



strategy paper
**INDONESIA
SUSTAINABLE
FOOD SYSTEM**

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strategy paper **INDONESIA SUSTAINABLE FOOD SYSTEM**

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The drafting of this strategy paper involved active participation of relevant food stakeholders, through workshops, focus group discussions, interviews, and dialogues.

2019



Foreword

EU Ambassador to Indonesia and Brunei Darussalam

Sustainable food system, including ensuring inclusive access, sustainable production and consumption, as well as minimizing food loss and waste is a priority for both Indonesia and the European Union.

In the EU, we recently announced the *European Green Deal*, which charts the path of the European Union to a sustainable green transition. This will happen by developing a green, circular and low-carbon economy in a way that is economically just and inclusive for all. Faced with a global scarcity of natural resources, ‘doing more with less’ has become the main challenge for producers and consumers. To address this challenge during a period of rapid climate change and growing demand for energy and resources, the EU is introducing a range of policies and measures aimed at sustainable consumption and production. In the framework of the European Green Deal, the ‘Farm to Fork’ strategy designs a fair, healthy, and environmentally food system. The strategy will pave the way to formulating a more sustainable food policy in Europe.

As this is a global challenge, it can only be tackled together. The EU and Indonesia are committed to working together to meet our global commitments under the 2030 Agenda and the Sustainable Development Goals (SDGs). In the spirit of SDG 12, ‘Ensure sustainable consumption and production patterns’, the EU supports responsible supply chains and business practices through the SWITCH Asia programme. Launched in 2007, it aims to accelerate the transition of countries in Asia, including Indonesia, to a low carbon, resource efficient, and circular economy, engaging the industrial sector, consumers, financial institutions and national governments.

For instance, in Indonesia, the ‘Local Harvest: Promoting Sustainable and Equitable Consumption and Local Food System’ project, funded with EUR 2 million, supports sustainable food consumption and production as a solution to achieve sustainable food security and sovereignty to support community welfare.

One outcome of the project is this strategy paper on Indonesia’s Sustainable Food System, which was developed in a series of workshops and dialogue forums with participation of representatives of several Indonesian ministries and government agencies such as the Ministry of National Development Planning (BAPPENAS), Ministry of Agriculture (KEMENTAN), Ministry of Industry (KEMENPERIN), Ministry of Environment and Forestry (KLHK), Ministry of Maritime Affairs and Fisheries (KKP), Ministry of Finance (KEMENKEU), as well as the National Agency of Drug and Food Control (BPOM). The strategy paper provides an overview of the food life cycle in Indonesia, identifies the main challenges and provides a basis to formulate strategies and innovations to improve the performance of food management in Indonesia.

I hope we all can learn from this strategy paper and it will provide inputs for policy decisions by the Government of Indonesia as well as for new approaches by the business sector as well as consumers. The paper will also help us to work together to enhance sustainable food consumption and production in Indonesia and take the country forward towards achieving the SDGs by 2030.

Jakarta, December 2019

Vincent Piket

EU Ambassador to Indonesia and Brunei Darussalam

Foreword

Ministry of National Development Planning/National Development Planning Agency (Bappenas) Republic of Indonesia

The Government of Indonesia has committed to achieve the Sustainable Development Goals (SDGs) targets. This commitment is demonstrated by mainstreaming and aligning indicators for achieving the SDGs targets with the national development strategies and priorities listed in the National Medium-Term Development Plan (RPJMN) and the Government Work Plan. However, synergy and collaboration from related stakeholders at national and local levels are crucial for the implementation of the plans. The importance of multi-stakeholder partnership is also mandated in the Presidential Regulation No. 59 of 2017 concerning the Implementation for Achieving Sustainable Development Goals (SDGs).

For Indonesia, the food sector is always positioned as one of the national development priorities. The Food Law No. 18 of 2012 mandates that food management should be carried out to meet basic human needs that provide fair, equitable and sustainable benefits based on food sovereignty, food independence, and national food security. Therefore, it is necessary to develop a sustainable food system that is applicable, suitable and adequate to the conditions of food practices in Indonesia by ensuring that all stakeholders, including vulnerable groups gain access to and are actively involved in the food system and practices in Indonesia, in line with the inclusive spirit mandated by the SDGs.

The Strategy Paper on Indonesia Sustainable Food System is a document established through a participatory process by Indonesian food system stakeholders. These include representatives of various government agencies, business actors, academics, media, and civil society organizations who are collaborating in a multi-stakeholder platform for Indonesia Sustainable Food System. This initiative aims to strengthen the implementation of the Food Law, especially in the food planning process for achieving indicators of the Desirable Dietary Pattern based on local diversity as stated in the RPJMN 2020-2024.

This document explicitly emphasizes the importance of mainstreaming sustainability principles in the food practices in Indonesia based on local food diversity as well as dietary needs, and ensuring inclusive access to food sources for all Indonesian people without exception. It is expected that this document would become one of references for the food planning process in Indonesia and its implementation through multi-stakeholder partnerships at the national and local levels.

We would like to express our gratitude to all parties who have actively participated and contributed to the drafting of this strategy paper, and continue to collaborate. It is our hope that this initiative can encourage further coordination, collaboration, and synergy among stakeholders to strengthen the Indonesia food system and ensure achievement of the 2030 Agenda for Sustainable Development Goals.

Jakarta, December 2019

Anang Noegroho

Director for Food and Agriculture

Ministry of National Development Planning/National Development Planning Agency

Foreword

Hivos

On behalf of Hivos it is my great pleasure to provide this foreword marking release of the Strategy Paper on Sustainable Food System of Indonesia which has documented the complexity of Indonesia's food system and provides recommendations to improve it. This strategy paper is an outcome of a series of workshops and in-depth interviews with several key stakeholders conducted in 2019 by the multi-stakeholder platform on Indonesia Sustainable Food System. The platform was established in collaboration with the Directorate of Food and Agriculture of the National Development Planning Agency (BAPPENAS) within the framework of the two projects implemented by Hivos and its partners i.e. European Union (EU) supported Switch Asia Local Harvest project and Dutch Government supported Sustainable Diets for All (SD4ALL).

Sustainable Food is one of Hivos thematic program areas which aims at providing access to sufficient, affordable and healthy food to all, in particular for low-income consumers, can create substantial economic opportunities and generate positive environmental returns. This thematic area contributes to Sustainable Development Goal 2 (zero hunger) and Goal 12 (responsible consumption and production) targets.

In realising the goals of its thematic programs, Hivos pursues a 3-step strategy which includes: working with front runners, co-creating solution through multi-stakeholder engagement and lobby & advocacy/ policy influence. All these approaches in general and the multi-stakeholder engagement in particular have been an integral part of implementing the work of the above mentioned projects and the platform. In applying these strategies Hivos has gained experience globally through its work in 25+ countries spread over 5 regions which adds significant value to its work with partners and other stakeholders in Indonesia. We appreciate that the Indonesian government, particularly the Directorate of Food and Agriculture of BAPPENAS, has shown strong commitment and support to this multi-stakeholder initiative to achieve the SDG targets.

We expect that the strategy paper can be used as one of the references for developing plan and policies related to the food system in Indonesia, and the platform will be sustained as a medium for sharing of experiences and best practices, improving co-creation, and increasing the effectiveness of the action towards the SDG targets. This collaboration is an embodiment of SDG 17.

I would like to take this opportunity to sincerely thank the EU for its support, BAPPENAS and other stakeholders who actively participated in the drafting of this strategy paper and supported the platform. Finally, I would like to invite others to participate in the next steps as this is only a start and implementation is of critical importance.

Jakarta, December 2019

Biranchi Upadhyaya
Regional Director
Hivos Hub Southeast Asia

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Food Glossary

FOOD is any product originating from biological resource such as agriculture, plantation, forestry, fishery, husbandry, marine, and water, whether processed or not, designated as food or beverage for human consumption, including food additive materials, food raw materials, and other materials used in the action of preparing, processing and/or producing food or beverages. (Act No. 18/2012)

FOOD SOVEREIGNTY is the right of the state and the nation to independently determine the food policy which guarantees the right to food for the people and which grants the community the right to determine the food system appropriate with the potential of local resources. (Act No. 18/2012)

FOOD AUTONOMY is the capacity of the state and the nation in producing a wide range of food domestically that is able to guarantee the fulfillment of food needs sufficiently reaching individual level by making use of potentials of natural, human, socio-economic, and local wisdom resources with dignity. (Act No. 18/2012)

FOOD SECURITY is a condition of food fulfillment of a state up to individual level, reflected from the sufficient availability of food, both by quantity and quality, which is safe, various, nutritious, prevalent, and affordable as well as not contradicting with religions, beliefs, and culture of the community in order for them to be healthy, active, and productive in sustainable way. (Act No. 18/2012)

FOOD SAFETY is a condition and attempts required to prevent food from possible pollution – biologically and chemically, as well from other objects that may spoil, harm, and endanger to human health and does not contradict with religions, beliefs, and culture of the community thus the food is safe to consume. (Act no. 18/2012)

FOOD PRODUCTION is an activity or process to produce, to prepare, to process, to make, to preserve, to pack, to repackage, and/or to change the form of food. (Act no. 18/2012)

FOOD AVAILABILITY is a condition of food availability originating from both domestic production and national food reserve, or from import in case the two main resources cannot meet the needs. (Act no. 18/2012)

FOOD DIVERSIFICATON is an effort to increase food availability and consumption which is varied in range, nutritionally balanced, and based on the potential of local resources. (Act no. 18/2012)

LOCAL FOOD is locally consumed food that is in accordance with the local potential and wisdom. (Act no. 18/2012)

FARMERS are Indonesian citizens, both individually as well as with their families, who work on farming business in food sector. (Act no. 18/2012)

FISHERMEN are Indonesian citizens, both individually as well as with their families, whose livelihood is catching fish. (Act no. 18/2012)

FISH CULTIVATORS are Indonesian citizens, both individually as well as with their families, whose livelihood is raising, breeding, and/or nurturing fish and other aquatic biological resources as well as harvesting from a controllable environment. (Act no. 18/2012)

NUTRITION is substance or compound contained in the food consisting of carbohydrates, proteins, fats, vitamins, minerals, fiber, water, and other components beneficial for human growth and health. (Act no. 18/2012)

NUTRITIONAL STATUS is a condition of a person's body health as the end result of food intake into the body and its utilization. (Governmental Regulation No. 17/2015)

FARM LAND is land area used for Agriculture business. (Act no. 41/2009)

SUSTAINABLE FOOD FARM LAND is farm land area determined to be consistently protected and developed in order to produce staple food for national food autonomy, security, and sovereignty. (Act no. 41/2009)

FOOD FARMERS, hereinafter referred to as farmers, are Indonesian citizens and their families who cultivate farm land for staple food commodities in sustainable food farm land. (Act no. 41/2009)

Summary

Nine Recommendations On Indonesia Sustainable Food

The recommendations on sustainable food below constitute a summary of strategy paper proposed in the framework of improving the performance of food systems and practices in Indonesia.

1 Mainstreaming Indonesia Sustainable Food System (ISFS) towards Governmental Policy.

Indonesia must have a sustainable food system that is applicable, suitable and adequate to the conditions of food practices in this country. The implementation of the ISFS must be based on eight principles of sustainable food (shared goals, holistic, inclusive, local, interdependence, food life cycle, environmental and natural resource system, and sustainability) in a consistent and sustainable manner. The Indonesia Sustainable Food System and its principles as well as various attributes must be incorporated into a formal policy of the Government of the Republic of Indonesia in the form of Governmental Regulation or Presidential Regulation.

2 Optimizing the utilization of local food germplasm and ensuring the availability of land and water for food.

Indonesia has 77 types of carbohydrate-resource food plants but only been focusing at only two plants: rice and corn. In the same way, Indonesia has 26 types of beans but solely been focusing at soybean. This situation has to be radically changed. Including herbs and spices, Indonesia has 945 species of food resource plants available for utilization. Such kind of diversity should be optimized, not extinguished as it has been so far. Aborting the genetic diversity of local food resources is a slowly suicidal attempt for national food security.

3 Ensuring the inclusive access to food land and water, including forest and marine as food sources.

Government must ensure inclusive access to land and water as food sources. Access to food sources is a top priority for the community, men and women, especially indigenous communities. In case of land or water conflict, including conflict with protected areas, access to food must remain be a priority. Food is fundamental need thus the fulfilment shall be guaranteed.

4 Empowering the concept of sustainable production in the collection, cultivation, processing and management, storage and reserve, as well as logistics and distribution of food.

Sustainable or responsible production consists of several fundamental elements, i.e. non-polluting, energy and resource efficient, economically viable, caring for labor safety, producing safe products and services for consumers.

In the context of food cultivation, a sustainable production system shall have high level of productivity so as posses a good economic viability. The production system shall also be shifted from chemical to organic base in order to reduce environmental impacts. The implementation of precision farming which enables to provide inputs and informations regarding the most suitable agriculture operation are expected to be able to reduce the use of resources and energy in the form of agricultural facilities and infrastructures. At the side of cultivating farmers, the production and operation system shall provide a high level of prevention and protection against labor safety risks, chemically, mechanically, ergonomically, as well as other risks. The last one is, the agriculture products produced shall be in good quality and safe for consumption.

5 Ensuring the product diversity of staple food cultivation and guaranteeing its quality and soundness.

Locally-based resource food diversity is a key factor in achieving national food security. Hence the utilization of local genetic resources must be conducted. These genetic resources have been adapting to the environment thus having a relatively high level of compatibility and resilience toward various factors related to its growth.

Each district/city in Indonesia must set a target of "basic need" for food as physical needs or public health. Sketchily, the target of food diversity and quantity is derived from the diversity of "Fill my plate locally" ("My Plate" initiative by the Government of Indonesia). The need of such basic food must be available and prioritized. Beyond this need, districts/cities may determine food for other reasons, such as for recreational need and as commodity.

6 Development of "granary" networks (real and virtual) based on local wisdom.

In order to ensure the sustainable food availability which should be any time accessible, there is a need to develop local wisdom-base food storage network (real and virtual) at different levels of community/ administrative (village, sub-district, district, region, province, large island, and national). Within the storage network, an integrated and real time information exchange of food reserve from each "granary" will be the backbone of national "granary" network system.

7 Ensuring the realization of a fair food price on each value chain.

Factually, dozens of millions of food farmers in Indonesia are quite vulnerable in terms of bargaining position regarding the trade of food commodity they produce. Almost similar condition has happened to food consumers, particularly those with middle-lower incomes. These groups are vulnerable to the fluctuation of food prices. As the actors and the very stakeholders are powerless against fair trade.

The first action shall be taken is to systematically set up the food distribution system. Indonesia must have a systematic and proper database and food distribution knowledge management. Detailed information about the actors in the food supply chain, from farmers to consumers, must be made available and transparent to all food stakeholders in Indonesia.

8 Making sustainable food consumption as the top-of-mind and lifestyle of Indonesian people.

Consumption patterns, including food, are largely determined by perception (top-of-mind) and lifestyle. Thus, a massive promotion is required for transformation in order to enable sustainable food consumption be the top-of-mind in food preferences and viral lifestyle in society.

9 Implementing the hierarchy of management in food loss and waste consistently at each stage of the food life cycle to prevent and minimize the amount of food loss and waste.

An ideal food system must able to create a closed loop (from cradle to cradle), so as there will be no in vain food loss and waste. Food loss and waste should be preventable, in case of already becoming waste, it should be able to make use of it or to return it back to the food system.

For this particular reason, a quantitative information on food must be available at each stage of its life cycle. Food material balance needs to be carefully prepared in order to understand precisely the flow of food along with its quantity and behavior. Such food material balance constitutes basic information that must be available in order to obtain information on the amount of food loss and waste.

Chapter 1

Introduction

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The process of tapping palm sugar palm juice in Kolaka, Southeast Sulawesi • (Photo: Hartaty)



Background

“The National Development Planning Agency (Bappenas) and the SWITCH Asia Local Harvest project consortium have initiated the establishment of stakeholder forum for Sustainable Food System in Indonesia.”

Food becomes one of Sustainable Development Goals (SDGs) elements, specifically SDGs 2, i.e. to end hunger, to achieve food security and to improve nutrition as well as to promote sustainable agriculture.

In order to achieve these goals, 5 measurable targets have been set through 20 indicators, namely:

- to end hunger and malnutrition
- to double agricultural productivity
- to ensure sustainable food farming
- to manage genetic diversity, and
- to enhance agricultural productive capacity.

There are several food related SDGs, however in this document we underline two most relevant ones, namely Zero Hunger of SDG 2 and Responsible Consumption and Production of SDG 12. In order to support these two SDGs, Hivos implements the SWITCH Asia Local Harvest Project in partnership with WWF Indonesia, Indigenous Peoples' Alliance of the Archipelago (AMAN), Association for Women in Small Business Assistance (ASPPUK), and Non-Timber Forest Product – Exchange Program (NTFP-

EP) Indonesia. This project is supported by the European Union.

The general objective of this project is to contribute to economic welfare and to end poverty in Indonesia by promoting the transition towards responsible consumption and sustainable- healthy-fair and local food production by consumers and MSMEs.

Whereas the specific objectives of the project are:

- A significant transition in consumption patterns towards sustainable and ethically obtained food products in Indonesia which is driven by increasing consumer knowledge and awareness about the impacts of food choices they make.
- The capacity enhancement of MSMEs and producers – including women and indigenous communities – to enter the market, as well as lucrative policies for implementing responsible consumption and production practices in food sector.



Food Stakeholders Forum

One of the expected outputs of this initiative is successful lobbying and efficient advocacy through a national and local platform involving all key actors and stakeholders in the food system in Indonesia. In order to achieve the set targets, an integrated planning and inter-sector cooperation relevant to food system are needed.

This is in line with Hivos' strategy and plan to develop and/or strengthen a food system-related stakeholders forum, both locally and nationally, in order to promote local-fair-healthy – and - sustainable food system, or we call it *Pangan Bijak Nusantara* (Wise Foodways of the Archipelago).

The stakeholders forum is expected to be able to improve coordination and collaboration among related stakeholders, to become a sharing place of knowledge, experiences and best practices in food system as well as to provide inputs to government in the framework of formulating policies and executing programs related to food system.

