestry in a sustainable development system Article 27 (2): Extension materials are made based on the needs and interests of the main actors and business actors with due observance of the benefits andpreservation of agricultural, fishery and forestry resources.
Law No. 22/ 2019 on Sustainable Agricultural Cultivation System	Article 56: Harvesting is an activity to collect the results of agricultural cultivation, which aims to obtain optimal results by reducing the level of loss and/or damage during food production. Article 58: Post-harvest handling of crops is an activity that aims to maintain and/or improve the quality, reduce the level of loss and/or damage, extend the shelf life, improve usability as well as the added value of agricultural cultivation.
Presidential Instruction (Inpres) No.7/ 2009 on Rice Policy	Instructing (Relevant Ministries-Relevant Agency-Governor-Regent-Mayor) according to their respective main tasks and functions (Tugas Pokok Fungsi [tupoksi]), among others, encourage and facilitate the reduction of post-harvest losses of rice and implement policies to purchase grain/rice with HPP provisions.

Despite this policy emphasis on reducing losses, post-harvest management support and appropriate storage infrastructure is lacking, and the general guidance to support post-harvest loss reduction is not reflected in the amount of financial or machinery support. Machinery support for post-harvest management accounts for only 3.23% of total machinery support at the national level, while machinery support for food production accounts for 96.77% (see Table 5 below):

Table 7. Total Amount of Agricultural Machines and Tools for Rice (unit) at the National Level

Types of agricultural tools and machines (Alat Mesin Pertanian [Alsintan])	Number of Support - National (units)
Rice production	**233,688 (total units)**
2-wheel tractor (2016-2020)	118,817
4-wheel tractor (2016-2020)	7596
Rice planting machine (2020)	19,309
Water pump (2016-2020)	87,966
Rice post-harvest (2019-2020)	**7814 (units)**
Threshing machine	5992
Harvesting machine	132
Harvester	1427
Milling	108
Dryer	155

Agricultural machinery such as dryers are critical for post-harvest activities related to rice farming. The grains from the rice plant must be dried to avoid high humidity which may lead to losses due to fungus and rotting. Better storage infrastructure is also needed to reduce FLW as identified in the drivers of FLW (Table 4). In addition to the infrastructure needed to support post-harvest loss reduction as outlined in *Law No. 22/ 2019 on Sustainable Agricultural Cultivation Systems* Articles 56 and 58, support from extension services is also important. *Law No. 16 of 2006 on Agricultural, Fisheries and Forestry Extension Systems* stipulates the importance of strengthening agricultural systems based on the principles of sustainable development (Article 3). However, it is important to recognize that within Article 3, the Law noted the need to strengthen the development of advanced and modern agriculture, fisheries and forestry, and it is currently unclear what is meant by "advanced" and "modern" agriculture. For example, monocultures may be deemed as "modern," and the intensive use of chemical inputs may also be deemed as "advanced" industrial agricultural practices. It is important to be cautious to not devalue traditional regenerative agricultural practices that may promote more circularity and less reliance on fossil-fuel based inputs.

Law No 16 of 2006 also states the importance of promoting sustainable development system through extension services. Moreover, it states that materials developed for extension purposes should be developed with the preservation of natural resources in mind (Article 27(2)). It is important to note that based on the Central Statistics Agency (2017), 70.72% of farm households did not receive any agricultural extension services or support in the year prior to the survey. From the total allocated for the Ministry of Agriculture's budget of Rp. 22.1 trillion in 2017, less than 5% of the budget was allocated for extension services, and only 2% was allocated to programs that supported crop diversification and community food security (Wihardja, 2019).

Interviews and focus groups with stakeholders corroborate the survey from the Statistics Agency on the gap in post-harvest extension support. Further, agricultural extension services for farmers have thus far focused on technical support to increase production and getting farmers to improve input-related practices (e.g more precise use of fertilizers) or test new types of hybrid seeds. This suggests that the extension support is focusing on modernization and monocultures instead of integrated and diversified closed loop agricultural practices.

The lack of post-harvest extension support and extension resources for reducing food loss are major gaps identified by stakeholders. Support for marketing and connecting farmers with buyers have also been identified as gaps in the type of extension support that farmers are receiving. In general, the issue of food loss is currently not included in extension support materials or training. As we will explain further in the regional section, current extension support on the ground is inadequate and needs to be better supported financially. The laws identified in this section provide the justification and directive at the national level to better support post-harvest management at the regional level and the development of sustainable agricultural systems that reduce loss and damage, extend shelf-life and add value.

3.1.3. Policies on stabilization of the price of staples, rice quality and domestic food supply

Food pricing or food price instability have been documented in the literature as factors that result in farmers tilling their food under or leaving their food to rot in the field (Soma et al., 2021; Johnson et al., 2019). The policies in this section cover the stabilization of pricing, rice quality and domestic food supply, as well as the role of the state-owned enterprise National Logistics Agency (*Bulog*) (see Table 8). *Law No.18/2012 on Food* identifies the importance of government support in securing and stabilizing the cost of staple foods in order to maintain food sovereignty and food security. As noted in Article 55 of the Law, "The government must secure the stabilization of supply and the cost of staple foods both at the producer level and the consumer level." Stabilizing the cost and supply of staple food as intended in article 55 is done to protect the income and purchasing power of farmers, fishermen, fish cultivators and micro and small food business actors, as well as to maintain the affordability of staple foods for consumers. In Indonesia, a key staple food and commodity is rice, which is covered under the Law. However, despite this Law, non-subsistence farmers in Indonesia leave crops in the field to rot when the cost of producing food exceeds the price of purchase.

