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Systems Thinking for a
Sustainable Food System Booklet Series

Environmental Sustainability within the Food System Framework

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Foreword

Food and environmental sustainability are two sides of the same coin. They cannot be separated. The way we produce and consume food will affect the sustainability of the environment.

At the same time, maintaining environmental sustainability is a solution to various food issues around us. Ignoring environmental sustainability in finding solutions to food issues is a reckless move that will create new, more difficult problems to solve in the future.

Koalisi Sistem Pangan Lestari (KSPL), part of Food and Land Use Coalition (FOLU), has produced this booklet to invite readers to apply systems thinking not only in looking at food issues, but also in finding solutions. This booklet is a part of the Systems Thinking for a Sustainable Food System Booklet Series, which consists of five volumes:

Volume 1: Understanding the Food System and the Systems Thinking Framework

Volume 2: Healthy Diet

Volume 3: Agroecology

Volume 4: Reducing Food Loss and Waste

Volume 5: Environmental Sustainability within the Food System Framework

This booklet, Volume 5, is divided into four sections. The first section introduces the importance of protecting and restoring environmental sustainability. Readers are invited to see how the interrelationship between food and environmental sustainability works. By understanding this interrelationship, readers can understand the importance of protecting and restoring environmental sustainability.

The second section delves into environmental sustainability in the context of the food system. In this section, readers can gain a clear understanding of the close correlation between the food system and environmental sustainability.

The third section of this booklet talks about possible government and business policies to maintain environmental sustainability. Readers will learn about policy choices that can be made by governments and businesses to maintain and restore environmental sustainability.

The fourth section of this booklet covers various strategies for preserving and restoring environmental sustainability. By the end of this section, readers should be able to identify and take small steps to actively encourage policymakers in government and business to maintain and restore the environment.

This booklet draws on training materials on systems thinking for a sustainable food system and other relevant literature. KSPL would like to express our gratitude to all those who have assisted in the publication of this booklet.

We understand that this booklet may not be perfect and there is always room for improvement. We welcome any feedback or constructive criticism that can help us enhance the quality of this booklet in the future.

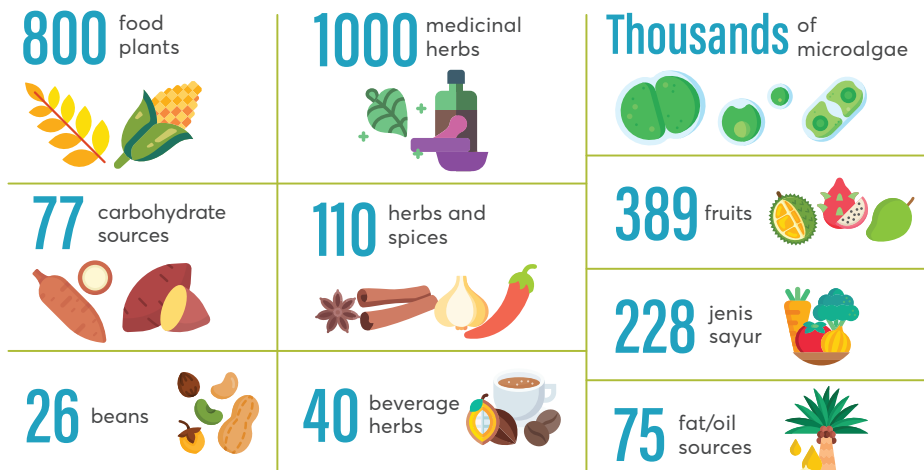
Ultimately, we hope for this booklet to be a valuable resource for readers who are interested in learning about the application of systems thinking in building a sustainable food system.

Jakarta, January 2023

I. The Importance of Restoring and Protecting Environmental Sustainability

Today, rice continues to be the staple food for most Indonesians. **However, Indonesia has diverse food sources** due to its unique ecological conditions such as landscapes, soil types, climate and the distribution of islands.

Food biodiversity in Indonesia¹



Source: Khudori

Indonesia boasts the second largest biodiversity in the world. However, rice has become the only staple food in Indonesia since the policy to make rice as the standard staple food in the 1980s. During the New Order regime, the government's agricultural policy prioritized rice, relegating non-rice agricultural policies to a secondary role. Consequently, few specific policies are geared towards developing non-rice foods, particularly from a research standpoint².

Making rice as the standard staple food has also altered the consumption patterns of Indonesians, making the community vulnerable to hunger disasters in the event of a disruption in the rice supply. According to Yohana Susana Yembise, the Minister of

Women Empowerment and Child Protection at the time, the high number of malnutrition cases in Asmat, Papua in 2018 was attributed to the community's reliance on rice. She said that Papuans, including the Asmat people, traditionally relied on local foods such as tubers and sago. However, the rice subsidy (Raskin) program launched by the government in 2003 accelerated the transition to rice. Since the rice subsidy program was launched, the people of Papua have stopped processing local foods. Instead, they simply wait for their monthly subsidized rice³.