In the context of formulating the stakeholders forum on *Pangan Bijak Nusantara*, a number of workshops have been held with the participation of relevant food stakeholders.



Activity participants of the Indonesian Sustainable Food System Stakeholder workshop Forum - (Photo: Ario Tranggono)

Methodology in Drafting the Strategy Paper

The drafting of this strategy paper was kicked off by organizing workshops involving relevant food stakeholders. The workshops applied Sustainability Accelerator Tool, a sustainability-based approach that has been commonly used in numerous workshops in various sectors such as business, academic, governmental and civil society organizations.

In exploring the issues arised during the workshops as well as in order to enrich the outlook, in-depth interviews with resource persons and experts in food sector had been conducted. Furthermore, in order to strengthen the information and inputs, analysis toward reports and various presentation materials regarding current issues on food, including the presentation regarding the drafting of 2020-2024 Indonesian National Medium-Term Development Plan had been conducted. The output of the three activities is a list of main issues of national food.

In-depth interviews and consultations, among others with resource persons and experts from National Development Planning Agency (*Bappenas*), National Food Security Agency (BKP), Competence Authority for Food Safety (OKKP), Human Nutrition Research Center of University of Indonesia, Policy Laboratory for Food Development and Inclusive Agriculture of Bappenas, Indigenous Peoples' Alliance of the Archipelago (AMAN), Global Alliance for Improved Nutrition (GAIN) Indonesia, KEHATI Foundation, and the Department of Community Nutrition of Bogor Agricultural Institute.

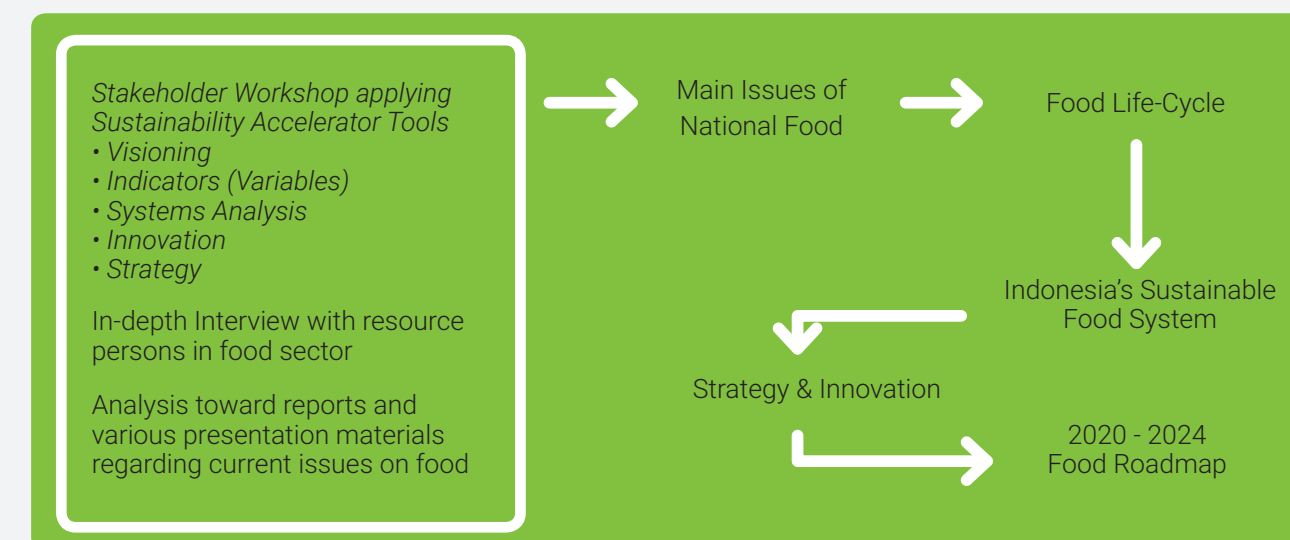
In this paper the food life cycle concept is adjusted to the actual conditions of Indonesia. In turn, this food life cycle will be implemented in order to formulate Indonesia Sustainable Food System or ISFS, a food system compatible with local condition in Indonesia orienting towards sustainable development, holistic approach and local diversity.

In general, the ISFS has three main components, i.e. principles of sustainable food, preconditions and interactions in the food system, as well as outputs and impacts of the food system.

The main issues of food that had been identified are grouped in each stages of compatible life-cycle. Based on the issues, relevant food strategies and innovations then be developed. These strategies and innovations are also arranged based on each food life cycle stages.

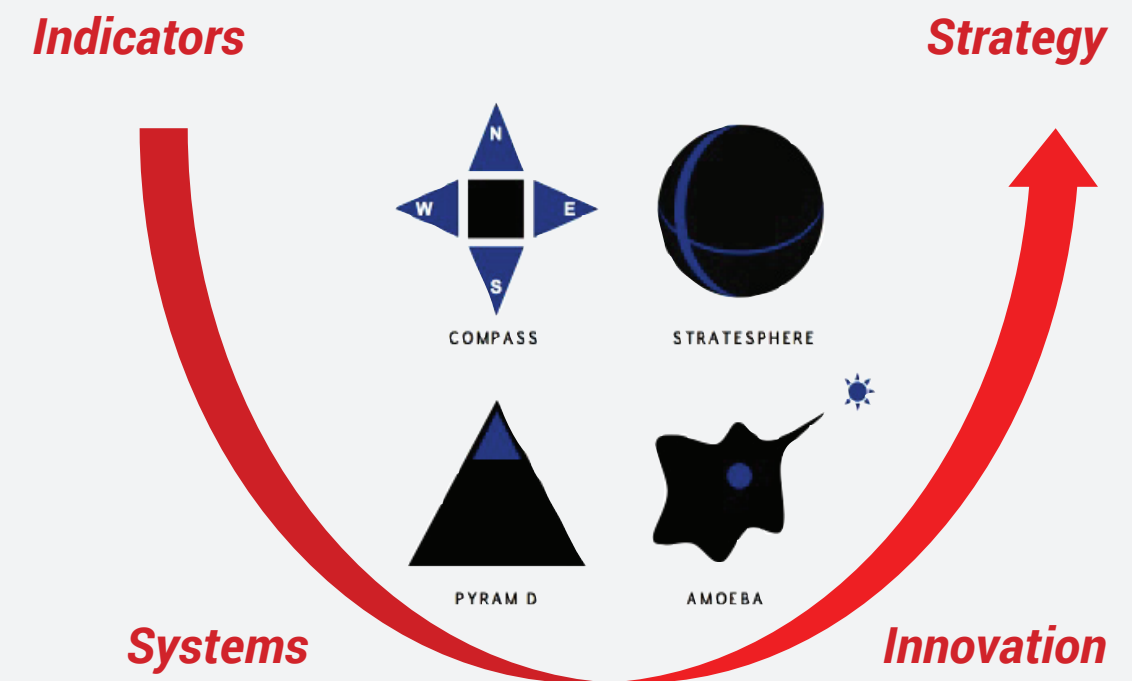
Various strategies and innovations that had been drafted during the Food Stakeholders Workshop become one of inputs in formulating the strategies and innovations in this paper. Such innovations can be introduced as priority programs to improve the performance of food management in Indonesia.

The final part is the drawing up 2020-2024 roadmap for National Sustainable Food consisting food milestone to achieve, strategic activities to conduct, and key indicators to measure annually.



Sustainability Accelerator Tools

Indicators > Systems > Innovation > Strategy



Sustainability accelerator tool was applied to facilitate workshops with stakeholders. The stages of activities in applying the tool are:

- **Visioning:** To set a shared vision that will serve as an ideal goal approved unanimously by all workshop participants. This shared vision will become the ultimate ideal goal of sustainable food system in Indonesia. The vision agreed is *Pangan Bijak Nusantara* (Wise Foodways of the Archipelago).
- **Indicators:** To define key indicators (variables) based on Sustainability Compass that splits participants into four streams, i.e. Nature, Economy, Well-being, and Society. In accordance with their area of expertise and experience, the workshop participants then were asked to split into four streams in order for them to draft nine key variables for each stream. Pyramid Metaphor had already been used at this stage.
- **Systems Analysis:** To formulate causal loop diagrams by using system thinking approach in order to visualize the causal relation and complexity of food system for each and all streams including identifying the leverage points.
- **Innovation:** This stage was initiated by defining the most efficient leverage point that is able to change the behavior of the system. Interventions delivering the best advantage and have a major impact on the system are then formulated by listing the most relevant innovations. At this stage, the most influential actors in the implementation of innovations are being mapped by applying Amoeba Metaphor.
- **Strategy:** The process of strategy formulation is basically a systematic effort to realize an applicable and efficient vision of "Wise Foodways of the Archipelago". The core strategy was then incorporated into 2020-2024 Indonesia Sustainable Food Roadmap, as well as the milestone and annual achievement stages.

Vision of “Wise Foodways of the Archipelago”

Complexity of Food System

“ The vision of *Pangan Bijak Nusantara* (Wise Foodways of the Archipelago) is the realization of a fair, respecting local wisdom, and sustainable food sovereignty for all Indonesian people. ”

The Vision of *Pangan Bijak Nusantara* is a common ideal goal that must be actualized by all food actors and stakeholders in Indonesia. By applying a back-casting planning approach, the vision becomes a pull factor for the development and execution of food policies, programs and events. It serves as the direction for all food activities in Indonesia at each stage of food life cycles. Thus, in this context, planning must be initiated by making the final goal as the initial (begin with the end-in-mind).

In order to operationalize, the vision needs to be interpreted into some operational criteria for each of keywords in the above vision statement. At the table below, you can see the definition of each operational criteria of the vision.

Vision Keywords	Vision Operational Criteria
Sovereignty	<ul style="list-style-type: none">State chooses and stipulates local food as the main food resource in Indonesia.Local governments and communities choose food from each region in order to meet food needs in the region, in accordance with characteristics of available food resources.
Fairness	<ul style="list-style-type: none">Food is available in sufficient quantities when needed.Food is available within the reach of the consumers (reachable).Food is purchasable by consumers at affordable price.Food price is reasonable (fair trade along the food value chain).Food available in diversity, good quality, safe, healthy, fresh and cultural/religious value conformed.
Local Wisdom	<ul style="list-style-type: none">Food crop cultivation uses local food superior seeds and germplasm.Food collection, particularly from forest and marine, applying values of local wisdom embraced in the region.Food management throughout its life cycle also uses proven superiority of local approaches and technology.Food management empowers local social capital (social groups, institutions, gender diversity, etc.)Food consumption prioritizes local resource food diversity.
Sustainable	<ul style="list-style-type: none">State must ensure the availability of sustainable food land in accordance with the needs of food cultivation and collection from forest and marine.State ensures access for indigenous peoples around forest and marine areas to gather food materials wisely. Forest and marine as food sources must be conserved by all stakeholders.Food cultivation applies concept of precision farming or sustainable production.The concept of consumption pattern is responsible consumption, which is healthy, diverse, local and sustainable.

Food system contains high complexity. Interaction and interdependence among food actors and stakeholders can be very intense. Decision taken by one party will have effects to the other, and vice versa. In general, the complex behavior as complex system has counter-intuitive character. In order to have better understanding of such complexity, linear system model cannot accurately represent the actual state of the food system.

In order to gain understanding regarding interactions within a food system, system thinking approach is to utilize. This approach uses a causal loop diagram

for visualization to represent interactions, feedbacks, and behaviors of the interactions itself. The tools used in the modelling are qualitative in character. However, in the future, quantitative models using system dynamics approach can be further developed based on the previous model.

In the framework of creating a food system model, the workshop participants selected at least nine of the most important variables for each stream (nature, economy, society, and well-being). Out of the four streams, based on existing phenomena in the real world, a causal diagram of food system in Indonesia was created.

Systems Thinking Variables

Nature		
Responsible consumption and production	Water protection, Management of scarcity	Biodiversity & ecosystem protection
Ecosystem resilience	Knowledge and capacity of local producer	Enabling policy and institutional framework
Soil health	Land use restoration	Climate change resilience
Economy		
Standardized products	Area of cultivation land	Human resource quality
Technology utilization	Food research and development	Value added of agricultural products
Farmers' well-being	Food production	Raw material availability
Logistic cost		
Society		
Consumer awareness towards local food products	Access to livelihood resources	Fair selling price on farmers level
Local wisdom	Women's role	Farmer capacity
Farmers' prosperity	Local product diversification	
Well-being		
Food consumption quality	Quality of health human resources	Number of young farmers
Safe food availability	Positive experience regarding healthy food	Health literacy of family members
Consumer awareness	Consumer access	Malnutrition

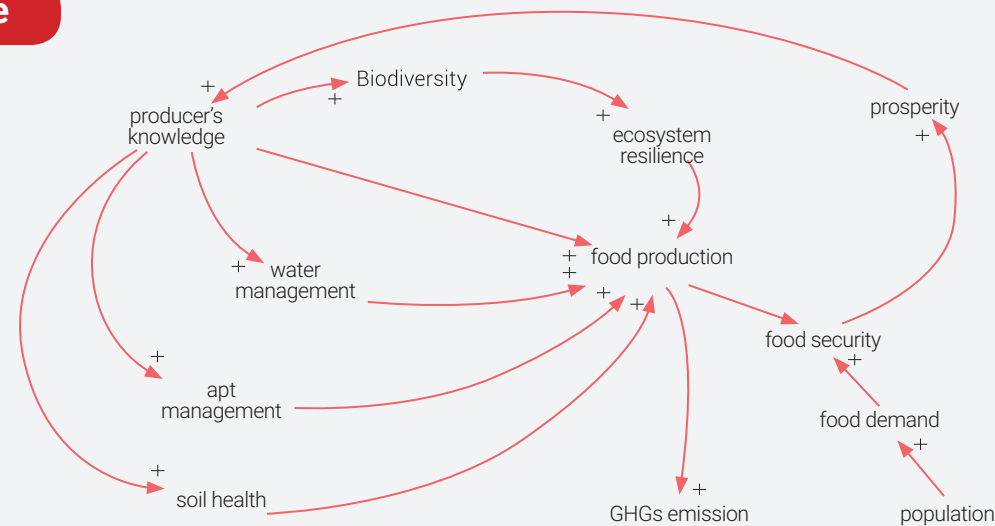
Complexity of Food System

The following four causal loop diagrams describe one among the complexities of real-world interactions phenomena, which are called feedback loop. There is a loop with reinforcing character or unidirectional (marked by notation R for Reinforcement). The basic behavior of this loop is to supply growth. There is also a loop with balancing (marked by notation B for Balancing), which is the opposite of R. If in one system there are R loop and B loop with balanced numbers then the resultant can have oscillating character or in the long run can have stagnant character.

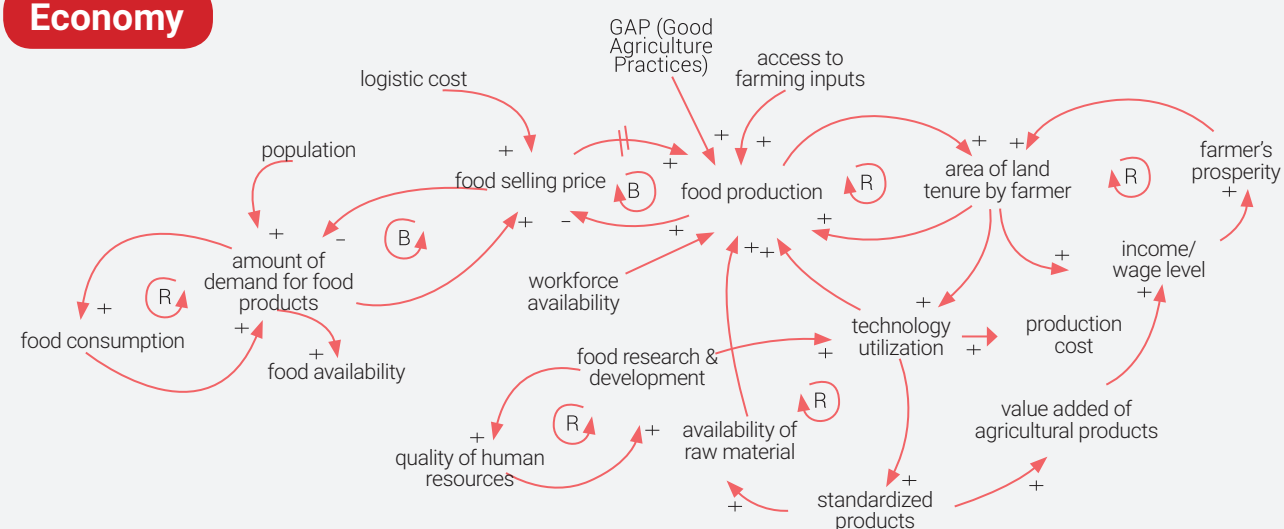
A simple illustration below describes that a decision taken can cause unexpected system behavior or even opposite to the expectation of the policy makers.

It is crucial for food actors and stakeholders to understand this complexity. Intensive multi-party dialogues for the whole food life cycles is one of key factors which at the end able to make decisions with positive impacts regarding food performance in Indonesia.