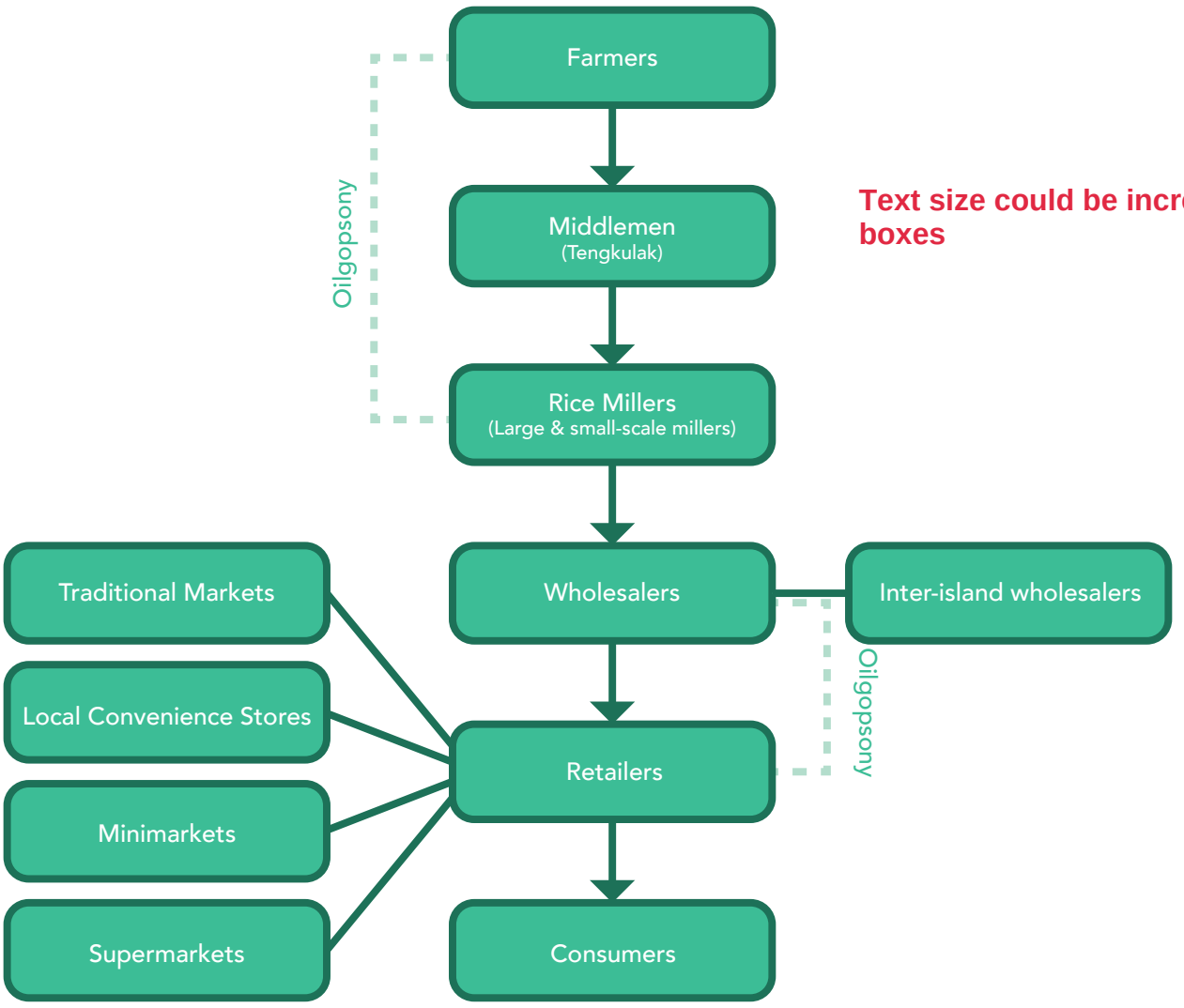
The issue of the price of food not meeting the cost of production has been documented across the country with diverse types of crops (Gunawan, 2021) and also during the stakeholder focus groups. When this occurs, farmers do not have sufficient capital to pay laborers to harvest, pack and transport the food because the prices paid for such food do not cover the cost of production. It is important to note that this issue is further exacerbated when imported foods compete with the same type of domestic foods, particularly during bumper crop (*panen raya*) season, as noted in the interviews and stakeholder focus group. This ties to the new *Law No. 11/2020 on Job Creation*, also more familiarly known as the Omnibus Law. This Law removed earlier provisions from *Law No.18/2012 on Food,* stipulating that food imports should only be done during off-harvest season and when local production and national reserves are insufficient to fulfill domestic demand. However, protecting the prices or the sector from imports can stimulate higher production domestically, which can harm nature, particularly if food systems are inefficient or unsustainable.

Table 8. Policies on stabilization of the price of staples, rice quality and domestic food supply

Regulation/ Policy	Relevant Content text size seem a bit irregular within cells please check
Law No. 18/ 2012 on Food	**Article 55:** The government must secure the **stabilization of supply and the cost of staple foods both at the producer level and the consumer level.**
Law No. 11/2020 on Job Creation (Omnibus Law)	Food Availability is the condition of the availability of food from domestic production, national food reserves, and **food imports**
Ministry of Trade Regulation (*Peraturan Menteri Perdagangan* [PERMENDAG]) No. 127/ 2018 on the Management of Government Rice Reserves for Supply Availability and Price Stabilization.	**Article 2:** The government undertakes supply availability and price stabilization to prevent and overcome rice price fluctuations. What can be done: Directly at the consumer level at the people's markets, wholesale markets, and places that are easily accessible to consumers Through large distributors and / or partners of *Perum Bulog* with due observance of the sales price down to the consumer retail level. Article 4 In implementing supply availability and price stabilization, the Minister assigns state owned enterprise (SOE) Bulog
Presidential Decree No. 20/2017 on the role of the BULOG public corporation	In the context of realizing national food security, the Government has assigned state owned enterprise (SOE) to ***maintain food availability and stabilize food prices at the consumer and producer levels.*** SOE *Bulog* controls the availability & distribution of food, which includes procurement, processing, equitable stock distribution and distribution The food procurement policy through the purchase of domestic grain and rice refers to government purchase price (*Harga Pembelian Pemerintah* [HPP]) as regulated in Presidential Instruction No. 5 of 2015
Regulation of the Minister of Agriculture (Permentan) Number 38 of 2018 concerning the Management of Government Rice Reserves	**Article 3** (1) **Disposal of government rice reserves** (Cadangan beras pemerintah [CBP]) is carried out if CBP: a. **has exceeded the storage time limit of at least 4 (four) months; and/or** **b. has the potential for experiencing a decline in quality.** (2) The Deadline for Saving as referred to in paragraph (1) sub paragraph (a) starting from CBP being stored in a warehouse controlled by Perum BULOG.

Another confounding issue in the stabilization of prices and support for farmers is the structure of the current rice supply chain, which is long and contains many intermediaries/middlemen/ brokers (*tengkulak/penebas*). The middlemen have been playing an important role in Indonesia's rice supply as they are willing to loan money to farmers, whereas banks deem small farmers to be too risky. The middlemen have significant decision-making power to determine rice price for farmers, have capital, have the ability to monopolize grain stocks, and also have market information (Munandar and Lubis, 2021). According to the Cost Structure of Paddy Cultivation Household Survey, 73.78% of farmers are selling their rice through intermediaries (BPS, 2017). These intermediaries may then sell the rice to other intermediaries, which reduces the purchase price for the farmers and increases the end cost for consumers (BPS, 2017). It is important to note that high retail prices do not entail higher prices for farmers, and similarly, low prices at the farmgate do not necessarily get transferred to consumer prices (Swastika & Sumaryanto, 2012). A long supply chain also leads to more food wastage across the supply chain (Mena et al., 2011) as well as higher costs for consumers (BPS, 2017). The following diagram highlights the long supply chain for rice.