Making rice the standard staple food has also contributed to the loss of forest cover. According to data from the Faculty of

Agriculture at Pattimura University (Unpatti) in Ambon, over the past 50 years, there has been a decline in sago land in Maluku by up to 50 percent. The latest survey in 2006 showed that only 40,514 hectares of sago is left in Maluku. This decline is attributed to the opening of paddy fields, such as the conversion of a 350-hectare sago forest in Besi Village, Seram Utara District, Central Maluku into a paddy field in 2015⁴.

The shift in consumption patterns from local food to rice also drives communities living around forests to resort to cutting down trees to be exchanged for rice. "In the past, even if we didn't have rice, we could still eat. Deer, wild boars, monkeys, birds and pigs were everywhere. Now they're very difficult to find. Sometimes, we don't find any in one day," said Manik, a member of the Punan Batu indigenous community.

"We suffer. In the past, no one would cut down trees. Instead, we gathered sweet potatoes. Today, we have to carry one cubic meter of wood. We cannot live without rice⁵."

This relationship between consumption patterns and forest loss is not unique to Maluku. In Java Island, one of the main contributors to deforestation is land conversion for agriculture⁶. The loss of forest due to the expansion of paddy fields makes the area more vulnerable to ecological disasters. For a deforested area, floods and landslides are some of the common ecological disasters.

Moreover, the loss of forests also contributes to greenhouse gas emissions (GHG). Scientists estimate that emissions caused by deforestation and forest degradation account for about 20 percent of all GHG emissions per year⁷.

The agricultural sector is one of the contributors to GHG emissions, which causes disruption to the climate system in the atmosphere. In Indonesia, the agricultural sector contributes 13 percent of total GHG emissions. The projected GHG emissions from the agricultural sector in Indonesia in 2030 are even estimated to be 478.503,66 GtCO₂e⁸.



Not only a contributor to GHG emissions, agriculture is also highly vulnerable to the impacts of climate change. Globally, climate change can reduce agricultural production by 5-20 percent⁹. Unfortunately, the Intergovernmental Panel on Climate Change (IPCC) report in February 2022 stated that the climate crisis is coming sooner than predicted¹⁰. This means that the decline in agricultural production will occur more quickly.

One of the impacts of the climate crisis is the looming food crisis. Since 1961, plant productivity growth in Africa has decreased by one-third due to climate change¹¹. A decline in agricultural production has also occurred in Indonesia. In Garut Regency, hundreds of hectares of tomato and chili crops were damaged due to high rainfall. Meanwhile, in Jambi, around 578.5 hectares of rice fields experienced crop failure due to high rainfall¹².

Food productivity decline is also seen in seafood.

The increase in temperature and sea surface oxidation are reducing the productivity of both shellfish aquaculture and fisheries¹³. If this issue is not addressed, we will soon face a protein source crisis from fishikan.

The increasing frequency of storms and high waves as a result of the climate crisis has hindered fishermen from going out to sea. For instance, in Kedung Cowek, East Java, fishermen are unable to set sail due to unfavorable weather conditions, causing a sharp decline in their income¹⁴. Similar situations have also been observed in Demak, Central Java, where according to data from the KIARA Data and Information Center, 1,336 fishermen in the Wedung District of Demak Regency were forced to suspend their activities at sea due to bad weather¹⁵.

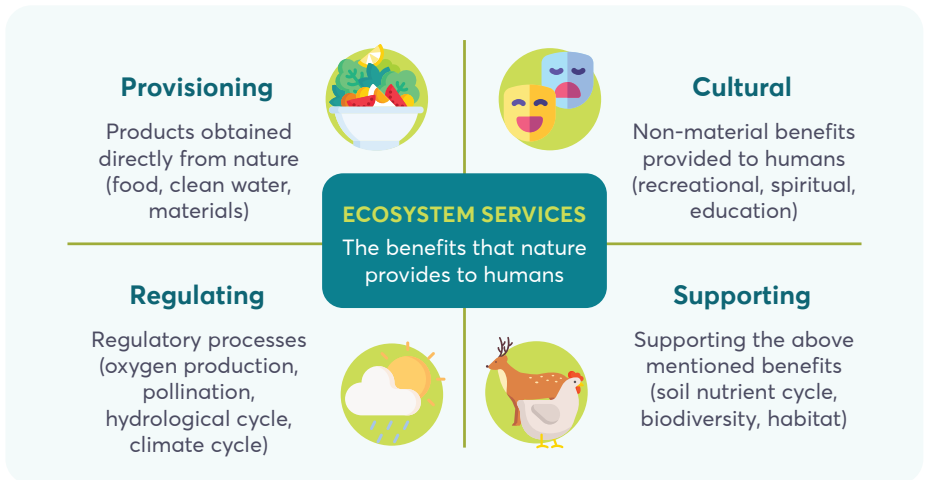
The climate crisis is not just a theory. It is a stark reality that has caused various calamities. Therefore, a transition towards a sustainable food system is both pertinent and pressing in the current climate crisis.