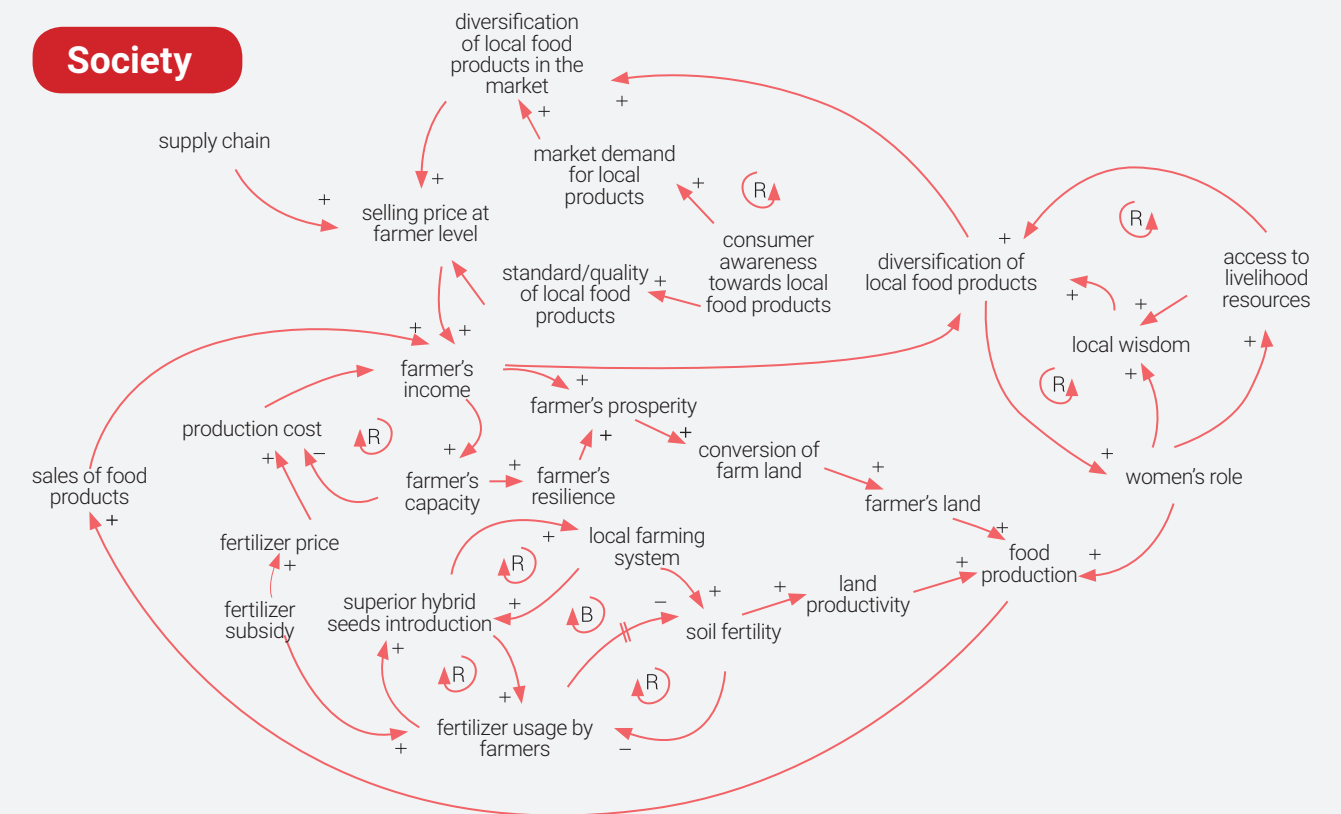
Nature



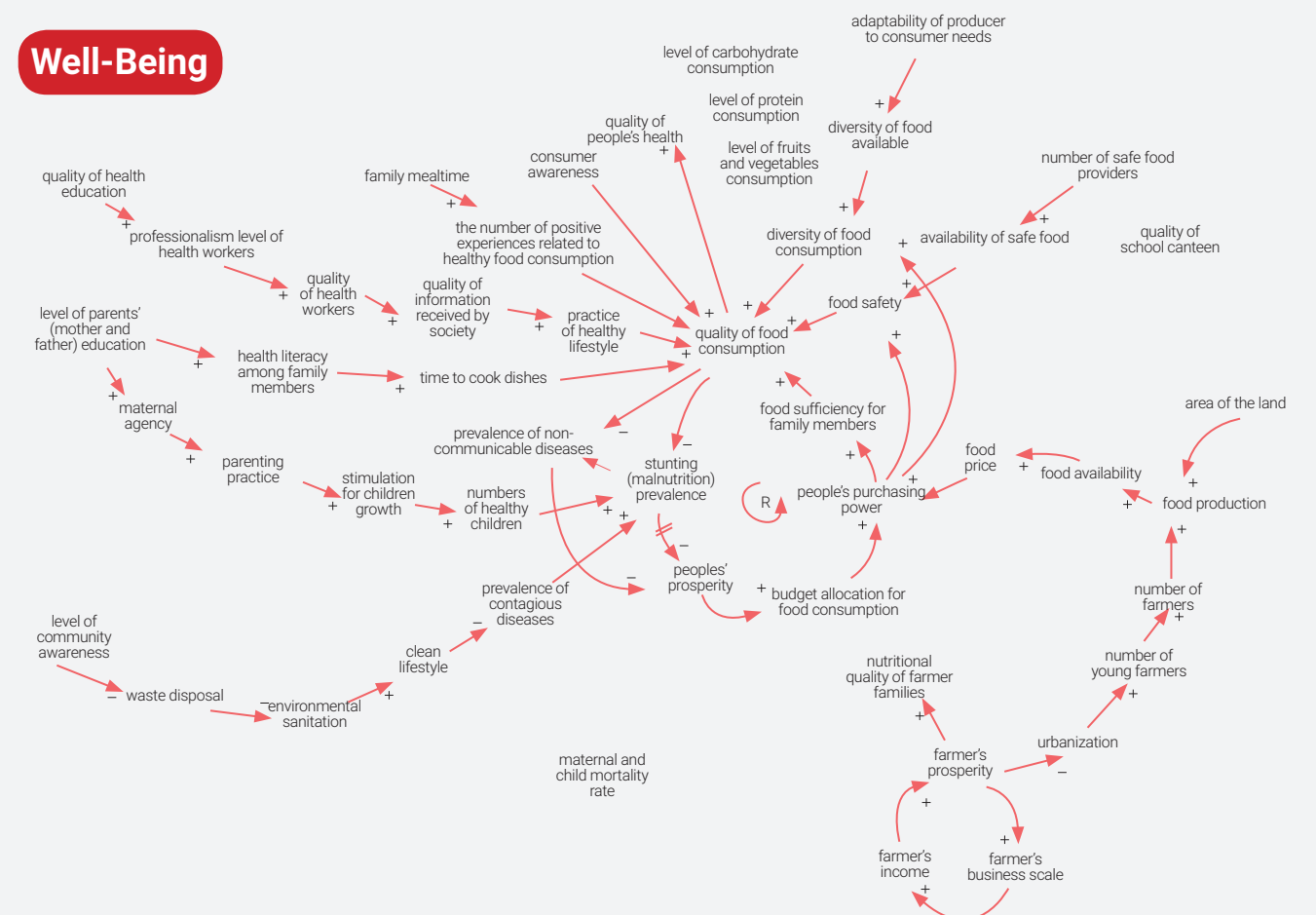
Economy



Society



Well-Being



Generic Causal Loop Diagram of Food System

In general, food sovereignty will be achieved when the condition of food security is accomplished by food supply being fulfilled from domestic resources and not depend on other countries. At the causal loop diagram, food security is conceived as the variable of food availability. The concept of food availability constitutes a ratio between national food stocks and

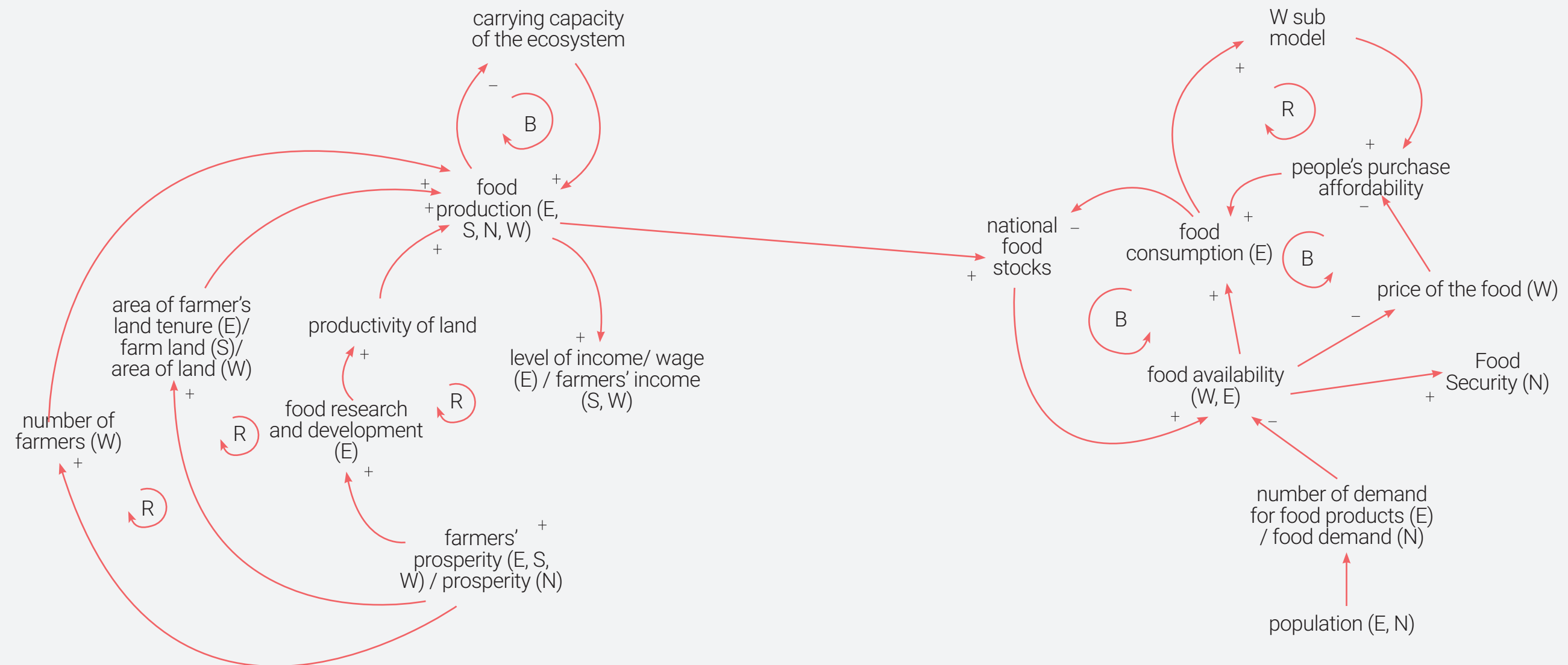
national food demand. The national food demand arises due to population factor in Indonesia.

Food availability then defines the food consumption, and food consumption reduces the food stock (Loop B1). Food availability also determines food prices, consumer affordability, and finally determines food

consumption as well (Loop B2). Food consumption will determine the quality of life of Indonesian people. (R4 loop).

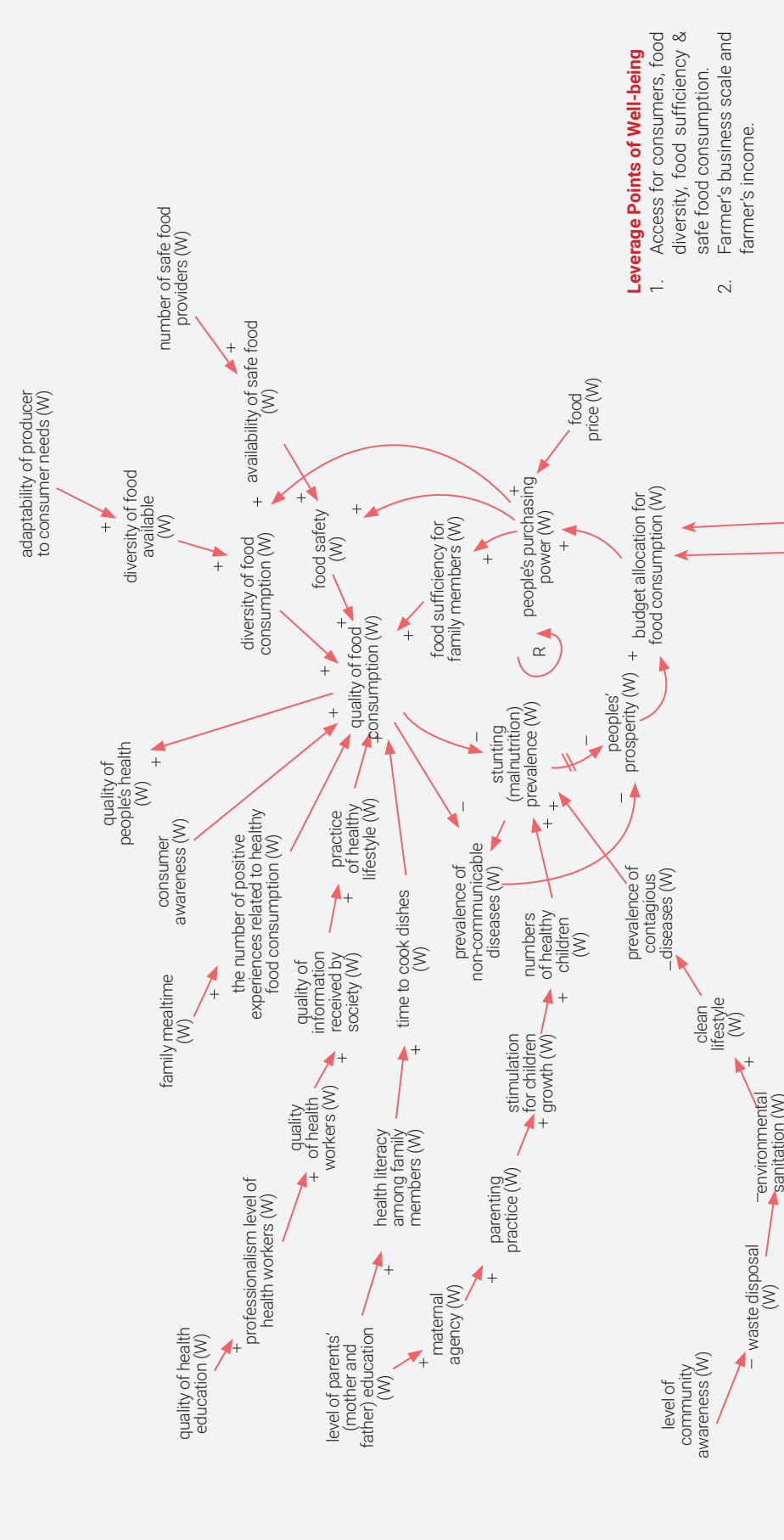
It is also visible that food stock increases due to food production factor. Food production is determined by the number of farmers, the area of farm land, and the land productivity. At general, food

production will be in line with the rise of farmers' incomes and their prosperity. Factor of farmers' prosperity then will be the pull factor for people to become farmers, leading to increase the number of farmers (Loop R1). This farmers' prosperity will specify the land area owned by farmers that will serve as the food production factor (Loop R2). The farmers' prosperity will also improve the land productivity through allocation of the cost for food research and development (Loop R3).



Causal Loop Diagram of Whole Food System and Leverage Points

Some leverage points have been identified from the overall food system. The leverage points are the location of intervention expected to provide the most efficient result in order to improve the performance of food system in Indonesia.

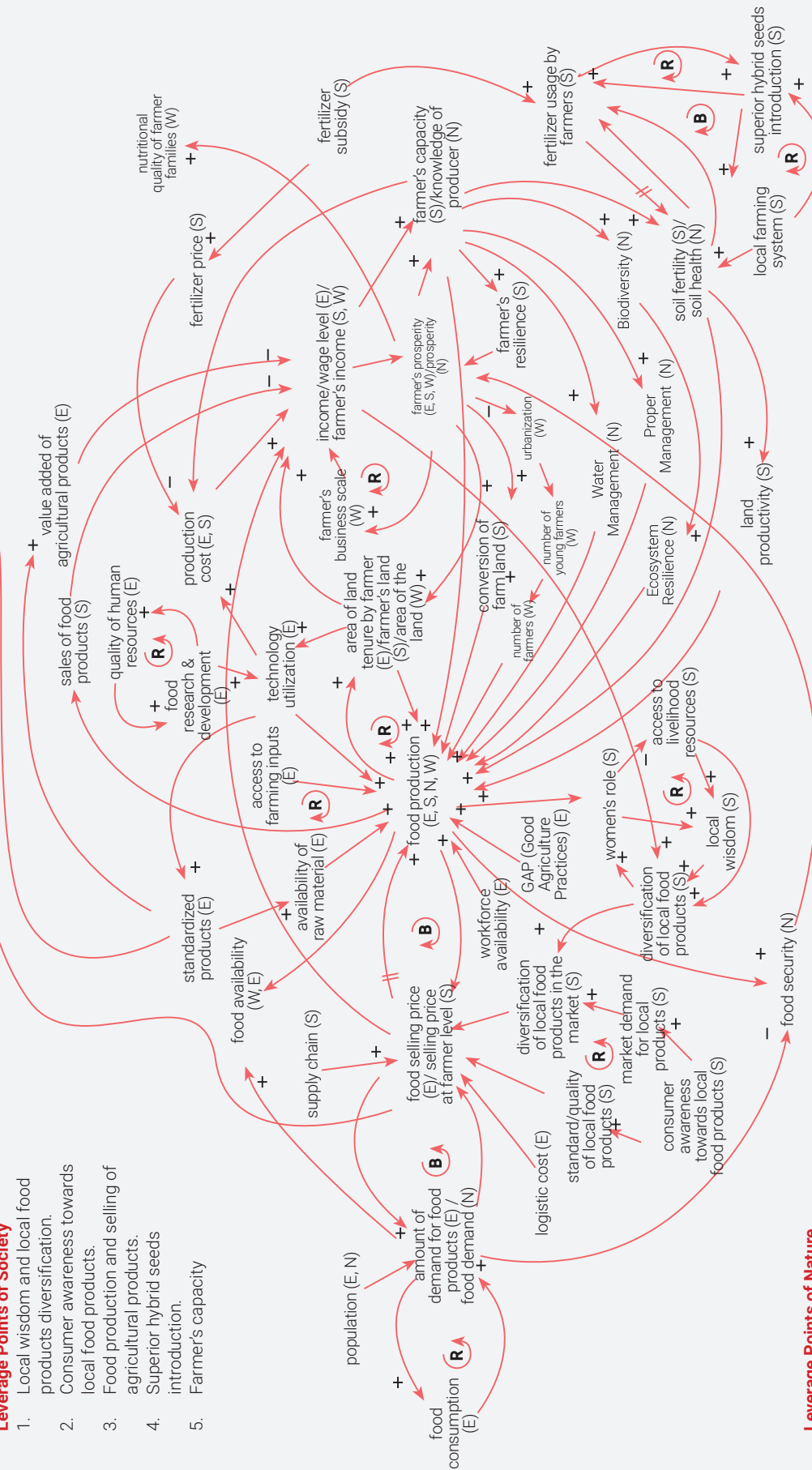


Leverage Points of Well-being

1. Access for consumers, food diversity, food sufficiency & safe food consumption.
2. Farmer's business scale and farmer's income.