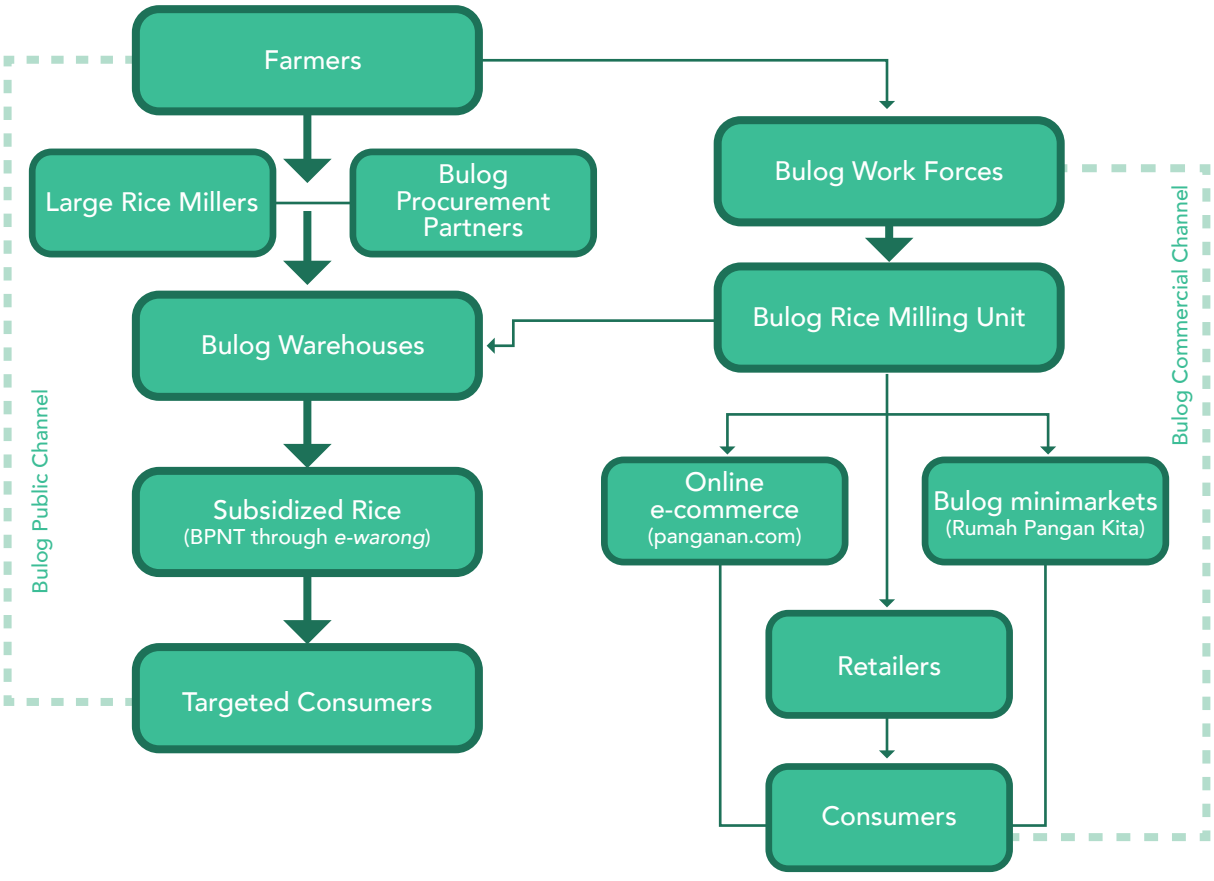
Figure 2. Indonesia rice supply chain (adapted from Octania, 2021)



In addition to selling to middlemen, farmers rely on them for other reasons, such as for loans for food production and harvesting. In some cases, farmers sell rice to middlemen before harvest through bonds/contract farming (*ijon/tebasan*). *Ijon*, or informal bonds from middlemen, help farmers with capital to cover expenses such as the purchase of machinery and tools. Farmers are sometimes pressured into these arrangements - which can be problematic or exploitative - because they face difficulties accessing formal bank loans. According to Swastika and Sumaryanto (2012), the reliance on middlemen through the *ijon* system has resulted in a decrease in farmers' income of Rp. 1 to 2 million per hectare in comparison to the practice of selling their produce after harvest. In the following section on fiscal-focused policies, a new policy to increase opportunities for small farmers to access low-interest loans may help address the issue around *ijon*.

As further identified by the Ministry of Trade Regulation No. 127/ 2018 and Presidential Decree No. 20/2017 on the role of the National Logistics Agency (*Bulog*) public corporation, the management of supply availability and price stabilization for rice has been assigned to the state-owned food enterprise *Bulog*. *Bulog* is responsible for maintaining national rice stocks and managing distribution of rice particularly for welfare support but also for regular consumers. Unfortunately, multiple studies and reports (Octania, 2021) have identified issues around the quality of rice stocks in *Bulog*-operated warehouses, complex distribution challenges faced by the agency (Octania, 2021), and the need to better monitor food production data to better stabilize prices and ensure spikes do not occur (Wihardja, 2019). During our focus group, it was also noted that farmers often felt frustrated with the payment process managed by *Bulog*. In one case study in the regency in East Java, the tengkulak offered slightly higher purchase price in comparison to *Bulog*, resulting in farmers deciding not to sell to the agency (Al Ayyuby, 2016).

Figure 3. Bulog's Rice Supply Chain (adapted from Octania, 2021)



Addressing distribution logistics and procurement issues are relevant to FLW as one documented case found that 20,000 tonnes of government rice reserve (CBP) worth Rp. 160 billion had to be disposed of after being kept in the warehouse for over one year (Valenta, 2019). Based on the *Minister of Agriculture Regulation [Permentan] Number 38/ 2018 concerning the Management of Government Rice Reserves (CBP),* government rice stocks with a storage time limit of at least four months or rice stocks with the potential for quality degradation must be discarded. At the time of the reported case, 100,000 tonnes of additional rice stocks were already above the four-month limit (Valenta, 2019). It is important to note that rice purchased by *Bulog* was paid for by the agency and therefore utilized public finances. Thus, there are significant financial implications to having to dispose of rice paid for using public money, both in terms of the cost of purchase as well as the cost of disposing.

Without addressing the inefficiencies of distribution, procurement and stock management, the issue of rice disposal due to inefficient procurement, planning, and distributions will continue. It is currently estimated by Indonesia's central statistics agency (Badan Pusat Statistic [BPS]) that there was a decline in national rice production from 59.2 million tonnes in 2018 to 54.6 million tonnes in 2019 (BPS, 2020). Reducing losses by addressing inefficient logistics and procurement issues can support the overall goal of increasing the total national rice stocks to feed the population without actually focusing on increasing yield.