II. Environmental Sustainability within the Food System Framework

Nature is a component of a larger system consisting of interconnected elements. The interdependent relationship between living organisms and their physical surroundings that enables life to exist is what is commonly referred to as an ecosystem¹⁶.

Ecosystems arise from the interplay of biotic (living components) and abiotic (non-living components that are crucial in maintaining ecosystem balance) elements. Interactions between these elements in an ecosystem form patterns such as food chains, water cycles, carbon, nitrogen and others¹⁷.

As humans, we are an element of this ecosystem. We depend on the services it provides. These services range from direct products like food, clean water and other materials to non-material benefits such as cultural services¹⁸.



Source: IUCN (2017)

Food is inherently linked to nature, as it relies on fertile soil and sufficient water supply. Ecological disasters resulting from the climate crisis, such as droughts, floods and the proliferation of crop pests, can have detrimental impacts on food crops. Conversely, agricultural practices that disregard the importance of sustainability also contribute to rising greenhouse gas emissions, ultimately leading to the climate crisis.

III. Government and Business Policies for Environmental Sustainability

Human lives depend on ecosystem services. It is therefore not out of bounds for the UN Human Rights Council to recognize access to a healthy environment as a fundamental human right. The council has adopted a resolution recognizing the right to a clean, healthy and sustainable environment, which serves as the first formal recognition of those rights as a global human right¹⁹.

International human rights standards safeguard the right to life in Article 6 of the International Covenant on Civil and Political Rights (ICCPR), which has been ratified by Indonesia. This standard stipulates that certain rights are inherent to all human beings, including access to food, adequate housing, clean water, sanitation and healthcare²⁰.

In terms of human rights, the state has the primary legal responsibility to protect, promote and advance human rights, especially for its citizens²¹.

Nevertheless, corporations are also responsible for protecting human rights and should refrain from engaging in practices that are harmful to individuals. The Guiding Principles on Business and Human Rights, established by the UN Human Rights Council on June 16, 2011, serves as a guide for companies to prioritize human rights principles in their operations²².

Governments and the business sector can fulfill their obligations to uphold the right to a healthy environment in various ways. In the context of restoring and safeguarding the natural ecosystem related to the food system, the following are some of their responsibilities:²³



Government

- Increasing payment for ecosystem services and enhancing education services.
- Establishing and enforcing a moratorium on the conversion of natural ecosystems, while granting legal recognition for the land of indigenous populations.
- Increasing REDD+ funding up to USD50 billion per year by 2030 if the objectives are achieved.
- Forming a global alliance against environmental crimes.
- Protecting breeding grounds, ending illegal and excessive fishing practices and granting ownership/access rights to fishermen.
- Working with the business sector to develop new approaches and business models for climate disaster insurance and compensating poor fishermen for the cost of restoring fish stocks.



Business

- Shifting from commodity purchasing to investing in sustainable supply chains.
- Establishing a transparent and deforestation-free supply chain.
- Collaborating with the government to develop new approaches and business models for climate disaster insurance and compensating poor fishermen for the cost of restoring fish stocks.

IV. Environmental Sustainability

Restoration and Protection Measures

As part of the ecosystem, we can take strategic steps to restore and protect environmental sustainability. There are many options that we can take in the context of environmental restoration and protection in relation to the food system, such as²⁴:

a. Scaling up productive and regenerative agriculture and making all agriculture more sustainable

Productive and regenerative agricultural practices combine traditional techniques, such as crop rotation, controlled livestock grazing and crops cover, with high-precision agricultural technology and new bio-based fertilizers and pesticides. These practices are supported by sustainable land management and integrated water resource management.

b. Protecting and restoring forests and other natural ecosystems

The current food system relies heavily on a small number of high-calorie but low-nutrition staple crops. This contributes to unhealthy diets, leading to health problems and environmental degradation. The UN Food Systems Summit 2021 acknowledges that the world needs a food system transformation in which forests play a key role. Forests enrich biodiversity, restore degraded land and help mitigate and adapt to climate change. Forests also provide nutrient-rich food. If all food system actors give proper attention to forests, they can contribute to a healthier and more sustainable food system transformation.

c. Maintaining the health and productivity of the oceans

Sustainable fishing and aquaculture can increase the supply of seafood protein, reduce demand for land and support healthier and more diverse diets. This will only be possible if important habitats such as estuaries, wetlands, mangroves and coral reefs are protected and restored, and if nutrient and plastic pollution is stopped.

Countries, businesses and all of us as a society have different responsibilities to start taking steps to restore and protect the environment.

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