Leverage Points of Society

1. Local wisdom and local food products diversification.
2. Consumer awareness towards local food products.
3. Food production and selling of agricultural products.
4. Superior hybrid seeds introduction.
5. Farmer's capacity



Leverage Points of Nature

1. Technology utilization & access to natural resources.
2. Biodiversity & environmental protection, local product diversification & consumer awareness.
3. Land use & restoration, number of young farmers & knowledge & capacity of local product.
4. Safe food availability.
5. Consumer awareness.
6. Water resource protection.

Leverage Points of Economy

1. Standardized products.
2. Value added of agricultural products.
3. Food production, young farmers and local product diversification.
4. Extension and optimization of farm land.
5. Knowledge and capacity enhancement for local producers.

List of Innovations from Food Stakeholders Workshop

Each leverage point in the food system causal loop diagram resulting several applicable innovations.

The innovations are going to be applied as inputs to formulate strategy in order to implement Indonesia Sustainable Food System.

NO	INNOVATIONS
1	Development of urban farming technology.
2	Standardization of local food products to be exportable.
3	Intensification of land tenure, especially in urban areas, through optimizing unused land for food farming.
4	Applying smart agriculture or precision farming.
5	Revitalization and massive introduction of climate field schools.
6	Reviewing of Law on Land Use to further empower the actors of food production.
7	Protection for ecosystem and biodiversity to support the conservation of food germplasm.
8	Diversification of local food products along with intensive efforts to increase consumer awareness of local food products.
9	Expanding the diversity of staple food resources, apart from rice, corn, and soybean, such as taro, sago, sorghum, etc.
10	Restoration and sustainable food land use.
11	Increasing the number of young farmers as food producers.
12	Increasing food start-ups throughout the whole stages of food life cycles.
13	Increasing the knowledge and capacity to produce local processed food.
14	Incorporating peasants and land tillers as actors in food-related laws.

NO	INNOVATIONS
15	Encouraging consumers to process food and become producers for processed food.
16	Dissemination & promotion to urban communities regarding local & fresh food products.
17	Developing National Food Information System.
18	Developing knowledge management of local food materials and its dissemination.
19	Increasing capacity food providers, in this case the entry points are the cooks/chefs of both professional and non-professional.
20	Procurement of healthy food in the food service sectors, retail industries as well as online food retail through applications.
21	Raising family consciousness by having a number of local food ambassadors for each region and national level.
22	Selection for healthy food ambassadors at regional and national level.
23	Increasing capacity for street food vendors and school canteens.
24	Creating added value for farmers, such as coffee farmers not only selling coffee beans but also offering brewed coffee with baristas on-site at the farm.
25	Facilitating access to market and business networks for actors at food sector, particularly farmers and young actors.
26	Facilitating financial access for farmers and young farmers.
27	Facilitating social entrepreneurship for food sector.
28	Campaigning to consumers and also socializing organic farming practice.
29	Making use of local varieties in the form of cooperatives so as superior seeds sovereignty.
30	Developing physical and virtual germplasm banks and affiliate local food granaries via smart applications.

Chapter 2

Sustainable Food as a Common Goal

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Variety of food products in traditional markets - (Photo: Ario Tranggono)



Reviewing the National Food Practices

“ Food is the most basic need. Food is the source of human activity and growth. Food is inevitable. Life without food is impossible. Because food is the life itself. ”

Nowadays, the food practices in Indonesia are relatively less sustainable. The existing practices are more production-oriented. Only quite a few types of foodstuffs and commodities are being “pushed” into the market/ consumer by producers. In other words, the system is more supply-oriented rather than demand-oriented. What has happened is food uniformity becoming an inevitability.

Food production facilities and infrastructures tend to be unsustainable and are more chemical oriented rather than organic farming, due to such kind of practice that has been subsidized by the government. Accordingly, organic farming has become underdeveloped because it will more costly.

Food self-sufficiency has been most focusing on rice, corn and soybean, thus accordingly most of agricultural resources are exerted for these commodities only. In addition, the national food logistical and distribution systems are also supporting such practices. Food diversity has been marginalized while at the same time dismissing local food potentials and its various wisdoms that have been proven as high resilience.

The “Isi Piringku” (My Plate initiative), a government program on healthy diets designed to support food diversity, becomes paralyzed due to lack of support from food suppliers and distributors.

Pressure on food issues is also encumbered by the emerging of competition from the usage of food material as energy resources. The absence of policy implementation that is truly prioritizing food materials as food resources instead of as energy sources is severing the poor performance of national food system.

In Indonesia, it can be said, that unsynchronized inter-ministrial/institutional coordination has been occurred. There is no harmonization of food management from upstream to downstream. Mismanagement has already happened in the upstream that the downstream will surely be troubled.

The impact has been felt recently, amidst of abundance of food quantity which indicated by plenty of food supplies, thus non-communicable diseases associated with dietary risk is even becoming the highest risk factor for mortality and disability in Indonesia. Thus fundamental shifting of food paradigm is needed in order to Indonesia be able to implement sustainable food system.

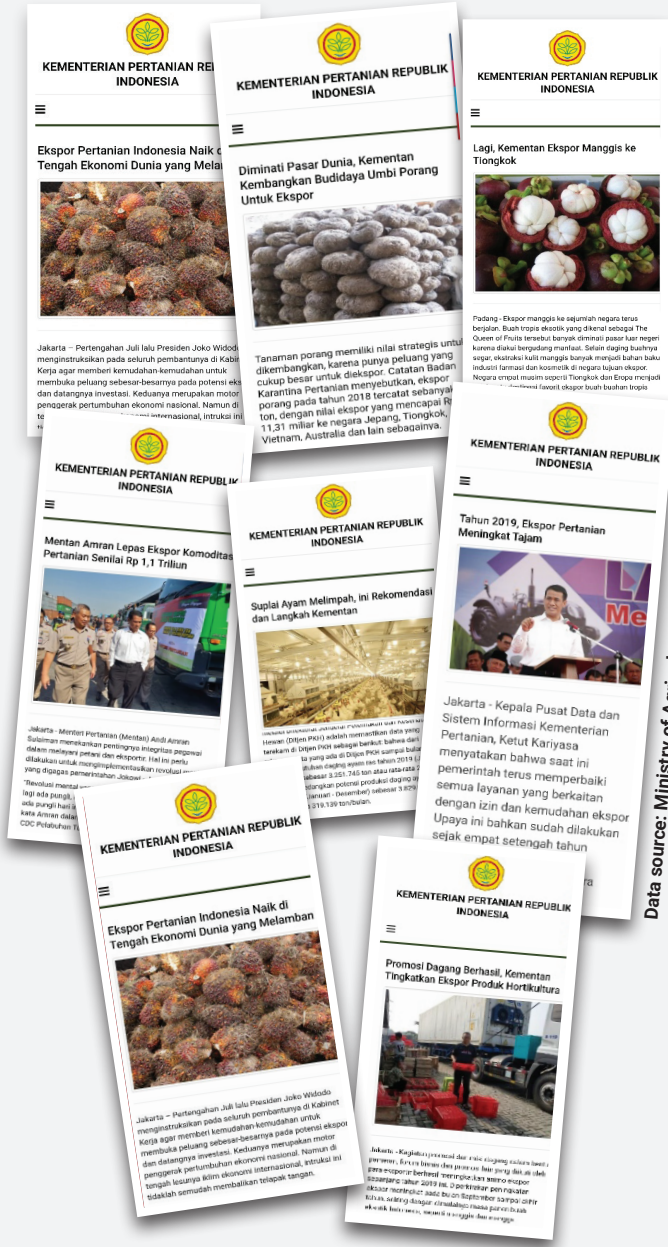
Aspect	Recent Practice	Sustainable Food System
Production	Production oriented	Nutrition fulfilment oriented for Indonesian people
Marketing and Distribution	Food products are ‘pushed’ into market/ consumers. Food product oriented promotion.	Food products are ‘pulled’ to market/ consumer in accordance with nutritional needs. Food promotion is focused on health (nutritional needs) and sustainability (economic, social and environmental) aspects.
Diversity	Rice, cord & soybean as staple food orientation.	Staple food and food materials with orientation toward diversity and local resources utilization.
Facility and Infrastructure	Subsidy for agricultural facilities and infrastructure are oriented to uniformed superior seeds and chemical fertilizers.	Subsidy for agricultural facilities and infrastructure are oriented to local superior seeds and organic farming practices.
Priority for food and policy	Food resources as food and as commodity are not clearly separated.	Land is limited; there is a clear separation between food resources as a food source and as energy and commodity sources, which chooses food as a priority.
Policy	Food policies have been separated base on sectors; coordination has been conducted through coordination meetings.	Sustainable food as a shared goal; national and local food planning and its implementations are conducted integrately; each stakeholder/actor conduct a self-coordination.

The Paradox of National Food

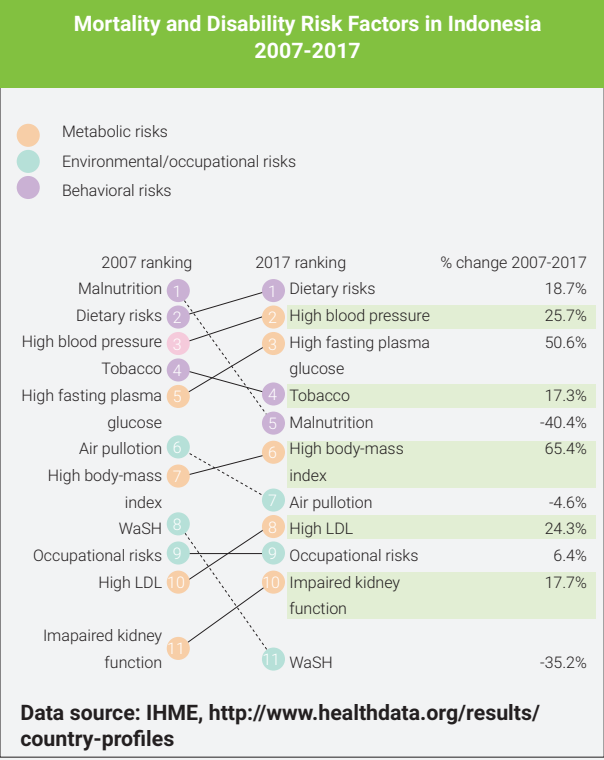
Food availability in Indonesia tends to have been increasing in recent years. Even, recently, the Ministry of Agriculture has been more and more encouraging the export of food commodities to various countries. Corn, horticulture and fruits are some of outstanding export commodities.

Unfortunately, this abundance is not followed by the betterment of overall nutritional status of Indonesian people. Risk associated to food dietary had been increasing by 18.7% over the period of 2007-2017. Triple Burden of Malnutrition (calorie and protein deficiency, micronutrient deficiency, and excessive calories) have also been haunting Indonesian citizens. Internationally, Global Hunger Index ranked Indonesia at number 73rd among 119 countries observed.

This paradox emerges from unsynchronized food planning system. There is no connectedness between upstream and downstream in the planning and implementation of food practices in Indonesia. Accordingly, the national food planning system must be changed comprehensively. Food planning shall begin with the end point, which is the target of community nutritional status. From the target, then consumption pattern plan, logistics and distribution plan, and sustainable food production can be derived.



Data source: Ministry of Agriculture of the Republic of Indonesia



Triple Burden of Malnutrition	
1. Calory and Protein Deficiency	
Hunger and Malnutrition 17.7%	Stunting 30.8%
2. Micronutrient Deficiency	
Anemia in Pregnant Women 48.9%	
3. Excessive Calory	
Obesity in Toddlers 8%	Obesity in Adults (age > 18 y.o.) 28.9%

Mainstreaming towards Diverse Healthy Food

Source: Ministry of Health



The content of "My Plate"

- 50% of the food on each meal is vegetables and fruits.
- The other 50% is staple food and side dishes.
- More vegetable serving rather than fruit serving.
- More staple food serving rather than side dish serving.

The Government of the Republic of Indonesia has released a guideline for consumption of essential food items for healthy living. The recommendation is called "My Plate".

"My Plate" is a dietary plan that encourages people to consume diverse foods. Why should be diverse foods? Because there is no particular food that has perfect nutritional value to fulfill the need of human body to be healthy. By eating a good proportion of diverse foods, people can meet their own dietary needs, and in turn, will directly contribute to overall quality of the nation health.

The concept of diverse healthy food shall be the soul and common goal of food planning and practice at all levels of ministries, institutions and stakeholders.

Within the context of planning, the common goal shall be the starting point in food planning stages for all ministries and institutions. Realizing "My Plate" as peoples' daily consumption pattern is the main key performance indicator of food management in Indonesia.

It is not easy to realize this common goal. Complex, comprehensive and continuous efforts are required, together with the engagement and coordination of all food actors, from upstream to downstream.

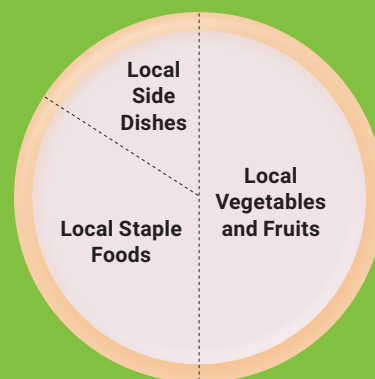
Historically, every region in Indonesia has its own foods variety. Food type in one region can be different to another region in terms of its carbohydrate source, its protein source, its vegetables, and even the seasonings are also different.

Therefore, "My Plate" shall be modified in accordance with food resources available in each region. Accordingly, "My Local Plate" which is the modification of "My Plate" for each region shall be stipulated, disseminated and implemented in each region.

"My Plate" and "My Local Plate" shall become big movements that massively, consistently and continuously be implemented with active engagement from all food stakeholders in Indonesia.

My Local Plate

Food diversity is abundantly available in the Archipelago, each region has different types of food sources. However, the diversity shall be empowered. Wise utilization of this abundance will further ensure food security in their respective regions and directly contribute to national food security.



The abundance of Indonesian food diversity that can be served within "My Local Plate" are:

- 77 types of carbohydrate source plants
- 75 types of oil/fat source plants
- 26 types of beans
- 389 kinds of fruits
- 228 types of vegetables
- 40 types of beverage ingredient plants
- 110 types of herbs and spices
- Meat food sources
- Sea food sources other than fish.

Mainstreaming towards Family-Based Healthy Diverse Food

Indonesia had ever been experiencing an extremely high level of success in managing promotion for the *Keluarga Berencana* (Planned Family) program. This kind of promoting model needs to be revitalized and strengthened in order to promote healthy and diverse foods.

Food promotion needs to be done through a family-based approach. A healthy diverse diet must be introduced since early age and accepted as habit or lifestyle. Indonesian families will therefore be the spearheads in developing healthy diverse eating habit and character.

Promotion of healthy and diverse food need to target Indonesian families. The raising of awareness, understanding, and competency of the Indonesian families regarding "My Local Plate" shall be developed in a systematic and sustainable manner.

In this context, the role of Family Empowerment and Welfare (PKK) and Integrated Service Post (*Posyandu*) - a monthly clinic for children and pregnant women, providing vaccinations and nutritional supplements, needs to be revitalized and empowered in order to promote and encourage people regarding healthy and diverse dietary habits. Since the role of women in the development of family is central and crucial, they should be fully engaged in the program and be treated equally.

The phenomena of dietary pattern shifting among young people toward unhealthy pattern today must be handled wisely. As the future family makers, young people (both males and females) must have competence in dietary pattern. Apparently, young women will be prioritized because of their role to give birth the next Indonesian generation. Young women who take unhealthy diet would apparently be very vulnerable to multiple degenerative diseases, which in turn will give significant impacts on the health of their babies on their wombs.

One the most effective facilities to solve these challenges is through schooling. "My Plate" concept with diverse and healthy food needs to be applied and adopted at all levels of elementary and secondary education. Healthy diverse food needs to be provided on a regular basis at schools.

In addition, school canteens and processed food vendors must be enabled to provide "My Plate" menus and other healthy diverse food items. All of these initiatives are aimed at making students as the future generation of Indonesian families recognize and have hands-on experience in health and diverse food practices.

"Kebun Sekolah" (School Garden) program needs to be re-empowered, in particular in order to introduce and implement local food diversity. "Panen Beragam Sekolah" (School Diverse Harvest Day) followed by the celebration of the "Pesta Pangan Lokal" (Local Food Festival) needs to be held as one of regular agendas of elementary and secondary education curricula.

Sorghum from East Nusa Tenggara that are processed and presented creatively can be served as "elegant" snacks. (Foto: Ario Tranggono)



Biodiversity-Based Food Sovereignty

In August 2019, the Indonesian Biodiversity Foundation (KEHATI) has drafted 10 recommendations on food sovereignty based on diversity in Indonesia. Diversity is a key success factor for Indonesia's food autonomy, sovereignty and security.

Historically, research has shown that people in the Archipelago have varied dietary habits, depending on the availability of local resources in their respective

regions. These local wisdom and food diversity have been proven as being high level of food resilience.

For instance, food granary as local wisdom serving as one of the backbones of food security needs to revive. Existing food granary designs, such as those in the indigenous communities of Baduy, Ciptagelar or Minangkabau, are local wisdom specimens of knowledge and wisdom assets based on diversity that are, and still, relevant to food management in Indonesia nowadays.