3.1.4. Policies connected to fiscal matters, credit and fiscal incentives

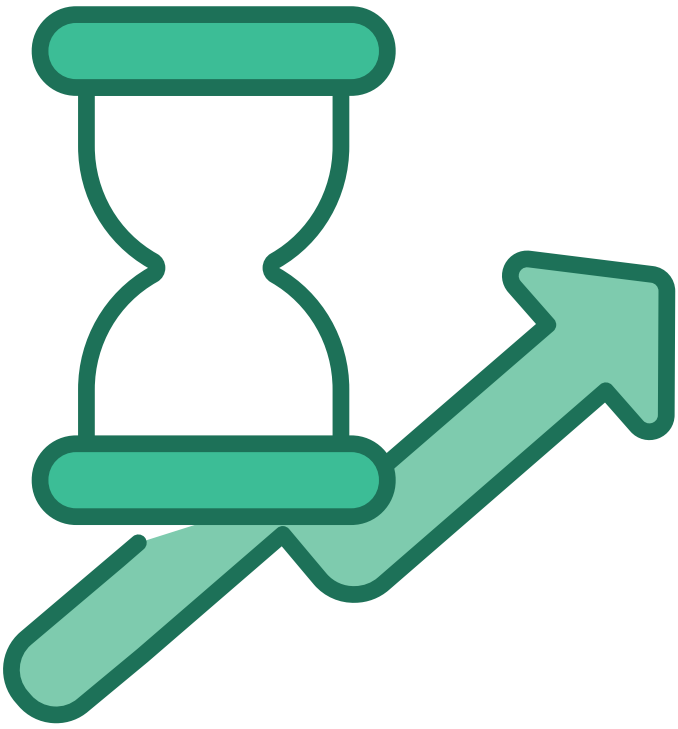
At the national level, the government as per *Presidential Regulation Number 17/ 2015 on Food Security and Nutrition* Article 26 sets the directive for promoting the development of technologies and incentive systems for local food processing. This directive may be harnessed to reduce food loss by supporting local food processing infrastructure for value-addition, milling, drying etc., and extending the shelf life of food. In fact, the lack of food processing infrastructure has been identified as one of the drivers of food losses. Article 61 of the Presidential Decree also sets the direction for government support through the provision of guidance, monitoring and incentives for the food distribution system. This means that Article 61 provides the justification and basis to establish regular monitoring and measurement of food loss. The article also indirectly supports potential food loss reduction through mechanisms such as guidance, which may entail agricultural extension support as per Law No. 16 of 2006 on Agricultural, Fisheries and Forestry Extension Systems.

Related to the previous section on the role of *Bulog* in rice procurement, distribution, logistics, and price stabilization, the "Ministry of Trade Regulation No 24/2020 regarding the determination of rice purchasing price (HPP) for unhulled rice or rice" is an important policy that farmers have identified as an issue because the governments' push for increasing food production without sufficient support for post-harvest infrastructure (such as drying machinery) has led to lower quality rice and losses due to high moisture content. Article 3 notes that there are certain standards for rice and unhulled rice that will enable farmers to receive the rice purchasing price (HPP) set by *Bulog*. These standards for unhulled rice include water/moisture content and vacuum (empty husk) / dirt content. For example, as Article 3 noted, the rice purchasing price (HPP) of paddy (GKP) with a max moisture content of 25%, a max vacuum content of 10% is Rp. 4,200 / kg at the farm level or Rp. 4,250 / kg at the mill. The HPP of dried unmilled rice (GKG) with a max moisture content of 14% and a maximum vacuum (empty husk)/ dirt content of 3% is Rp. 5,250 / kg at the mill or Rp. 5,300 / kg at *Bulog* warehouse. However, the stakeholders interviewed, particularly the farmers' association, noted that farmers face difficulties when trying to meet these standards because they

lack the postharvest infrastructure to process the rice better. This issue was also identified in the literature as the push for farmers to increase rice production year-round, particularly during the rainy season and without proper post-harvest facilities, results in farmers experiencing a significant amount of losses (Wihardja, 2019).

As noted in this report, a sizable majority of the farmers in Indonesia are *gurem* farmers, who own land of less than 0.5 hectares) or non-land-holder farmers. Based on the national socio-economics survey (SUSENAS) in 2012, 15% of the net rice consumers are actually farmers. Therefore, these farmers are particularly vulnerable and need more financial support to access needed agricultural machineries and tools. It has been extensively documented that farmers in Indonesia often have difficulties accessing loans or financial support from banks as they are perceived to be "risky" (Wihardja, 2019). This is issue is also faced by traditional food retailers and wet markets as will be detailed in the regional section. The "Coordinating Minister Regulation (Permenko) Number 8 of 2019 concerning the Implementation Guidelines of People's Business Credit (Kredit Usaha Rakyat [KUR])" Article 3 seeks to provide financial support to improve and expand access to financing for productive businesses, particularly for micro, small and medium business groups such as farmers' groups. The KUKR (People's Credit Business) program has allocated Rp 50 trillion to different sectors (World Food Program, 2021). In comparison to commercial banks with a 9.3% interest rate for working capital loans and 12.1 % interest rate for micro credits (in October of 2020), the interest rate offered by KUKR is 6%/year for 5 years. Through the KUKR program, beneficiaries can receive a loan ranging from Rp 50 million to Rp 500 million. As noted by the medium-term National Development Plan (2020-2024), Micro, Small and Medium Enterprises (MSMEs) are critical to Indonesia as they absorb the largest workforce, which is about 97 percent. Therefore, fiscal policies such as KUKR may help increase the capacity and added value of MSMEs -particularly in the agricultural and service sector- to support marketing, post-harvest infrastructure and other agri-food needs.

Another fiscal policy that may indirectly support FLW and support farmers is the agricultural insurance policy as per the Ministry of Agriculture Regulation No. 40/ 2015 on Agricultural Insurance Facilities and the Minister of Agriculture of the Republic of Indonesia No.2/kpts/SR.230/B/01/2020 on Rice Farming Insurance premium guidelines. The purpose of the insurance program is to provide a government subsidized insurance premium, with 80% of the premium covered by the government's APBN (State Budget) and the rest covered by the individual. While this may appear to be significant financial support, findings from the key informant interviews and stakeholder focus groups noted that farmers are struggling just to meet their basic needs and even paying 20% towards insurance premiums is too much. The issue again is that most farmers are net rice consumers and are *gurem* farmers. They have very low capacity to pay insurance and do not have the incentive to do so as they tend to own very little land and tools and have very little control over the entire procurement process associated with agricultural production (e.g inputs).