First	Government and relevant stakeholders need to restore the idea of food of the Archipelago, that is culturally local resource base food diversity and which has already been adapting to local environmental conditions and is historically used as the food source for the community. The government needs to change its national food vision by adopting food diversity. Consequently, the data on the availability of food in the Archipelago shall be incorporated within national food availability and not simplify it by merely defining rice, corn and soybean, and then force the limited types of food through out Indonesia which is in fact diverse in agroclimate and culture.
Second	Government and relevant stakeholders need to mainstream Food of the Archipelago into national program as the manifestation of vision of the elected President focusing, and properly targeted, at the development of human resources and national state budget (APBN). Furthermore, it is important to broaden the scope of his mandate by speeding up continueing the construction of infrastructure, not only for rice farming and plantation, but also for other food reserves.
Third	The idea of restoring food diversity of the Archipelago needs to be incorporated in the National Medium-Term Development Plan (RPJMN), national priority program and national budgeting system.
Fourth	Government and relevant stakeholders need to set a national target to minimize the consumption of rice as the source of carbohydrate and substitute it with other domestic food varieties.
Fifth	Food policies must be integrated with health, biodiversity, climate change and, particularly must be in line with the second goal of the Sustainable Development Goals (SDGs). It should be emphasized that in the future, food production will develop a sustainable model using an agro-ecological approach based on four pillars: economically viable, technogically adaptive, environmentally friendly, and socio-culturally acceptable.
Sixth	Subject to Article 33 of the Food Act, government and relevant stakeholders must implement Community Food Reserves whereby the community has right and wide opportunity to do so. The government also needs to facilitate the development of the Community Food Reserves in accordance with local wisdom.
Seventh	Government and relevant stakeholders need to develop incentive-based mechanism, including acknowledgment for local governments and local food conservation activists.
Eighth	To determine the acceleration of local food consumption as government's priority according to the Food Act through consumer movement (involving women and children) using culinary and cultural approaches.
Ninth	To develop condusive ecosystem in order to encourage young farmers cultivating local food plants.
Tenth	To reinforce the initiative of seed development sourcing from Indonesia's own biodiversity towards seeds and food sovereignty by protecting the rights of conservationists/seed farmers.

Planning Process for Sustainable Food System

Ideally, preliminary stage of food planning process is to set goals on nutritional status and public health. Other processes are drawn up so as to be able to accomplish the goals set. Thus, every single process is interconnected and mutually sustained.

At present, causal relationship of each planning process is practically non-existent. As a result, inter-sectoral coordination is fairly difficult to perform. Therefore, the paradigm of food planning needs to be shifted from production-oriented in the begining towards target-oriented which is to achieve the ultimate goal on nutritional status and public health.

There are, however, two main keys to make sustainable food system work and get implemented, i.e. sustainable food consumption and sustainable food production. In principle, both supply and demand management are combined in an integrative way.

Sustainable food consumption implies that consumers choose healthy food derived from

sustainable food sources. Whereas, sustainable food production implies that food cultivation and food collection are done within the limits of natural resources as well as economically efficient and socially equitable.

In order to materialize the whole processes as stated above, food planning should no more be carried out separately, in accordance merely with the mandates, tasks or functions of the related authorities. Instead, food planning must be carried out holistically throughout the life cycle, involving all relevant ministries and institutions. For each stage of the life cycle, all institutions and ministries facilitated by focal points of associated ministries and/or institutions, must sit together. The key is food planning must be integrated from upstream to downstream.

Although the focal points of the food planning process are ministries and governmental institutions, but in the implementation, all the relevant stakeholders since the beginning have already actively involved at every stage of relevant food planning (national, regional, district/city).



Role of Focal Points in National Food Planning

No	Planning Stage	Focal Points of Ministries and Institutions	Role of Ministries and Institution
1	Setting Goal for Nutritional Status and Public Health	Ministry of Health (<i>Kemenkes</i>), National Family Planning Coordinating Board (BKKBN), National Social Security (BPJS), National Development Planning Agency (<i>Bappenas</i>), Ministry of Home Affairs (<i>Kemendagri</i>), Regional Government (Provincial, District, City Government)	At this stage, <i>Kemenkes</i> is the main focal point; BKKBN plays roles in mainstreaming the family approach to nutrition and health status; BPJS works to increase nutrition and health quality in order to reduce the risk of diseases, which in effect would reduce the cost of healthcare; <i>Bappenas</i> plays roles in aligning policies with the whole national plan. Provincial, district, and city governments need to be active at all levels of food planning from the beginning since they are the spearheads of food management in Indonesia.
2	Setting Goal for Healthy Dietary Pattern	Ministry of Health, Ministry of Communication & Information Technology (<i>Kominfo</i>), National Social Security, National Development Planning Agency, National Family Planning Coordinating Board, Ministry of Education & Culture (<i>Kemendikbud</i>), Ministry of Religious Affairs (<i>Kemenag</i>), Ministry of Female Empowerment and Child Protection (KPPPA), Ministry of Environment & Forestry, Ministry of Home Affairs, Creative Economy Agency, Regional Government	<i>Kominfo</i> , <i>Kemendikbud</i> , <i>Kemenag</i> , and KPPPA are to take action to massively promote and educate through various media (including digital media) and educational institutions regarding healthy, diverse, and sustainable food dietary patterns.
3	Setting Goal for Food Consumption Needs, including Food Waste Management	Ministry of Trade (<i>Kemendag</i>), Ministry of Environment & Forestry, Ministry of Agriculture, National Development Planning Agency, Ministry of Home Affairs, Regional Government	<i>Kemendag</i> & <i>Kemenkes</i> formulate food consumption needs based on mutually agreed food consumption practices (such as the “My Plate” and “My Local Plate” concepts). All ministries and institutions set the level on demand of food material as the priority of community needs, and make a clear distinction between the level of demand on food as commodities and food as energy source.

No	Planning Stage	Focal Points of Ministries and Institutions	Role of Ministries and Institution
4	Determining and Achieving for Food Availability (Including Logistics and Distribution)	Ministry of Trade, Indonesia Logistics Bureau, Ministry of Transportation, Ministry of Home Affairs, Ministry of Social Affairs (<i>Kemensos</i>), Local Government	Ministries and institutions determine the extent of food availability, food reserves, national food logistics systems and national food distribution systems; <i>Kemensos</i> formulate a non-cash food aid strategy, which is non-rice oriented, but instead oriented towards local-need-based staple food potential.
5	Determining and Achieving Sustainable Food Production, including Food Loss Management	Ministry of Agriculture (<i>Kementan</i>), Ministry of Maritime Affairs and Fisheries (KKP), Ministry of Environment & Forestry (KLHK), Ministry of Public Work and Public Housing (PUPR), Ministry of Industry, Ministry of Home Affairs, Creative Economy Agency (<i>Bekraf</i>), Regional Government	<i>Kementan</i> and KKP formulate national level of food production on the basis of healthy and sustainable food practices and formulate the change in farming practices from chemical to organic-based; KKP, KLHK and BPN/ATR develop mechanisms in food collection from sea and forest (particularly indigenous people forests); PUPR formulates and prepares infrastructure needs in the framework of shifting to organic food cultivation. <i>Bekraf</i> encourages creative aspects of the food so that healthy and diverse foods will meet each generation's taste demands, particularly the youth.
6	Setting Goal for Sustainable Food Cultivation & Collection System	Ministry of Agriculture (<i>Kementan</i>), Ministry of Maritime Affairs (KKP) and Fisheries, Ministry of Environment & Forestry, Ministry of Land and Spatial Planning/ National Land Agency (BPN/ATR), Ministry of Home Affairs, Regional Government	<i>Kementan</i> and KKP formulate the system and mechanism of food cultivation by organic cultivation mainstreaming. KKP and KLHK develop mechanisms in food collection from the forest and sea.

Chapter 3

Indonesia Sustainable Food System

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A woman in Krayan, North Kalimantan is picking red edible fern. (Foto: Ery Bukhorie)



Eight Principles of Indonesia Sustainable Food System

**“ Food system must be holistic and sustainable.
Food system must be based on environmental carrying capacity and natural resources.
Because both are the most valuable food assets. ”**

Sustainable food system and practices in Indonesia have to be based on progressive but also be rooted at the Archipelago's traditional wisdom. Such principles will be able to provide the Indonesian people with

robust as well as suitable and sustainable foundation for the needs of the nation. There are at least eight principles need to be adopted in order to form a sustainable food system in Indonesia.



Common goals. Food is a unifier for all actors and stakeholders in the planning process and food practices in Indonesia.



Holistic. Indonesian food planning and practices from the upstream to downstream level must involve food actors and stakeholders in a participatory manner.



Inclusive. All food actors and stakeholders are entitled to engage in food practices and receive sufficient and equitable healthy diverse food. Marginalized groups such as women, children, peasants, fishermen and indigenous peoples, must have fair and equal access including access to food land tenure.



Local. It should be based on the conditions and needs of the Indonesian state, nation and people, and the specificity and diversity of local food resources in each region and also include accommodating traditional system.



Interdependency. Active interactions and mutually need each other are happened among food actors and stakeholders.



Environmental and natural resource system. Food system and practices must be within the carrying capacity level of environment and natural resources; including able to anticipate for climate change.

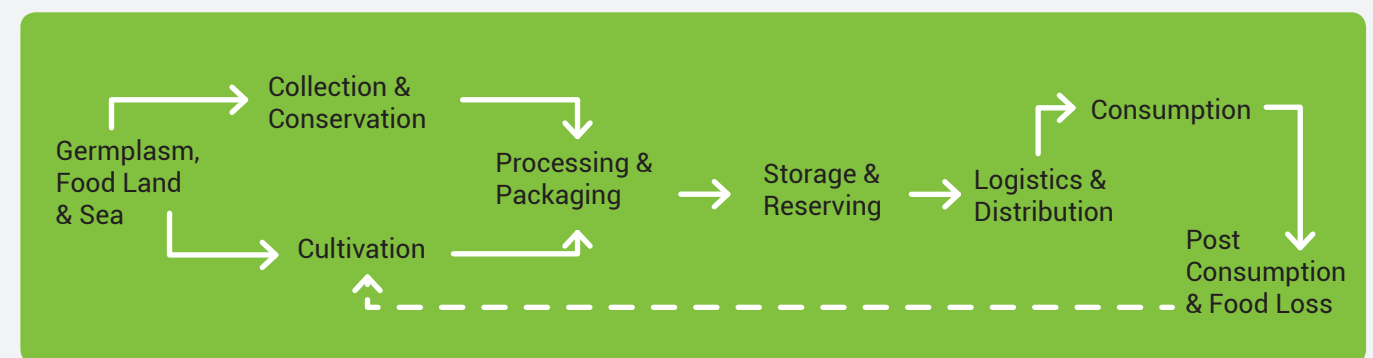


Food life cycle. Food management shall be oriented to a closed food cycle (from cradle-to-cradle).



Sustainability. Food management is oriented toward national capacity building so as be able to gain optimum food benefits without sacrificing the potentials of future generations.

Indonesia Sustainable Food Life Cycle



Sustainable food system need be based on life-cycle approach. The concept of cradle to cradle must consistently be applied. Food system has to be in a closed loop in order to increase the efficiency and reduce lost resources of all its life cycle.

The first stage of food life cycle is germplasm, land and sea. Both are fundamental natural resources in Indonesia's food life cycle. Various types of staple food can be optimized to meet national food autonomy. In Indonesia, there are essentially two major types of food land, i.e. cultivated land and forest. For cultivated land, the main issue is the availability of sustainable food land, thus sustainable food land must be treated as one of national development priorities.

According to the data of Indigenous Peoples' Alliance of the Archipelago (AMAN), currently there have been around 20-30 million indigenous peoples in Indonesia who are dependent on food collection from forest and sea around their homes, in addition to traditional farming in their own fields. AMAN estimates that nowadays the total number of indigenous peoples in Indonesia achieving 60-70 million. Conservation of forests and land around indigenous peoples is very crucial issue affecting the performance of national food security. Indigenous people recognize the 'food cycle', which is the types of food (vegetables and animals) available at a certain time, throughout the year. In the forest with fairly good condition, the food cycle of indigenous people may reach hundreds types of food, whereas at the worst case there are only six types of food throughout the year. In such situation, indigenous peoples will surely be facing with food shortage. Therefore, forest conservation and access to forest for food collection are very pivotal to Indonesia's food security.

On the other hand, as a maritime country, Indonesia is very dependent on the sea as one of resources for food and major commodities. Analogous to land, inclusive access is required so as people can wisely gather food from the sea. Marine conservation for food source is an immediate and crucial to conduct during the present and future times.

Food cultivation or food business has been implemented by tens millions of Indonesian peoples. This stage plays a significant role in the preparing fresh food and raw materials for processed food. Thus, such role of the community must be supported by sufficient incentives. Aside from that, the role of private sector is imperative. This role must be empowered in order to deliver maximum food value-added.

Food storage and reserve are attempted to 'save' food that should be applied by various parties, societies, local governments and central government in order to ensure sustainable food availability. Food distribution is a delivery stream of food commodity from producers to customers or business involving flow of activities for goods and services from suppliers until the hands of consumers. Two important aspects of distribution are distribution channel and distribution physical activity.

Primarily, the consumption involves families and/or communities. At this stage, food consumption pattern gives major impacts on individual nutritional status of the population. Therefore, responsible consumption has to be the option. Post-consumption causes piles of food waste. Actually, food resources can also be reduced at every stage of pre-consumption food life cycle in the form of food loss. Reducing these two types of waste will be able to significantly increase the food availability.

Indonesia Sustainable Food System Model

Indonesia Sustainable Food System (ISFS) consists of a number of key components. The first component is the core mandatory principles (holistic, inclusive local, life-cycle, interdependence, environmental and natural resource system, and sustainability). The concept has served as the basis for a robust sustainable food system.

The implementation of ISFS is family-based. As the smallest system in community and nation, families across Indonesia will be the cores and spearheads in developing healthy, diverse and responsible food consumption pattern. The concept of food as physical needs must be more embedded rather than as recreational needs.

Throughout the food life cycle, interactions are occurred among food actors and stakeholders with socio-economic and cultural factors. These interactions are the common ground of the sustainable food system. At this point, sustainable production and consumption practices must be implemented consistently.

One of the important aspects that must be considered is that the interactions occurred within the system of environment and natural resources. It confirms that the system must work within the potential limits of the environment and natural resources. Exceeding it means destroying the most precious food reserves.

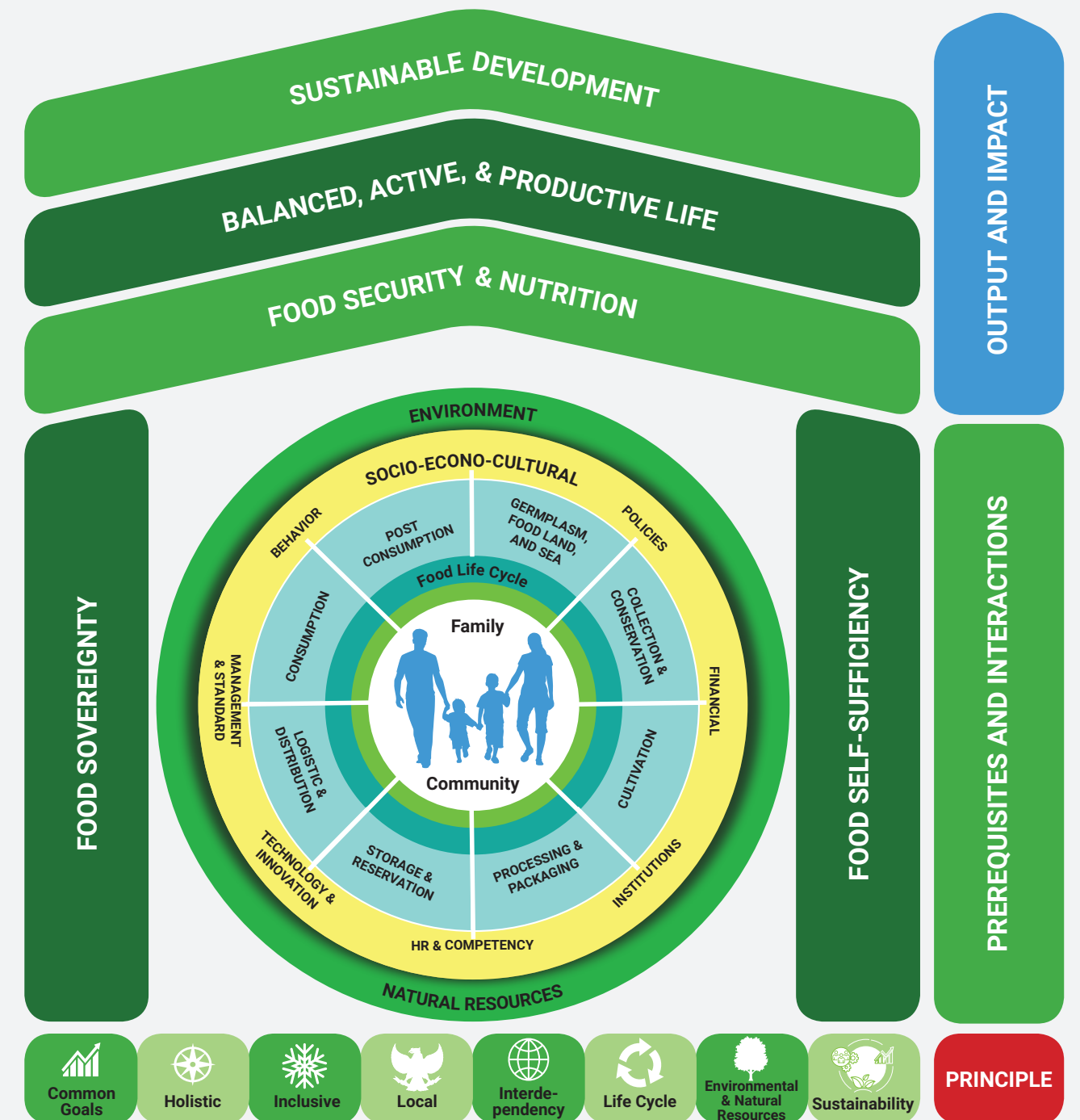
Food autonomy component is associated with the right to food selection, whereas the food sovereignty component is related with a nation's capacity to provide by itself with all or a certain amount of food. Both components are the prerequisites for the realization of sustainable food system. Both central and local governments as well as the people of Indonesia have to opt diverse, healthy and sustainable food as the nation's food consumption pattern.

The resultant of both components will develop security for the food and nutrition, i.e. the availability of safe food to consume any time in sufficient quantity. The security of food and nutrition basically are the outputs of a sustainable food system.

Whereas the outcomes of the system are active, healthy, and productive individuals. At this stage, various factors outside the food need to be involved, such as clean and healthy lifestyle. That means that all key actors and stakeholders are expected to participate actively. ISFS does not merely produce food, but also covers all stages of food life cycle.