There are other fiscal policies that are indirectly related to losses, such as the fertilizer subsidy policy, a historical legacy of the Green Revolution during the era of President Soeharto. This subsidy generates chemical pollution, runoff, and GHG emissions from fossil-fuel based fertilizers. The fertilizer subsidy may indirectly contribute to overproduction and also environmental pollution. Studies have also found the subsidized fertilizer program to be problematic as it distorts farmers' production decisions, encourages excessive use of fertilizers, and leads to pollution (ADB, 2019). By reducing food losses and improving efficiency, fertilizer application can be reduced. According to the Presidential Regulation 15/2011 on Fertilizer Subsidies for Agricultural Production, the Indonesian government appoints the SOE PT Pupuk Indonesia as the implementer of the fertilizer subsidy, and as a producer as well as procurer for subsidized fertilizers. The fertilizers subsidized by the government include both imported and domestic products as well as organic and inorganic fertilizers. Fertilizer support takes a significant amount of the state budget. PT. Pupuk Indonesia received Rp 31.15 trillion in government subsidies in 2017 alone, which at that time was the largest non-energy subsidy (Wihardja, 2019). In 2020, Rp. 26.6 trillion in the state budget was allocated to support 7.94 tonnes of subsidized fertilizer (GOI, 2020), this amount was then increased in the same year to Rp 29.76 trillion for a total of 8.9 tonnes of subsidized fertilizers (Uly, 2020). In the 2021 State Budget, the government allocated 8.2 million tonnes of subsidized chemical fertilizer, but it is not clear how much funding has been allocated for this initiative as there is no line item for this expenditure (Ministry of Finance, 2021). A study conducted by Falatehan et al. (2021) found that an increase in the quantity of subsidized fertilizer does not reduce the level of post-harvest rice losses. By phasing out the fertilizer subsidies or redirecting the subsidies to organic fertilizers, more support can be invested for post-harvest, agricultural extension and marketing support that is needed for farmers to reduce losses.

The phasing out of fertilizer subsidies can also provide more support for agricultural research and development. Currently, a new fiscal policy developed by the Ministry of Finance offers this type of support. According to the Ministry of Finance Regulation No. 153/ 2020 on the Granting of Reduction of Gross Income for Research Activities **Article 2:** Taxpayers who carry out certain research and development activities in Indonesia may be **given a gross income tax reduction of a maximum of 300%** of the total costs incurred for certain Research and Development activities which are charged within a certain period of time. Food and agriculture related research are eligible for this tax break and this therefore offers potential opportunities to spark innovation in FLW research. It is however too early to assess this policy as it was only recently published in 2020 and the impact on the ground is unknown (See Table 9)