State must take active roles in the food system, especially in order to ensure the food availability and the stability of food price, in accordance with the mandate of Food Act. In order to ensure ISFS goes well, the Government of Indonesia has to specify proper incentive and disincentive system. Furthermore, active participation of all actors and stakeholders must also be accommodated and guaranteed. In short, by nature ISFS has to be participatory.

Sooner or later, the holistic achievement of sustainable food system will contribute to sustainable development that is capable to meet the needs of healthy and diverse food at present time without sacrificing the potential of future generations to meet their needs.



Indonesia Sustainable Food System (ISFS) is a family-based system whereby family becomes the core to habituate and build characters, as well as embed culture on healthy, diverse, local and sustainable food consumption pattern.

Main Issues of National Food

Based on the results of workshops, interviews, focus group discussions, reviews towards presentations regarding food, and literature reviews, it is obtained that there have been several issues regarding food emerging in Indonesia nowadays. These issues will be the focus of 2020-2024 Indonesia's food strategy and roadmap formulation.

1. No national food system has been available.
2. No holistic national food plan has been available, instead each sector has its own planning, and there has been no upstream-to-downstream harmonization.
3. There have been issues on disharmony among ministries and institutions at each element of food value chain concerning programs, budget, and the performance of the whole food cycle.
4. No harmonizing coordinator for national food system has been available.
5. Institutional coordination at central and local level need to be strengthened as the coordination through the Food Security Council has not been running optimally.
6. No comprehensive national food information system yet, and no national dashboard yet.
7. The existing Food Act is not inclusive as farmers, women and vulnerable/marginalized groups have not been included.
8. Food (and beverage) have not been recognized as a separated economic sector, thus barely regarded as the top priority in governance and investment.
9. Minimum service of food standard as one of means of incentive and disincentive for local governments has not been available.
10. The role of private sectors in food practices in Indonesia has been still low due to no clear mechanism for their participation; thus a mechanism for financing food massively involving the private sector is required.
11. Genetic food resources have not been farmers' common property.
12. The determination of sustainable farm land and tenurial aspects (especially access to farm land) for the community has still not been fully guaranteed.
13. There is no food distribution mechanism from indigenous peoples to 'conventional' food markets.
14. The value of forest ecosystem services (one of them is as food source) has not been comprehensively valued neither widely known.
15. Legal certainty regarding the status of indigenous peoples' forest as local food source is needed.
16. Food diversity has merely been oriented towards rice, corn and soybean (*Pajale*).
17. The focus on *Pajale* has only been considerably productive for corn, while rice and soybean have been less significant: the import of both commodities are remain high.
18. There has been a gap between the quantity of food production and peoples' nutritional status which remain be problem.
19. Organic farming is less common because it is hampered by certification aspect and the high cost investment during the first three years.
20. There have tendency that many local food (carbohydrate) sources, such as sorghum, millet, barley, and tubers been ignored
21. The disparity between domestic rice price and of other countries indicates that the production of rice in Indonesia has still been inefficient, and such condition has pushed the practice of importing rice.
22. The need for processed food has been rapidly growing and taking over the market share of fresh food.
23. The development of local food industry by the Ministry of Agriculture has still been sporadic project or pilot project-base, neither systematic nor continuous.
24. There is a need to anticipate Food 4.0 and new food forms (for example farmless meat).



Main Issues of National Food

25. Despite their wisdom, local food granaries have been neither optimized nor replicated as national food storage system.
26. In several parts of Indonesia there have been gaps regarding access to food.
27. Food safety has not yet been fully met.
28. Product development to improve the quality of food consumption has often been constrained by conflicts of interest and limited understanding of its purpose, so as some of food fortification programs, for example, are hindered by problems at implementation level, and that bio-fortification, for example, has not been prioritized in the commodity development planning.
29. By major retailers, local fruits have not been defined as “the host of fruits”.
30. Separated food safety institutions (OKKP & BPOM) have been less powerful to comprehensively monitor food safety. One of the factors is inequality at second level of echelon.
31. The safety aspects of rice-for-the-poor managed by *Bulog's* (state-owned logistics affair body) has not been audited by external body, in this case OKKP (*Otoritas Kompeten Keamanan Pangan/Competence Authority for Food Safety*), as Bulog has its own system.
32. No national food logistics system has been available.
33. There have been changes regarding food patterns in the community, particularly among youths. In the perception aspect, healthy foods has been challenged by ‘popular’ foods.
34. For taste aspect, there have been changes of dietary patterns occurred among teenagers, where teenagers tend to prefer to consume less healthy food, with extreme tastes (very spicy, very sweet, very creamy) and replacing fresh or healthy food with a relatively ordinary (mild) taste.
35. Degenerative diseases have been increasing, with one of the causes is due to food consumption (dietary-associated) patterns.
36. The rates of stunting, hunger, and malnutrition among infants and toddlers are relatively still high.
37. The phenomena of increasing numbers of adult people with overweight and obesity have emerged.
38. The expenditure on tobacco and betel consumption is relatively equivalent to the value of food consumption.
39. The “My Plate” concept of healthy consumption has not commonly been adopted by consumers; one of the causes is due to lack of marketing efforts.
40. There is no party managing pre-DM (diabetes mellitus) aspect which is closely linked to consumption pattern.
41. BPJS (Social Security Administering Body) has not been actively involved in promoting food-related health to reduce the curative burden of the institution.
42. Budget policy has not been in favour of promotive and preventive healthcare closely linked to food.
43. The Village Funds have not been used for health aspects, in particular promotive and preventive healthcare.
44. *Posyandu* (integrated service post) and *Puskesmas* (community clinic) need to be revitalized in order to strengthen healthy and diverse food practices.
45. Improvidence in the form of food loss and food waste has not been systematically incorporated in a holistic policy and action plan involving cross-sectors integratedly.

Matrix on Indonesia Sustainable Food System

In line with the Indonesia Sustainable Food System (ISFS) model, there have been strong interactions among social, economic, cultural and activity aspects

at each stages of food life cycle. The interactions of ISFS are incorporated into matrix below, which basically are elaborated from the model.

Life Cycle Stage	Germplasm, Food Land, and Sea	Collection & Conservation	Cultivation	Processing & Packaging	Storage & Reservation	Logistics & Distribution	Consumption	Post-Consumption & Food Loss
Aspects								
Food's Common Issues	This line describes the main food issues that arise at the whole or several stages of the food life cycle.							
Main Issues	This line describes the main food issues that arise at each stage of food life cycle.							
Main Actors	This line describes who will take part as the main food actors for each stage of food life cycle.							
Focal Points of Ministries/ Institutions	This line describes the focal points of ministries and institutions having relevant authority and responsibilities at each stage of food life cycle.							
Stakeholders	This line describes who will take part as the stakeholders that must be involved at each stage of food life cycle.							
Interventions	These seven lines below describe interventions applied to the main food issues that have been identified.							
Policies	This is to describe the interventions for aspects of governmental policy.							
Institutional	This is to describe the interventions for institutional aspects.							
Financial	This is to describe the interventions for financial aspects.							
HR & Competencies	This is to describe the interventions for human resources and competencies regarding food aspects.							
Technology & Innovations	This is to describe the interventions for food technology and innovation aspects.							
Management & Standard	This is to describe the interventions for aspects of regulations and standards (norms, procedures, standards and criteria).							
Behavior & Culture	This is to describe the interventions for behavior and cultural aspects.							

Common Issue at Every Stage of Food Life Cycle

Life Cycle Stages: Aspects	Germplasm as well as Food Land & Sea	Collection & Conservation	Cultivation	Processing & Packaging		Storage & Reservation	Logistic & Distribution	Consumption	Post-Consumption & Food Loss
Food's Common Issues	<div><div>1. No national food system has been available.</div><div>2. No holistic national food plan has been available, instead each sector has its own planning, and there has been no upstream-to-downstream harmonization.</div><div>3. There have been issues on disharmony among ministries and insitutions at each element of food value chain concerning programs, budget, and the performance of the whole food cycle.</div><div>4. No harmonizing coordinator for national food system has been available.</div><div>5. Institutional coordination at central and local level need to be strengthened as the coordination through the Food Security Council has not been running optimally.</div><div>6. No comprehensive national food information system yet, including no national dashboard yet.</div></div>					<div><div>7. The existing Food Act is not inclusive as farmers, women and vulnerable/marginalized groups have not been included.</div><div>8. Food (and beverage) have not been recognized as a separated economic sector, so as barely regarded as the top priority in governance and investment.</div><div>9. Minimum service of food standard as one of the means of incentive and disincentive for local governments has not been available.</div><div>10. The role of private sectors in food practices in Indonesia has been still low due to no clear mechanism for their participation; so that a mechanism for financing food massively involving the private sector is required.</div></div>			
Main Issues on Each Food Life Cycle	<div><div>11. Genetic food resources have not been farmers' common property.</div><div>12. The determination of sustainable farm land and tenurial aspects (especially access to farm land) for the community has still not been fully guaranteed.</div><div>13. There is no food distribution mechanism from indigenous peoples to 'conventional' food markets.</div></div>	<div><div>14. The value of forest ecosystem services (one of them is as food source) has nor been comprehensively valuated neither widely known.</div><div>15. Legal certainty regarding the status of indigenous peoples' forest as local food source is needed.</div></div>	<div><div>16. Food diversity has merely been oriented towards rice, corn and soybean (<i>Pajale</i>).</div><div>17. The focus on '<i>Pajale</i>' has only been considerably productive for corn, while rice and soybean have been less significant: the import of both commodities has been remain high.</div><div>18. There has been a gap between the quantity of food production and peoples' nutritional status which remains a problem.</div><div>19. Organic farming is less common because it is hampered by certification aspect and by the high cost of investment during the first three years.</div><div>20. There have tendency that many local food (carbohydrate) sources, such as sorghum, millet, barley, and tubers been ignored</div><div>21. The disparity between domestic rice prices and of other countries indicates that the production of rice in Indonesia has still been inefficient, and such condition has pushed the practice of importing rice.</div></div>	<div><div>22. The need for processed food has been rapidly growing and taking over the market share of fresh food.</div><div>23. The development of local food industry by the Ministry of Agriculture has still been sporadic or pilot project-base, and neither systematic nor continuous.</div><div>24. There is a need to anticipate Food 4.0 and new food forms (for example farmless meat).</div></div>	<div><div>25. Despite their wisdom, local food granaries have been neither optimized nor replicated as national food storage system.</div></div>	<div><div>26. In several parts of Indonesia there have been gaps regarding access to food.</div><div>27. Food safety has not yet been fully met.</div><div>28. Product development to improve the quality of food consumption has often been constrained by conflicts of interest and limited understanding regarding its purpose, thus some of food fortification programs, for example, are hindered by problems at implementation level, and that bio-fortification, for example, has not been prioritized in the commodity development planning.</div><div>29. By major retailers, local fruits have not been defined as "the host of fruits".</div><div>30. Separated food safety institutions (OKKP & BPOM) have been less powerful to comprehensively monitor food safety. One of the factors is inequality at second level of echelon.</div><div>31. The safety aspect of rice-for-the-poor managed by <i>Bulog's</i> (state-owned logistics affair body) has not been audited by external institue in this case OKKP (<i>Otoritas Kompeten Keamanan Pangan/</i> Competence Authority for Food Safety), as Bulog has its own system.</div><div>32. No national food logistics system has been available.</div></div>	<div><div>33. There have been changes regarding food patterns in the community, particularly among youths. In the perception aspect, healthy foods has been challenged by 'popular' foods.</div><div>34. For taste aspect, there have been changes of dietary patterns occured among teenagers, where teenagers tend to prefer consuming less healthy food, with extreme tastes (very spicy, very sweet, very creamy) and raplacing fresh or healthy food with a relatively ordinary (mild) taste.</div><div>35. Degenerative diseases have been increasing, with one of the causes is due to food consumption (dietary-associated) patterns.</div><div>36. The rates of stunting, hunger, and malnutrition among infants and toddlers are relatively still high.</div><div>37. The phenomena of increasing numbers of adult people with overweight and obesity have emerged.</div><div>38. The expenditure on tobacco and betel consumption is relatively equivalent to the value of food consumption.</div><div>39. The "My Plate" concept of healthy consumption has not commonly been adopted by consumers; one of the causes is due to lack of marketing efforts.</div><div>40. There is no party managing pre-DM (diabetes mellitus) aspect which is closely linked to consumption pattern.</div><div>41. BPJS (Social Security Administering Body) has not been actively involved in promoting food-associated health in order to reduce the curative burden of the institution.</div><div>42. Budget policy has not been in favour of promotive and preventive healthcare which is closely linked to food.</div><div>43. The Village Funds have not been used for health aspects, in particular promotive and preventive healthcare.</div><div>44. <i>Posyandu</i> (integrated servise post) and <i>Puskesmas</i> (community clinic) need to be revitalized in order to strengthen healthy and diverse food practices.</div></div>	<div><div>45. Improvidence in the form of food loss and food waste has not been sistematically incorporated in a holistic policy and action plan involving cross-sectors integrately.</div></div>	

Food Actors, Focal Points, and Stakeholders

Food Actors are individuals, groups, organizations or business entities that directly carry out food activities and/or businesses at one stage of food life cycle or more.

Food Focal Points are ministries and/or institutions with authority, main tasks and functions to perform one aspect or more of food management. In the

context of food management, focal point is one of the actors.

Food Stakeholders are individuals, groups, organizations, and/or business entities that are affected or have influence on the food decisions and activities of food actors. Individuals or groups can become stakeholders since one or several

factors such as dependency, responsibility, attention, influence, diverse perspectives, and others.

Basically, Food Main Actors, Focal Points, and Stakeholders have high-level interdependency. Various food issues related to one party can affect other food issues from other parties. Thus, to address thorough understanding regarding food

issues and the roles of each party is mostly required. Intensive and participatory communications, such as through a multi-stakeholder platform must be realized, so as each party can have concerns and competence as well as actively participate in order to realize Indonesia Sustainable Food.

Life Cycle Stages	Germplasm as well as Food Land & Sea	Collection & Conservation	Cultivation	Processing & Packaging			Storage & Reservation	Logistic & Distribution	Consumption	Post-Consumption & Food Loss
Aspects										
Main Actor	<ul style="list-style-type: none"> Farmers Fishermen Indigenous community Research Institution and Universities Seed Corporation Seed entrepreneurship 	<ul style="list-style-type: none"> Indigenous community Forest products collecting community Fisherman Food corporation 	<ul style="list-style-type: none"> Landowner farmer Cultivator farmers Fishermen Indigenous community Peasants Fishing workers Food cultivation corporation Food cultivation entrepreneur 	<ul style="list-style-type: none"> Food cooperative Food entrepreneurs and MSMEs Food start-ups 			<ul style="list-style-type: none"> Indigenous community Farmers Farmer groups and associations Village government 	<ul style="list-style-type: none"> Wholesaler Large-scale retailers MSME retailers Online retailers Food start-ups 	<ul style="list-style-type: none"> Communities Family Welfare Empowerment Integrated health service post Schools 	<ul style="list-style-type: none"> Communities Hotels and hospitality Restaurant Corporation Catering corporation Ready-to-eat food MSMEs Ready-to-eat food entrepreneurs Farmers Fishermen
Focal Point of Ministry/ Institution	<ul style="list-style-type: none"> Ministry of Agriculture Ministry of Environment & Forestry Ministry of Maritime Affairs and Fisheries Ministry of Land and Spatial Planning / National Land Agency Indonesian Institute of Sciences Ministry of Research, Technology and Higher Education Local Government 	<ul style="list-style-type: none"> Ministry of Environment & Forestry Ministry of Maritime Affairs and Fisheries Local Government 	<ul style="list-style-type: none"> Ministry of Agriculture Ministry of Maritime Affairs and Fisheries Ministry of Public Work and Public Housing Local Government 	<ul style="list-style-type: none"> Ministry of Industry Ministry of Trade National Agency of Drug and Food Control (BPOM) Competence Authority for Food Safety Local Government 			<ul style="list-style-type: none"> Ministry of Trade Logistics Affair Body Local Government 	<ul style="list-style-type: none"> Ministry of Trade Ministry of Cooperative and SMEs National Agency of Drug and Food Control (BPOM) Competence Authority for Food Safety Local Governments 	<ul style="list-style-type: none"> Ministry of Health Ministry of Education & Culture Ministry of Religious Affairs Ministry of Female Empowerment & Child Protection Ministry of Environment & Forestry Local Government 	<ul style="list-style-type: none"> Ministry of Environment & Forestry; Ministry of Agriculture; Logistics Affair Body; Ministry of Research; Technology and Higher Education; Local Government
Stakeholder	<ul style="list-style-type: none"> Ministry of Home Affairs Ministry of Finance Banking and Financial Institution 	<ul style="list-style-type: none"> Ministry of Home Affairs Ministry of Finance Banking and Financial Institution 	<ul style="list-style-type: none"> Farmer groups and & associations Cooperative Corporation of farming facilities Entrepreneur of farming facilities Ministry of Home Affairs Ministry of Finance Banking and Financial Institutions 	<ul style="list-style-type: none"> Ministry of Home Affairs Ministry of Finance Banking and Financial Institutions 			<ul style="list-style-type: none"> Ministry of Communication and Information Technology (virtual granary supporter) Ministry of Social Affairs Ministry of Home Affairs Ministry of Finance Banking and Financial Institutions 	<ul style="list-style-type: none"> Ministry of Trade Ministry of Cooperative and SMEs Ministry of Home Affairs Ministry of Finance Banking and Financial Institutions 	<ul style="list-style-type: none"> National Family Planning Coordinating Board National Social Security Teachers/Educators, Teachers Associations Ministry of Home Affairs Ministry of Finance Banking & Financial Institutions 	<ul style="list-style-type: none"> Ministry of Home Affairs Ministry of Finance Banking and Financial Institutions