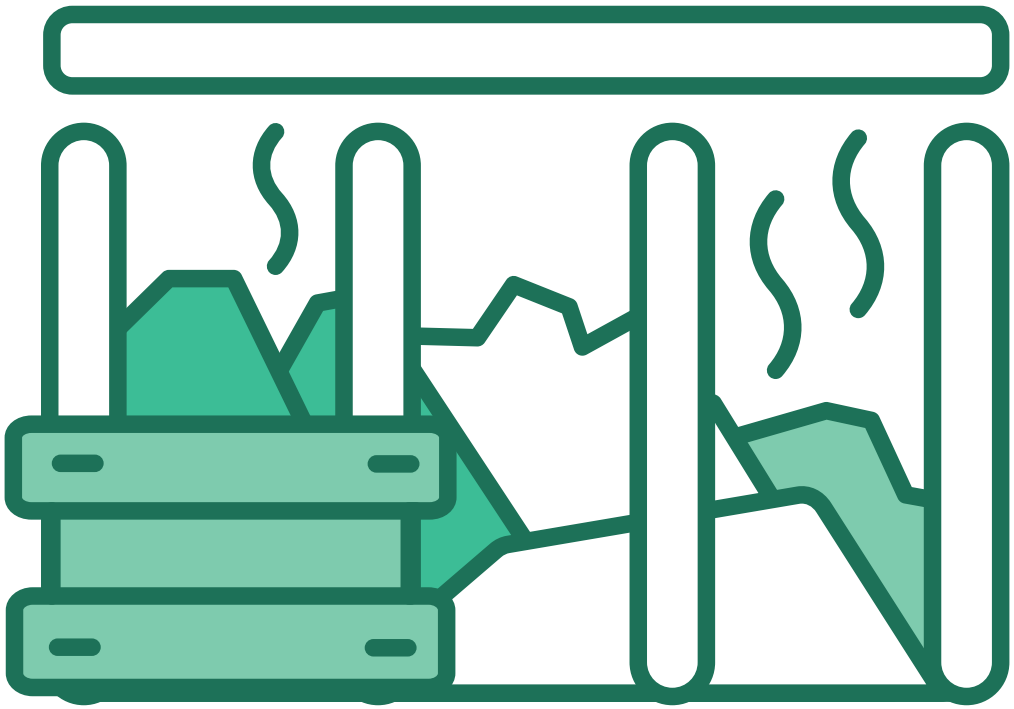


Table 9. Policies connected to fiscal matters, credit and fiscal incentives

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Regulation/Policy	Relevant Content
Presidential Regulation Number 17/ 2015 on Food Security and Nutrition	**Article 26 (verse 1):** Development of ***technology and incentive systems for local food processing businesses***. **Article 61:** The management of the food distribution system includes guidance, monitoring, supervision, control, facilitation and provision of ***incentives***
Ministry of Trade Regulation No 24/2020 regarding the determination of rice purchasing price (HPP) for unhulled rice or rice	**Article 3** Rice purchasing price (HPP) of paddy (GKP) with a max moisture content of 25%, a max vacuum content of 10% is Rp. 4,200 / kg at the farm level or Rp. 4,250 / kg in the mill. HPP of dried unmilled rice (GKG) with a max moisture content of 14% and a maximum vacuum content of 3% is Rp. 5,250 / kg at the mill or Rp. 5,300 / kg at *Bulog* warehouse. The HPP of rice with a maximum water content of 14%, 20% max of broken grain, 2% max of groat content, 95% minimum crushed level is Rp. 8,300 / kg at *Bulog*'s warehouse
Coordinating Minister Regulation (Permenko) Number 8 of 2019 concerning Implementation Guidelines of People's Business Credit (Kredit Usaha Rakyat [KUR])	**Article 2:** The implementation of People's Business Credit (KUR) aims to: a. **Improve and expand access to financing for productive businesses**; b. Increase the competitiveness capacity of micro, small and medium enterprises; and c. Promote economic growth and employment. **Article 3:** KUR recipients consist of: (f) Micro, small, and medium business groups which include: 1) Joint Business Group (KUBE); 2) **Joint Farmers and Fishermen Groups (Gapoktan); or** 3) Other Business Groups.
Ministry of Finance Regulation No. 153/ 2020 on the Granting of Reduction of Gross Income for Research Activities	**Article 2:** Taxpayers who carry out certain research and development activities in Indonesia may be **given a gross income reduction of a maximum of 300% (three hundred percent)** of the total costs incurred for certain Research and Development activities in Indonesia which are charged within a certain period of time. ***Food (e.g., rice, corn, soybean, fruit and vegetable plantations)** is included in the focus of research and development activities that can be facilitated.
Presidential Regulation 15/2011 on Fertilizer Subsidies for Agricultural Production	**Article 3** 1. Subsidized fertilizers can come from domestic and foreign production. 2. Types of Subsidized Fertilizer as referred to in paragraph (1) consist of Inorganic Fertilizer and Organic Fertilizer. 3. Types of Inorganic Fertilizer as referred to in paragraph (2) consist of: 4. UREA; b. SP-36; c. ZA; and d. NPK. 5. Subsidized Fertilizer as referred to in paragraph (1) is produced and/or procured by the Implementer of the Fertilizer Subsidy. 6. The implementer of the Fertilizer Subsidy as referred to in paragraph (4) is PT. Pupuk Indonesia (Persero) which has been appointed by the Minister of State-Owned Enterprises. **Article 15(2)** Subsidized Fertilizer HET as referred to in paragraph (1) is determined as follows: • Urea fertilizer = Rp. 1,800; per kg; • SP-36 fertilizer = Rp. 2,000; per kg; • ZA fertilizer = Rp. 1,400; per kg; • NPK fertilizer = Rp. 2,300; per kg; • Special Formula NPK Fertilizer = Rp. 3,000; per kg; • Organic Fertilizer = Rp. 500; per kg.
Ministry of Agriculture Regulation No. 40/ 2015 on Agricultural Insurance Facilities	**Article 5-8** Insurance includes crop insurance (e.g., for food crops, horticulture, plantations) and livestock insurance (e.g. for ruminants, non-ruminants, monogastric). There are 2 schemes, namely self-help agricultural insurance, and government premium assistance. **Protect farmers from crop failure losses due to natural disasters, pest attacks, infectious animal disease outbreaks, climate change impacts and other risks.**
Minister of Agriculture of the Republic of Indonesia Regulation No.2/kpts/ SR.230/B/01/2020 on Rice Farming Insurance premium guidelines	**Provide protection** to farmers who meet certain criteria against the **risk of damage/loss of rice crops** due to floods, droughts, pest attacks. **Premium amount: APBN 80%, self-help 20%**

3.2 National Policies relevant for food waste

According to BAPPENAS (2021), the consumption stage is the largest generator of FLW. It is very difficult to be accurate with food waste quantification at a national level since waste collection is uneven and a lot of waste goes uncollected. Considering the extensive issues documented with Indonesia's solid waste infrastructure, including the lack of sanitary landfills (Meidiana & Gamse, 2010), lack of source segregation (Damanhuri et al., 2014) and issues around the poor working conditions of waste pickers in the final disposal site (Tempat Pembuangan Akhir [TPA]) (Sasaki et al., 2014), prevention and reduction of food waste should be an important national priority. The disposal of food waste in Indonesia's dumpsites results in the massive generation of methane emissions. National waste management data currently identifies organic waste (i.e., food waste) as the largest fraction of the solid waste dumped at 65%. In this section, national policies and regulations that are indirectly or directly relevant to food waste are analyzed. Food waste-related policies are those targeting the retail sector all the way through to consumption. A review found that the vast majority of such policies focus primarily on downstream management and handling of solid waste in general, with little or no emphasis or specific language on the prevention and reduction of food waste. This section explores two main types of food waste relevant policies: 1) Generic environment-related laws for the reduction of greenhouse gas emissions; 2) Waste management responsibilities and sustainable waste management based on the principles of 3R (Reduce, Reuse, and Recycling).

3.2.1 Environment related laws for the reduction of GHG emissions

There are numerous environmental policies and regulations that provide the foundation and justification to include food waste prevention and reduction as part of Indonesia's overall efforts to move towards GHG reduction (See Table 10). Most of the policies and regulations relevant to food loss discussed in section 3.1.1 are also relevant to the issue of food waste. The generation of food waste and dumping of food waste contributes significantly to GHG emissions. According to Project Drawdown, if globalFLW is reduced by 50% by 2050, this will result in a GHG reduction equivalent to 87.45 gigatons of carbon dioxide. Other policies such as Presidential Regulation No. 61 of 2011 concerning the National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK) and Law No. 32 of 2009 on Environmental Protection and Management set the overarching directives for the national government to support activities for GHG reduction. This includes the national mandate for regional governments to develop the **RAD-GRK (Regional Action Plans for reducing GHG Emissions)** guided by the **National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK)** developed by the Ministry of National Development. One key priority identified in RAN-GRK is targeting the waste sector (BAPPENAS, 2013). Although these action plans are guided by targets and indicators, food waste reduction is not specifically included in any of these documents. Accordingly, incorporating the SDG Target 12.3 of halving food waste by 2030 would be an important start for both RAN-GRK and RAD-GRK. One major challenge for reducing food waste based on the SDG 12.3 Target is that there are still significant barriers to food waste composition quantification, collection, and waste management infrastructure.

Another issue identified through the analysis is that in contrast to post-harvest loss, which is explicitly stated and defined in numerous policies and regulations, food waste is only mentioned once in Presidential Decree 18/2020 on the Medium-Term National Development Plan (RPJMN) 2020-2024. As per this Plan's Agenda 1, managing urban food systems and managing food waste have been identified as important activities to strengthen economic resilience and equitable growth, and increase the availability, access, and quality of food for consumption. There is a significant amount of work to be done at the national level to incorporate food waste reduction as an integral part of the government's effort to support low carbon development, the preservation of natural resources and food security.