Interventions and Innovations of Indonesia Sustainable Food System

Life Cycle Stages	Germplasm as well as Food Land & Sea	Collection & Conservation	Cultivation	Processing & Packaging			Storage & Reservation	Logistic & Distribution	Consumption	Post-Consumption & Food Loss		
Aspects												
Overall	<ul style="list-style-type: none">Indonesia Sustainable Food System (ISFS). The formulation of the Indonesia Sustainable Food System and determining it as a formal policy in the form of a Governmental Regulation or Presidential Regulation of the Republic of Indonesia.Sustainable Food Planning. The formulation of mechanisms for sustainable food planning orienting at its holistic goal by involving harmonization the participation and decision-making of all stakeholders from upstream to downstream level. This mechanism must be defined into formal government policies (norms, procedures, standards and/or criteria).Tiered Key Performance Indicators (KPI) for Food. Formulation of harmonizing mechanism for program, budget and overall performance of food in ministries and institutions on each element of food value chain. Tiered key performance indicators that are interconnected from upstream to downstream are required. Analogous with the sustainable food planning process, the formulation of key performance indicators must also be developed from the KPI for nutrition and public health, passed down to KPI at the following planning level (consumption, availability and production). This mechanism must be incorporated to formal government policies (norms, procedures, standards and/or criteria).Upstream-Downstream Food Management Institution. The establishment of a single national food management institution in order to ensure the availability of a formal institution which is specifically handling food comprehensively. At present, there is no single institution that explicitly handles food in a comprehensive manner. The institution will also reinforce and strengthen the coordination among food actors, focal points and stakeholders.					<ul style="list-style-type: none">National Dashboard for Sustainable Food Systems. The establishment of a comprehensive national food information system, including the development of a national food dashboard.Inclusive Food Laws and Regulations. The revision of Food Acts and the relevant regulations in order to be inclusive. Peasants, women, indigenous communities and vulnerable/marginal groups must be explicitly regulated under the law if necessary affirmative action can be adopted.Food & Beverage as Specific Economic Sector. Making food (& beverage) as a separate economic sector in order to gain higher priority and be more focused at governance and investment.Minimum Food Service Standard. Formulation and re-application of the Minimum Food Service Standard as one of incentive and disincentive means for local governments.Incentives for Private & Community Engagement in ISFS. Massively developing mechanisms for active role of private sectors in food systems and practices in Indonesia. One of the most important issues is the need for incentives for active participation of private sector & societies, both financially and non-financially. Institutional strengthening for numerous food-related industrial/business association is also required at continual basis.						
Policies	<ul style="list-style-type: none">To ensure the materialization of food genetic resources as common property.Formal policies to ensure inclusive access to food resource land, including forests and seas, as food sources.Formal policies to ensure the availability of sustainable food lands and waters.	<ul style="list-style-type: none">Policies to conduct a comprehensive valuation towards of the value of forest ecosystem services in Indonesia, in particular its value as a food source.Policies on accelerating the comprehensive mapping on indigenous community forests throughout Indonesia.Policies on accelerating the stipulation of status certainty on indigenous forests as source of local food.	<ul style="list-style-type: none">The stipulation of staple food policy oriented towards local food diversity and gradually reducing the focus on rice, corn and soybean.To formulate and stipulate demand-management oriented food policy.To formulate planning and its implementation for harmonizing the types of food cultivated with the need of food diversity in order to achieve nutritional status of the community as planned.To formulate and stipulate a policy to increase the consumption and cultivation of local food (carbohydrate) sources such as sorghum, foxtail millet, barley, local tubers, which so far have been ignored.The establishmet of a national target on the expansion of organic food land by 5% per year.	<ul style="list-style-type: none">To formulate and stipulate a policy on improving the quality of processed food nutrition on massive scale.The policy to discontinue all (pilot) projects on local food production and industry conducted by Ministry of Agriculture as well as other ministries and institutions and instead replace them with an integrated upstream-downstream single program conducted by all food related ministries and institutions.	<ul style="list-style-type: none">Massive revitalization and dissemination of local food granaries, along with its respective governance wisdom, thus establishing virtual and real networks in all villages, districts, cities, regions, large islands and national.					<ul style="list-style-type: none">Establishing a national food storage and distribution system.Formularizing an involvement mechanism for indigenous communities and local people in logistics and distribution.Formulation and stipulation of upstream-downstream food safety policy; from food sources to consumption food security.Policy of a single security authority from upstream to downstream.Formulation and implementation of a single upstream-downstream food fortification mechanism strategy involving all related ministries, institutions, food actors and stakeholders.	<ul style="list-style-type: none">Massive national campaign policy regarding sustainable food consumption.Formulation and stipulation of policy and action plan to reduce the consumption of rice to less than 95 kilograms per capita, in order to increase the consumption of corn to 5 kilograms per capita and to increase the consumption of tubers to 10 kilograms per capita over five years.Formulation and stipulation of policy and action plan in order to increase the consumption of vegetables and fruits by 5-10% per annum.	<ul style="list-style-type: none">Formulation of system in preventing food loss and food waste and incorporate the system in a comprehensive formal policy and action plan by involving integrated cross-sectors.

Interventions and Innovations of Indonesia Sustainable Food System

Life Cycle Stages Aspects	Germplasm as well as Food Land & Sea	Collection & Conservation	Cultivation	Processing & Packaging			Storage & Reservation	Logistic & Distribution	Consumption	Post-Consumption & Food Loss
Institutional	<ul style="list-style-type: none"> Network development for local food germplasm (genetic resource) banks, virtually and physically, and connected to the national food germplasm information system. 	<ul style="list-style-type: none"> Strengthening the national network of indigenous communities in the Archipelago. 	<ul style="list-style-type: none"> Insurance and financial service institutions for food cultivation. 	<ul style="list-style-type: none"> National intergrated research and development centre for sustainable food. 			<ul style="list-style-type: none"> Local wisdom based (diverse) food granaries network at village, district, city, provincial, island, and national levels, virtually and physically. 	<ul style="list-style-type: none"> The establishment of a single authority institute for food security that manages food security from upstream to downstream integratedly. 	<ul style="list-style-type: none"> Revitalizing <i>Posyandu</i> (Integrated Service Post) and <i>Puskesmas</i> (Public Health Clinic) in order to strengthen sustainable food practices. Involvement of “unconventional” institutions, such as BPJS (Social Security Administering Body, in promoting sustainable food in order to reduce its curative burden), BKKBN (Family Planning Coordinating Agency), <i>Bekraf</i> (Creative Economy Agency), and others. 	<ul style="list-style-type: none"> Establishment of a governmental agency equal to first echelon for prevention, reduction and utilization of food loss and waste that is integrated from upstream to downstream based on the food life cycle. Establishment of “food bank”
Financial	<ul style="list-style-type: none"> Incentive mechanism for establishing local food germplasm (genetic resource) banks. Research and development incentive mechanism for food germplasm. 	<ul style="list-style-type: none"> Utilization of village funds to strengthen the facilities and management of sustainable local food by indigenous communities and villages throughout Indonesia. Valuation budgeting of forest ecosystem services, particularly those related to food. Incentive mechanisms for food distribution from food collection to food supply chains, at local and national levels. 	<ul style="list-style-type: none"> Formulation and establishment of incentive and subsidy mechanisms for organic food cultivation and precision farming. Mechanism for financing organic food cultivation and precision farming. Budgeting for food crop cultivation 	<ul style="list-style-type: none"> Incentive mechanism for healthy food product. Disincentive mechanism for sugar, salt, and fat in processed food. Incentive mechanism for research and development for new/futuristic food (insects, algae, lab-grown meat, etc.) 			<ul style="list-style-type: none"> Budgeting mechanism and incentive for developing virtual and physical (diverse) food granaries. 	<ul style="list-style-type: none"> Incentive mechanism to increase peoples’ purchasing affordability. Disincentive mechanism for selling tobacco (cigarettes) and betel in order to reduce the level of its consumption. 	<ul style="list-style-type: none"> Formulation of upstream-downstream integrated food budgeting system involving all food related ministries and institutions. Village Fund utilization mechanism for food related promotive and preventive health aspects. 	<ul style="list-style-type: none"> Incentive and disincentive mechanism related to prevention, reduction and utilization of food loss and waste. Incentive mechanism for establishing “food banks”.
HR & Competency	<ul style="list-style-type: none"> Awareness and competence raising on local food germplasm. 	<ul style="list-style-type: none"> National symposium on the revitalization of food related local wisdom in Indonesia. Documentation and dissemination of food related local wisdom in Indonesia. 	<ul style="list-style-type: none"> Mechanism and system for farmer regeneration through young farmers and millennial farmers. Competence system for sustainable food production. 	<ul style="list-style-type: none"> Competency training and certification on sustainable production regarding food processing. 			<ul style="list-style-type: none"> Symposium regarding granaries and local wisdom. Competency training and certification in managing virtual and physical (diverse) food granaries. 	<ul style="list-style-type: none"> Competency training and certification on logistics and distribution of sustainable food. 	<ul style="list-style-type: none"> Raising awareness and training on sustainable food consumption. Selection and appointment of 5,000 ambassadors and influencers for sustainable food consumption per year. 	<ul style="list-style-type: none"> Awareness and competence raising in preventing, reducing and utilizing food loss and waste. Competency certification in preventing, reducing and utilizing food loss and waste.

Interventions and Innovations of Indonesia Sustainable Food System

Life Cycle Stages Aspects	Germplasm as well as Food Land & Sea	Collection & Conservation	Cultivation	Processing & Packaging			Storage & Reservation	Logistic & Distribution	Consumption	Post-Consumption & Food Loss
Technology & Innovation	<ul style="list-style-type: none"> Online-based knowledge management system of local food germplasm & local food land, including local germplasm database system. 	<ul style="list-style-type: none"> Development of knowledge management and database of food related local wisdom. Development of knowledge management and database of local food cycle. 	<ul style="list-style-type: none"> Implementation of sustainable production for food or precision farming (4.0) on the food processing and food cultivation, especially for land conservation, increasing productivity and reducing the cost for food cultivation. In urban areas, implementing urban farming systematically and continuously. 	<ul style="list-style-type: none"> Implementation of sustainable production and food industry 4.0 in food processing. Implementation of good production practices in processed food MSMEs. Research and development for new/futuristic food (insects, algae, lab-grown meat, etc.) 			<ul style="list-style-type: none"> National system development for Diverse Food Granary 4.0 based on information technology, big data, block chain, and the latest virtual technology. National dashboard development for sustainable food reserve system. 	<ul style="list-style-type: none"> Development of food logistics and distribution system 4.0 based on information technology, big data, blockchain, and the latest information technology. Establishment of national management system 4.0 for fruits and vegetable, upstream-downstream integratedly, including synergy mechanism with fruit and vegetable estate corporations as well as with major retailers. 	<ul style="list-style-type: none"> Development of virtual content for sustainable food consumption. Development of 100 publications per annum regarding sustainable food (books, comics, periodicals), at local and national scale. 	<ul style="list-style-type: none"> National networks on knowledge management and database regarding food loss and food waste based on information technology, big data, blockchain, and the latest virtual technology.
Management & Standard	<ul style="list-style-type: none"> Food distribution mechanism from indigenous peoples to 'conventional' food markets. Management guideline for local food germplasm. 	<ul style="list-style-type: none"> Acceleration on the confirmation of law on indigenous communities. Comprehensive valuation guideline on forest ecosystem services in Indonesia, especially its value as food source. Guideline on the acceleration of comprehensive mapping on indigenous community forests throughout Indonesia. 	<ul style="list-style-type: none"> Guideline for sustainable food production. Mechanism for involvement and acknowledgment for women in sustainable crop cultivation system. 	<ul style="list-style-type: none"> Guideline for sustainable production and food industry 4.0 on food processing. Guideline for good production practice for processed food MSMEs. 			<ul style="list-style-type: none"> Guideline for developing and managing (diverse) local wisdom-based food granaries network at village, district, city, province, big island and national levels, virtually and physically. 	<ul style="list-style-type: none"> Developing and/or upgrading the number of healthy and diverse food MSMEs by 10,000 per year. Developing the number of healthy and diverse food start-ups by 1,000 per year based on information technology, big data, blockchain, and the latest virtual technology. 	<ul style="list-style-type: none"> Guideline for "My Plate" and "My Local Plate" menus for processed food corporations and entrepreneurs (hotels, restaurants, catering, food stalls, street vendors, food start-ups, etc.). Guideline and massive campaigns on "Healthy and Diverse Food for the Whole Life"; Guideline on healthy and diverse food "from cradle to grave". Guideline and campaigns on management for food-associated Pre-DM (diabetes mellitus). 	<ul style="list-style-type: none"> National standard on good food chain management to reduce food loss and waste. Publication of Annual Report on National Food Loss and Waste. A system to require periodical public reporting on the causes of large-scale food loss and waste (corporations, star rated hotels, large caterers, etc.)
Behavior & Culture	<ul style="list-style-type: none"> Promotion of local food germplasm. Local content curricula for elementary, secondary and higher education on local food germplasm. 	<ul style="list-style-type: none"> Educational curricula regarding food related local wisdom within the parts of local content at primary, secondary and higher education. 	<ul style="list-style-type: none"> Educational curricula for elementary, secondary and higher education regarding organic food cultivation and food sustainable production. 	<ul style="list-style-type: none"> Food sustainable production awards. Educational curricula on organic food cultivation and food processing sustainable production and food industry 4.0 for elementary, secondary and higher education. 			<ul style="list-style-type: none"> Granary Awards at district, city, provincial and national levels. 	<ul style="list-style-type: none"> Sustainable Food Distributor Awards. 	<ul style="list-style-type: none"> Perception campaign to change the top of mind regarding food targeted to young generation, teenagers and children, in order for them to have the right perception regarding responsible food consumption. Massive campaign on "Tobacco and Betel for Food". "My Plate" massive promotion through family, Family Welfare Empowerment (PKK), and <i>Posyandu</i> (Integrated Service Post). Campaigns on responsible food consumption through role models and influencers. "Popular Food is Healthy Food". 	<ul style="list-style-type: none"> Food loss and waste awards for all actors at each food life cycle stages; farmers, fishermen, food corporations, food entrepreneurs, food MSMEs, food start-ups, hotels, restaurants, catering, food stalls, etc.

Recommendations for Indonesia Sustainable Food

1 Mainstreaming Indonesian Sustainable Food System (ISFS) towards Governmental Policy

Indonesia must have a sustainable food system that is applicable, suitable and adequate with the conditions of food practices in the country. The implementation of the ISFS must be based on eight principles of sustainable food (shared goals, holistic, inclusive, local, interdependence, food life cycle, environmental and natural resource systems, and sustainability) in a consistent and sustainable manner. The Indonesia Sustainable Food System and its principles and various attributes must be incorporated into a formal policy of the Government of the Republic of Indonesia in the form of Governmental Regulations or Presidential Regulations.

Some of important attributes that need to be put in are stakeholder's engagement, inclusive access, and women's role. Holistic engagement of stakeholders from upstream to downstream throughout the food life cycle is very important, as well as to ensure inclusive coverage of all food actors. Without massively involving society and private sectors, government will not be able to finance and enforce sustainable food systems properly. Government have to set up mechanism, including financial and non-financial incentives and disincentives, in order to facilitate active participation of private sectors and the society in financing and implementing sustainable food practices in Indonesia.

Another crucial issue is the need for affirmative action to ensure that all stakeholders, including vulnerable groups, to have access and are actively engaged in food systems and practices in Indonesia. Women, for example, have a major role in this situation. Today, more than 8 million out of 33 million farmers in Indonesia are women. In addition, women also have a significant role in the cultivation and post-harvest process, but the role has not been seen. Unfortunately, this significant number is not supported with the participation of women in the formulation and implementation of food policies.

Within Indonesian families, women are indeed the most important actors in the selection, processing and serving food. It means, there are more than 52 million families very dependent on women in the context of food.

The increase of awareness and expertise of women on local, healthy and diverse food will therefore significantly influence the structure of the food system in Indonesia. If women are not being prioritized and not being encouraged in the context of food, the national food systems and practices would undoubtedly have poor performance in supporting food security and nutritional quality of the population.

2 Optimizing the utilization of local food germplasm and ensuring availability of land and waters for food.

It is ironical that Indonesia which has 77 types of carbohydrate-resource food plants only been focusing at only two plants: rice and corn. In the same way, Indonesia has 26 types of beans but solely been focusing at soybeans. This situation has to be radically changed. Including herbs and spices, Indonesia has 945 species of food resource plants available for utilization. Such kind of diversity should be optimized, not extinguished as it has been so far. Aborting the genetic diversity of local food resources is a slowly suicidal attempt for national food security.

In Indonesia, each region has its distinctive local type of food plants. As local genetic resources, the plants have been adapted to the conditions of local environment, thus they can be optimally grown in the area. Therefore, a national network of database and knowledge management regarding local food sources must be materialized as soon as possible in order to have comprehensive identification and documentation of the potential use of local food genetic resources in each area.

In order to materialize the idea, Government of Indonesia needs to stipulate a formal policy on local food, such as formulation and stipulation of policies and action plans to reduce rice consumption to less than 95 kilograms per capita, to increase corn consumption by more than 5 kilograms per capita, and to increase local tubers and grains consumption by more than 10 kilograms per capita in five years.

An action plan for the utilization of genetic local food resources must be prepared and implemented consistently. This also covers regular registration and annual reporting system as the material for evaluation and development of the action plan. For example, out of the 77 types of carbohydrate source plants how many types have been used, in which area, how much the quantity have been used as food source. The same treatment should be applied for other food plant as well.

3 Ensuring the inclusive access to food land and water, including forest and marine as food sources.

The government must ensure inclusive access to land and water as access to food sources that constitutes the top priority for the community, men and women, especially indigenous peoples. In case of land or water conflict, including conflict with protected areas, access to food must remain be the priority, because food is fundamental need that the fulfilment shall be guaranteed.

There have been existing conflicts and there are also potential conflicts between land and water as food sources and as other utilization, including protected areas. These conflicts need to be mapped comprehensively as the conflict map will be very useful information for formulating food-oriented policy on land and water use and access.

Furthermore, state must prepare and provide, for the context of long-term period, the supply of land and water for food cultivation. The future projection for the need of food land and water must be met with an adequate action plan, including the sufficiency of land area for crop cultivation in order to give economic scale for the cultivators.

More than 16 million or 58.7% of farmers in Indonesia occupy less than 0.5 hectares of farm land in average. For rice crop, for example, such area of land has no economic scale. That means, if they merely depend on rice farming, a smallholder farmer will never make any profit or never achieve break-even point and even will end up losing their income.