Table 10. Environment related laws and regulations for the reduction of GHG emissions

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Regulation/Policy	Relevant Content
Law No. 32 of 2009 on Environmental Protection and Management	**Article 57** One of the efforts to maintain the environment is carried out through the preservation of atmospheric functions including mitigation and adaptation to climate change, protection of the ozone layer, protection against acid rain. Elucidation of Article 57: **Mitigation of climate change is a series of activities carried out in an effort to reduce the level of greenhouse gas emissions as a form of efforts to mitigate the impacts of climate change.**
Presidential Regulation No. 61 of 2011 concerning the National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK)	**Article 1:** RAN-GRK is a work plan document for the implementation of various activities that directly and indirectly reduce **greenhouse gas emissions in accordance with national and regional development targets.** **Article 2:** RAN-GRK activities include the following fields: a. Agriculture b. Forestry and peatlands c. Energy and transportation d. Industry e. **Waste management** f. Other support activities **Article 6:** To reduce GHG emissions **in each province, the Governor must prepare RAD-GRK (Regional Action Plan for reducing GHG Emissions) guided by RAN-GRK** and regional development priorities.
Law No. 16 /2016 concerning Ratification of the Paris Agreement on the United Nations Framework Convention on Climate Change	In the first period, Indonesia's NDC target is to **reduce emissions by 29% with its own efforts and to 41% if there is international cooperation** (from business as usual) by 2030, which will be achieved, among others, through the forestry sector, energy including transportation, **waste**, industrial process and product use, and agriculture.
Presidential Decree 18/2020 about the Medium-Term National Development Plan (RPJMN) 2020-2024	**Development Agenda 1**: Strengthening economic resilience to support quality and equitable growth in priority programs to increase availability, access, and quality of food consumption; Priority activities for improving national food system governance (strengthening the food logistics system, developing warehouse receipts, managing urban food systems and **managing food waste**).

3.2.2. Waste management responsibilities and sustainable waste management based on 3R (Reduce, Reuse, Recycling)

The second theme identified through the policy analysis is the delegation of waste management responsibilities and sustainable waste management based on 3R (Reduce, Reuse, Recycling) (See Table 11 for related policies). Policies included under this theme are general and cover solid waste without a particular focus or mention of food waste. In general, Presidential Regulation No. 97 of 2017 concerning National Strategic Policy for Household Waste Management mandates the reduction of household solid waste by 30% in the year 2025. Considering that food waste is the largest waste category for household waste in Indonesia, the mandate to reduce the overall household waste indirectly ties to food waste. To reduce waste, Article 21 of Law No. 18 of 2008 concerning Waste Management identifies that the government could provide incentives to everyone who reduces waste and disincentives to everyone who does not. The types of incentives or disincentives can be determined by the government. This Law provides the broader context and precedent that enables fiscal incentives to reward more sustainable practices around food waste reduction and fiscal disincentives that will discourage food waste generation. However, these fiscal incentives will require strong collaboration with the regional government and the existence of institutions that can monitor compliance on the ground (e.g auditors).

In Indonesia, solid waste management is the responsibility of the regional government with a particular focus on waste handling and waste management conducted by the local district and municipality (*kota*). As noted in Law No. 18 of 2008 concerning Waste Management (Article 9), the District/City Government Authority has been appointed by the national government among others to: establish policies and strategies for waste management based on national and provincial policies; organize district/city-scale waste management in accordance with the norms, standards, procedures, and criteria set by the Government; conduct guidance and supervision of waste management performance carried out by other parties; and determine the location of temporary dumpsites, integrated waste processing sites and/or final waste processing sites. At the household level, it is the duty of households to take their waste to the temporary dumpsite (*tempat pembuangan sementara* [TPS]) before the waste is taken to the final disposal site by the municipality (*tempat pembuangan akhir* [TPA]).

Article 24 of Law No. 18 of 2008 concerning Waste Management establishes the responsibility of national and local governments for financing waste management from both the state budget (APBN) and the regional budget (APBD). However, improving and strengthening waste management infrastructure is hampered by limited space due to rapid urban development, the sheer size of the population and the growing complexity of packaging waste. One study found that the rise of packaging waste, particularly plastics, has made sustainable food waste management such as composting more difficult (Soma, 2017). Traditional packaging in Indonesia is typically made from banana leaf and paper but is increasingly being replaced by plastics and styrofoam. Food packaging complicates source segregation and makes it difficult to process household waste on site, therefore requiring a heavier emphasis on municipal collection (Soma, 2017). This means that the stipulation in Article 12 of Law No. 18 that "everyone in the management of household waste and similar household waste must reduce and handle waste in an environmentally sound manner" is not realistic. Although Article 15 concerning Waste Management states clearly that "Producers are required to manage packaging and/or goods that are produced that cannot or are difficult to decompose by natural processes," in reality, this policy is not implemented at the regional level. Private industry needs to contribute to more waste management infrastructure as it develops and determine the type of packaging sold to consumers. When single-use packaging and sachets disrupt and create barriers to more sustainable food waste management on the ground, industry must play a stronger financial role to support the management of said waste. At a national level, based on the APBN State Budget, the government plans to fund the development of 17 recycling centers and 348 units of waste containers (Ministry of Finance, 2021). However, there is no mention of food waste management, composting facilities or anaerobic digestion facilities.

There are also policies that seem to highlight alternative waste management infrastructure to divert food waste from landfills. Anaerobic digesters can be used to transform food waste into resources such as renewable energy. These types of infrastructure can support Indonesia's overall goal towards low carbon development. Currently, the role of the national government in these types of "waste to resource" initiatives is to simply issue permits and guidance. Decision-making responsibility for waste reduction lies at the regional level, as per Minister of Environment and Forestry Regulation No. P.10/MENLHK/SETJEN/PLB.0/4/2018 Regarding Guidelines for Formulating Regional Policies and Strategies for the Management of Household Waste and Similar Household Waste.

Table 11. Waste management responsibilities and sustainable waste management based on 3R (Reduce, Reuse, Recycling)

Regulation/ Policy	Relevant Content
Law No. 18 of 2008 concerning Waste Management	**Article 8.** Provincial Government Authority a. Establish policies and strategies in waste management in accordance with Government policies; b. Facilitating inter-regional cooperation within one province, partnerships, and networks in waste management; c. Organize coordination, guidance, and supervision of district/city performance in waste management; and d.Facilitate the settlement of disputes over waste management between districts/cities within 1 (one) province. **Article 9.** District/City Government Authority a. Establish policies and strategies for waste management based on national and provincial policies; b. Organize district/city-scale waste management in accordance with the norms, standards, procedures, and criteria set by the Government c. Conduct guidance and supervision of waste management performance carried out by other parties; d. Determine the location of temporary dumpsites, integrated waste processing sites, and/or final waste processing sites; e. Conduct regular monitoring and evaluation every 6 (six) months for 20 (twenty) years on the final waste processing site with an open disposal system that has been closed; and f. Formulate and implement an emergency response system for waste management in accordance with their respective authorities. **Article 12** Everyone in the management of household waste and similar household waste must reduce and handle waste in an environmentally sound manner. **Article 15** **Producers are required to manage packaging and/or goods that are produced that cannot or is difficult to decompose by natural processes.** **Article 20** Waste reduction includes activities as it pertains to article 19 include the following activities: a. Waste generation restrictions b. Waste recycling, and/or c. Waste reuse **Article 21** 1) The government provides: a. **Incentives to everyone who reduces waste, and** **b. Disincentives to everyone who does not reduce waste** 2) Further provisions regarding the types, forms, and procedures for providing incentives and disincentives as referred to in paragraph (1) shall be regulated by government regulations. **Article 24** 1) The government and local governments are obliged to finance the implementation of waste management 2) The financing as referred to in paragraph (1) shall be sourced from the state revenue and expenditure budget (APBN) and regional revenue and expenditure budget (APBD)

Presidential Regulation No. 97 of 2017 concerning National Strategic Policy for Household Waste Management	**Article 3** (1) The policy direction for the reduction and handling of Household Waste and Waste Similar to Household Waste as referred to in Article 2 paragraph (11) subparagraph (a) includes performance improvement in the fields of: a.**Reduction of household waste and similar household waste**; and b. Handling of household waste and similar household waste. (2) The reduction of household waste and similar household waste as referred to in paragraph (l) letter a is carried out through: a. **Limiting the generation of Household Waste and Waste Similar to Household Waste;** b. Recycling of household waste and similar household waste; and/or reuse of household waste and similar household waste. **Article 5** (1) Targets for reducing and handling household waste and similar household waste as referred to in Article 2 paragraph (1) subparagraph (b) include: a. **Reduction of Household Waste and Waste Similar to Household Waste by 30% (thirty percent) of the generation rate of Household Waste and Types of Household Waste prior to the national policy and strategy for reducing Household Waste and Types of Household Waste in the year 2025;** and b. Handling of Household Waste and Waste Similar to Household Waste by 70% (seventy percent) of the generation rate of Household Waste and Waste Similar to Household Waste prior to the existence of national policies and strategies for handling household waste and waste similar to household waste in 2025
Presidential Regulation No. 35 of 2018 concerning Planning for Construction of Waste Management Installations into Electrical Energy	**Article 2** 1) **Waste management aims to improve public health and environmental quality, and to significantly reduce the volume of waste for the sake of cleanliness and beauty of the city and to make waste as a resource** 2) Waste management is carried out in an integrated manner from upstream to downstream through waste reduction and waste handling 3) **Waste management as a resource** as referred to in paragraph (1) is carried out to obtain added value from waste into electrical energy
Attachment to Law 23/2014 Local Government _ Division of Environmental Affairs	**Central Government Affairs:** • Issuance of incinerator permits to convert waste into electrical energy • Issuance of permits for the use of methane gas for electrical energy in regional landfills by private parties • Guidance and supervision of handling at TPA/TPST • Determination and supervision of producer responsibilities in waste reduction • Guidance and supervision of producer responsibility in waste reduction **Provincial Government Affairs:** • Handling of waste at regional TPA/TPST **District/City Regional Government Affairs:** • Waste management • Issuance of permits for waste recycling/waste processing, waste transportation and final waste processing held by the private sector • Guidance and supervision of waste management organized by the private sector
Minister of Environment and Forestry Regulation No. P.10/MENLHK/ SETJEN/ PLB.0/4/2018 Regarding Guidelines for Formulating Regional Policies and Strategies for the Management of Household Waste and Similar Household Waste	1. The **local government has the authority to regulate the producer's obligations in reducing waste** 2. The Regional Government may **detail the norms, standards, procedures and criteria that have not been regulated by the Central Government** of the Republic of Indonesia in a Regional Regulation. Example: the ban on the supply of single-use plastics

3.2.3 Sustainable food consumption and food diversification

Sustainable production also goes hand in hand with sustainable food consumption. To address food consumption and nutrition at the national level, the Presidential Regulation of the Republic of Indonesia Number 83 of 2017 concerning Strategic Food and Nutrition Policy provides relevant guidelines that may indirectly help address the issue of food waste (See Table 12). Firstly, the regulation sets forward guidelines to develop both national and regional action plans on food and nutrition (RAN-PG and RAD-PG). This regulation clearly states that at the national level, it is the governments' duty to support food affordability and utilization through better marketing, strengthening food logistics systems and provision of food assistance for the poor. Considering that, at the national level, food that could have fed 61-125 million people is being wasted annually (BAPPENAS, 2021), this policy can help set the mandate for the national government to better support distribution of surplus foods.

The regulation also promotes the diversification of food consumption patterns, which is important in light of the pattern of overconsumption of white rice in Indonesia. As it pertains to food waste, rice waste contributes to one of the largest categories of wastage (BAPPENAS, 2021). Another relevant aspect of indirectly addressing food waste is through the nutrition initiative to address the issue of overconsumption. Through the "ideal food score" (*skor pola pangan harapan*) individuals and consumers are provided with guidance on the ideal food portion sizing, with a focus on nutritional balance and food diversification (BKPKP, 2015). The "ideal food score" is used as an indicator in the National and Regional Medium Term Development Plan.

Table 12. Sustainable Food Consumption, Nutrition and Food Diversification Policy

Regulation/ Policy	Relevant Content
Presidential Regulation of the Republic of Indonesia Number 83 of 2017 concerning Strategic Food and Nutrition Policy	**Article 1** **2)** The National Action Plan for Food and Nutrition hereinafter abbreviated as RAN-PG is **a national-level action plan containing programs and activities in the field of food and nutrition in order to realize quality and competitive human resources.** 3) Regional Action Plan for Food and Nutrition, hereinafter abbreviated as RAD-PG, is an **action plan at the provincial and district/city levels containing programs and activities in the field of food and nutrition** in order to realize quality and competitive human resources. **Article 6** Policies in the field of food affordability as referred to in Article 4 subparagraph (b), include: a. **Food marketing efficiency.** **b. Strengthening the food logistics system.** c. Stabilization of supply and prices of staple food and other foods. d. Community empowerment in the field of food and nutrition; **e.** Handling of food and nutrition insecurity; and **f. Provision of food assistance for the poor and people experiencing food insecurity and under nutrition.** **Article 7** Policies in the field of food utilization as referred to in Article 4 paragraph (c), include: a. Development of **diverse food consumption patterns**, nutritionally balanced, and safe; **Article 10** The implementation of the policies as referred to in Article 4 to Article 9 aims to realize: a. Increased availability of energy, protein, vitamins, and minerals; b. Increased **consumption of energy, protein, vitamins, and minerals to an ideal extent**; c. **Increase in the ideal food score** (***Skor Pola Pangan Harapan***); e. **Prevention of increased prevalence of obesity, especially in the population aged over 18 (eighteen) years.**