One of the efforts that need to be made is to accelerate food land-oriented agrarian reform. The ownership of food land area must be extensified. Priority should be granted to food farming families in order for them to have a minimum of farm land that can be cultivated so as the families can be prosperous. One study found that minimum land cultivation area for farmers to be prosperous is 0.65 hectares per capita for rice, while for corn is 1.12 hectares per capita and for soybean is 0.74 hectares per capita. In addition to the three types of food, there is also a need for in-depth studies on other staple foods in order to promote food diversity in Indonesia.

4 Empowering the concept of sustainable production in the collection, cultivation, processing and management, storage and reserve, as well as logistics and distribution of food.

Sustainable or responsible production consists of several fundamental elements, i.e. non-polluting, energy efficient and resource efficient, economically viable, caring for labor safety, producing safe products and services for consumers.

In the context of food cultivation, a sustainable production system shall have high level of productivity so as posses a good economic viability. The production system shall also be shifted from chemical to organic base in order to reduce the environmental impacts. The implemetation of precision farming which enables to provide inputs and information regarding the most suitable farming operation will be able to reduce the use of resources and energy in the form of agricultural facilities and infrastructures. At the side of cultivating farmers, the production system and operation shall provide a high level of prevention and protection against occupational safety risks, chemically, mechanically, ergonomically, as well as other risks. The last one is, the farming products produced shall be in good quality and safe for consumption.

Recommendations for Indonesia Sustainable Food

Basically, sustainable production can and should be undertaken at several stages of the food life cycle, namely (1) collection and preservation, (2) food cultivation, (3) preparation and processing, (4) storage and reserve, and (5) logistics and distribution. This concept is applicable for production and service system. Consistent application of this concept would enable to increase food productivity in Indonesia, while at the same time reducing the production cost, and also able to reduce food loss along the five stages of food life cycle.

This production approach can also be a pull factor for young people to enter the field of food cultivation. There is a need for regeneration of food farmers by young farmers. Thus, food cultivation and management must be developed so as enticing for them. Occupation in this field must be created and perceived as a competitive and decent work. The system and mechanism for the competency and the certification of the expertise in sustainable production must also be formulated as a form of acknowledgment towards the importance of profession and expertise in the field of food (cultivation, collecting and processing, storage and reserve as well as logistics and distribution).

The implementation of sustainable production requires adequate resources and governance. Both aspects are need to be prepared carefully and systematically. Therefore, hands-on training for farmers must be carried out in massive scale. The field school model which has been proven can be applied in order farmers be more competent and empowered in this area.

At the food processing side and downstream further, the concept of food industry 4.0 should as soon as possible be adopted as the new normal in the food production practices. The guideline for sustainable food production and food industry 4.0 on food processing must immediately be developed and implemented continuously. For micro, small and medium-sized enterprises (MSMEs), guideline, training and competency up-grading in good agricultural practices as well as good production practices also need be materialized.

In order to shift the food cultivation system from chemical-based to organic-oriented, adequate incentive and disincentive mechanism is needed. The initiative requires participation of private sectors and communities. Therefore, the efforts must be focused at mechanism in engaging private sectors and communities as active participants that must be established and be applied consistently. Communities and private sectors are the backbones of Indonesia's food supply. The state budget (APBN) is capable to meet only about 15% of food budget required. Thus, focus of the efforts must be shifted immediately to engage with private sectors and communities as soon as possible through various attractive incentive mechanism and facilitation strategy.

For organic farming, incentives particularly should be given in the early years of cultivation. Based on experiences, during the first three years of organic farming needs large investments during which the yield of this system is generally still low. Without such incentive, organic farming would be seen as costly, that it will be less appealing to farmers. Subsidy for organic farming facilities (Saprotan) must also be provided, and followed by subsidy reduction for chemical-based farming facilities as disincentive.

Acknowledgment towards organic farming needs to be done gradually, and not applying absolute approach. At present, factually, organic certification is one of entry barriers for farmers to perform organic farming. Strict certification requirements and long-time adaptation to fully shift from chemical-based to full organic system make it less appealing to obtain organic certification. Therefore, the recognition mechanism must be granted gradually.

In this context, the mechanism for organic acknowledgement and labelling are carried out by stages or by graded. For example, there are labels for partial organic practices, comprehensive organic (but still using land that is not fully organic) and organic certification.

Somehow, at any organic level, the yield of the cultivation will be relatively healthier compared to chemical-based cultivation. Organic farming is also more sustainable therefore it needs to be supported in many aspects in order to popularize and to make it the main choice of cultivation.



Ensuring the product diversity of staple food cultivation and guaranteeing its quality and soundness.

Locally-based resource food diversity is a key factor in achieving national food security. Hence the utilization of local genetic resources must be conducted. These genetic resources have been adapting to the environment so as having a relatively high level of compatibility and resilience toward various factors related to its growth.

Each district/city in Indonesia must set a target of "basic need" for food as physical needs or public health. Sketchily, the target of food diversity and quantity is derived from the diversity of "Fill my plate locally" (My Plate initiative by Government of Indonesia). The need of such basic food must be available and prioritized. Beyond this need, districts/cities may determine food for other reasons, such as for recreational need and as commodity.

For non-food producer urban areas, in order to ensure food diversity, people are encouraged to introduce urban farming, particularly by planting vegetables & fruits. Food collaboration with food producers in towns/cities needs to be developed to meet the basic needs of healthy and diverse food.

In addition to fulfilling physical needs, diversity on food cultivation also beneficial in maintaining the quality of the soil and preventing from pests and plant diseases. So, from the point of view of environment, this approach is more sustainable.

Cultivation diversity related local wisdom need to be sistematically developed and revitalized. One of examples is intercropping which had ever been popular. Intercropping is one way of farming land optimization that needs to be supported. Food and Agriculture Organization of the World (FAO) has also suggested the application of integrated farming of various plants with livestock animals and/or fish. The cultivation diversity is definitely more resilient and appears to be more sustainable.

Local food technology must also be developed in systematical and sustainable manner as well as with upstream-downstream concept. The whole pilot projects regarding local food which to date have been partly and temporarily implemented by several ministries and governmental agencies should preferably be stopped and replaced by a more substantial and comprehensive program.

As mentioned earlier, in order to confirm food safety throughout the food life cycle from upstream to downstream, there is a need to have a single institution of Indonesian authority for food safety. As food is a very fundamental, very essential, and very strategic need for the Indonesian people. Food safety must therefore be managed by a fairly high level organization with appropriate authorities. Institutional model such as Financial Services Authority can be used as a benchmark in the context of food safety in Indonesia.

In order to encourage food industry to be able to provide healthy food products, there is a need for incentive and disincentive mechanism for the products. In order to resolve food associated degenerative diseases, for example, there is a need for disincentives for processed food products containing high level of sugar, salt and fat. On the other hand, incentives need to be given to research and development for products of healthy and diverse processed food.

There also be a must to promote and encourage "My Plate" and/or "My Local Plate" as part of menu on processed food products offered to consumers either through hotels, caterings, restaurants, or other SMSEs on processed food. Food entrepreneurs, chefs, and other food actors need to be encouraged to have concerns and expertise to make "My Plate" a delightful and meeting the taste of customers. There should be systematic efforts to make Indonesia inundated with healthy food. Food consumers in Indonesia must be "invaded" with diverse and healthy food.

Recommendations for Indonesia Sustainable Food

Incentives for research and development on the potential of futuristic food (insects, algae, lab-grown meat, jackfruit as non-fruit food source, etc.) need to be provided in order to discover new food sources. Indonesia has an enormous potential for this. As a maritime country, Indonesia has an enormous diversity of algae. At present, more than 1,000 species of algae have been identified which is edible and can be used as food sources.

6

Development of “granary” networks (real and virtual) based on local wisdom.

In order to ensure the sustainable food availability which is any time accessible, there is a need to develop local wisdom-base food storage network (real and virtual) at different levels of community/administrative (village, sub-district, district, region, province, large island, and national). Within the storage network, an integrated and real time information exchange of food reserve from each “granary” will be the backbone of national “granary” network system.

The “granary” networks must be based on information technology, big data, blockchain and the latest information technology. In order to support the decision-making process, the development of a national dashboard for sustainable food reserve also needs to be materialized.

The learning from the food granaries of indigenous communities in Indonesia, which for ages have been applying sustainable food granaries, must be properly identified and recorded as a knowledge management that must be preserved and restored, and then consistently be applied to these food “granaries” in Indonesia.

7

Ensuring the realization of a fair food price on each value chain.

Factually, dozens of millions of food farmers in Indonesia are quite vulnerable in terms of bargaining position regarding the trade of food commodity they produce. Almost similar condition has happened to food consumers, particularly those with middle-lower incomes. These groups are vulnerable to the fluctuation of food prices. As the actors and the very stakeholders they are powerless against fair trade.

The first action shall be taken is to systematically set up the food distribution system. Indonesia must have a systematic and proper database and food distribution knowledge management. Detailed information about the actors in the food supply chain, from farmers to consumers, must be made available and transparent to all food stakeholders in Indonesia.

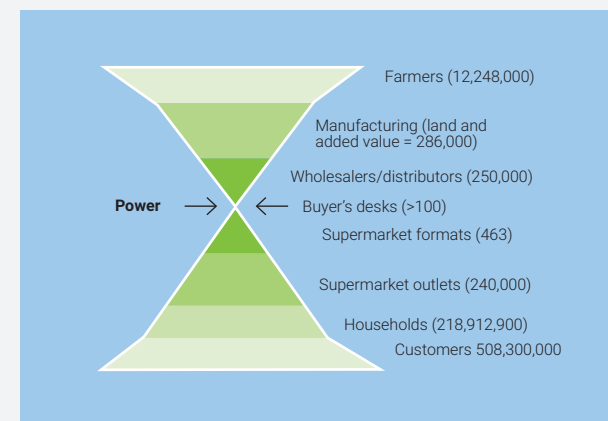


Diagram Resources: Eastham et al, 2017

A fair-trade food system need be applied consistently. This trading system gives priority to dialogue, transparency and mutually respecting in order to achieve trade (benefit) equality. This kind of system has been helping many marginalized parties in trading. Some of principles in food fair trade that need to be applied among others are:

- creating opportunities for micro, small and medium-scale enterprises in food sector,
- transparent and responsible,
- fair in transactions and payments,
- creating opportunities in order to increase the capacity of every food actor,
- avoiding discrimination, exploitation, child labor and not feasible working conditions, as well
- caring about social welfare, economic viability, and environmental protection.

8

Making sustainable food consumption as the top-of-mind and lifestyle of Indonesian people.

Consumption patterns, including food, are largely determined by perception (top-of-mind) and lifestyle. So then a massive promotion is required for transformation in order to enable sustainable food consumption be the top-of-mind in food preferences and viral lifestyle in society.

Some efforts that need to be done among others are:

- The engagement of ‘non-conventional’ institutions in the promotion of sustainable food, such as BKKBN (National Family Planning Coordinating Agency), which has very good experience and performance in transforming family planning, BPJS (Social Security Administering Body) needs to be involved in the preventive and proactive food-associated health in order to reduce the curative burden of the organization, *Bekraf* (Creative Economy) for innovative content regarding food and development of creative-interesting-diverse and healthy food for all communities and other institutions.



Photo source: Various sources

Recommendations for Indonesia Sustainable Food

- The empowerment and revitalization of *Posyandu* (Integrated Service Post) and *Puskesmas* (Community Health Clinic) to strengthen sustainable food practices, particularly among mothers, children and teenagers.
- The mechanism of village fund utilization for promotive and preventive health aspects related to local, healthy and diverse foods.
- The campaign to change perception (top-of-mind) regarding food among young generation, teenagers, and children in order for them to have right perception on sustainable food consumption.
- The compilation and publishing contents of printing, audio-visual and digital regarding healthy and diverse food. Massive and regular publications in this field need to be realized. In many countries, various publications related to healthy and diverse diets and healthy lifestyles are very popular. These publications, including digital contents circulating through various social media, have been generating a high level of concern towards food and healthy lifestyles. Such approaches can become learning in Indonesia for then be adapted and/or replicated.

9 Implementing the hierarchy of management in food loss and food waste consistently at each stage of the food life cycle to prevent and minimize the amount of food loss and food waste.

An ideal food system must able to create a closed loop (from cradle to cradle), so as there will be no in vain food loss and food waste. Food loss and food waste should be preventable, in case of already becoming waste, it should be able to make use of it or to return it back to the food system.

For this particular reason, a quantitative information on food must be available at each stage of its life cycle. Food material balance needs to be carefully prepared in order to understand precisely the flow of food along with its quantity and behavior. Such food material balance constitutes basic information that must be available in order to obtain information on the amount of food loss and food waste.

In order to minimize the amount of food loss and food waste, the application of hierarchy on waste management needs to be done consistently and continuously. The hierarchy of strategies starts from the highest to the lowest, covering:

1. Prevention. For example food loss and food waste can be prevented through redesigning on food cultivation, preparation, processing, storage and distribution.
2. Reduction. The food loss and food waste are reduced at the source, for example through process improvement.
3. Reuse. For example food loss can be reused as lower grade foodstuffs or processed as ready-to-eat food products.
4. Redistribution. Food excess can be redistributed, for example through food bank mechanism.
5. Recycle. For example, food waste that cannot be redistributed can be recycled into various types of animal feed, processed into liquid fertilizer, processed into compost, and/or utilized to produce biogas.
6. Safe processing and disposal. Food waste residues that can no longer usable can be processed and/or disposed safely into a good waste disposal (for example sanitary landfill).

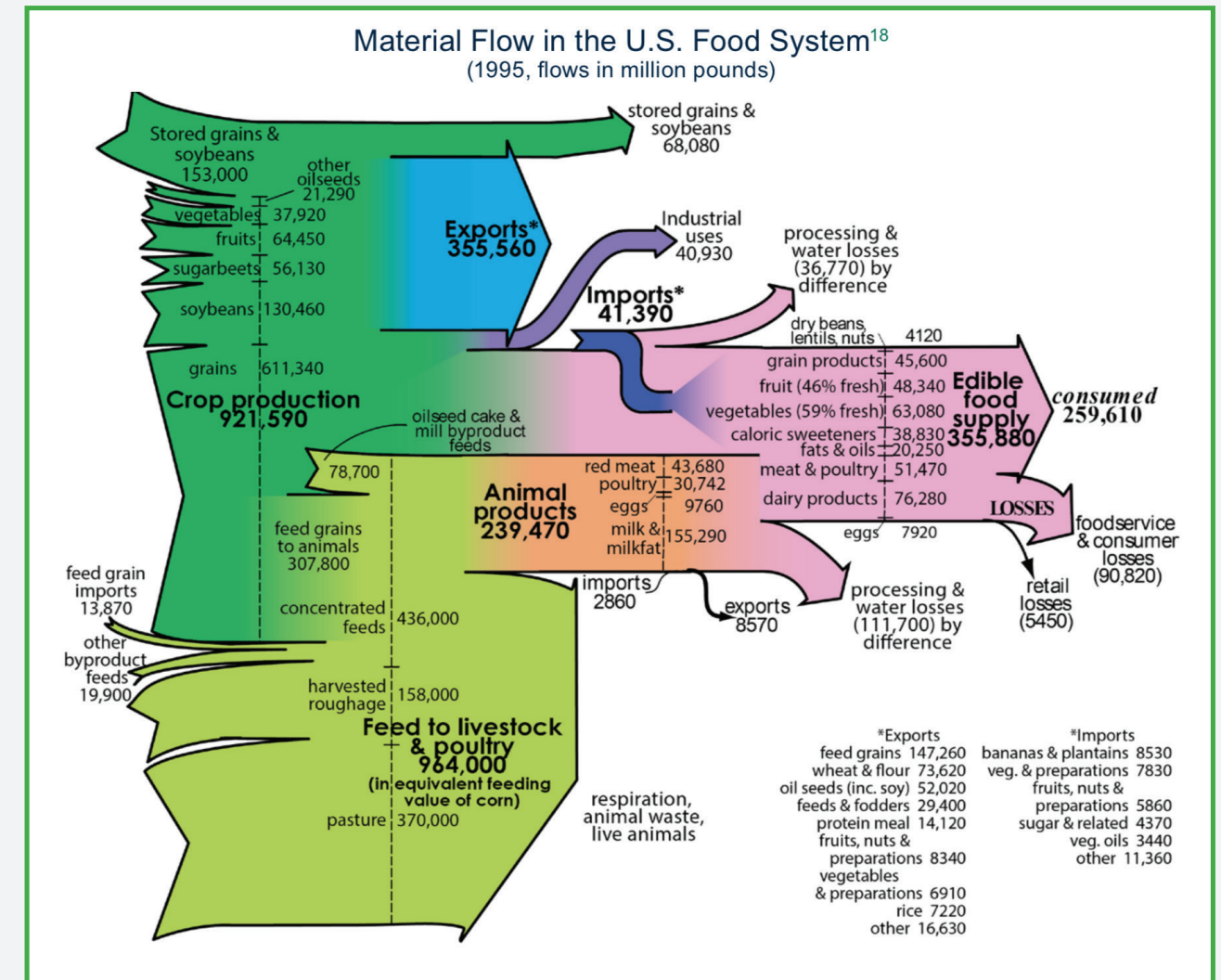


Diagram Resources: Heller & Keoleian, 2000

In order to format food material balance, an example of food flow in the USA as stated above can be added with information regarding the use of food loss, redistribution, recycling, and processing as well as disposal of food waste.

Chapter 4

2020-2024 Indonesia Sustainable Food Roadmap

The Indonesia Sustainable Food Roadmap, basically provides a five-year strategic guideline to materialize a practical sustainable food system in the country. The main components of the roadmap are annual milestone, strategic goals, and strategic initiatives. In this context, the milestone become the end stage in the sustainable food system, which illustrates the conditions or achievements have been gained. In order to achieve these milestone, one or more strategic goals are needed, which are realized through various strategic efforts or initiatives.

The stages of sustainable food milestone in Indonesia for five years are as follows:

1. Indonesia sustainable food system and mechanism.
2. Metric system for sustainable food performance in Indonesia.
3. Responsible food consumption.
4. Sustainable food production.
5. World leading state in sustainable food performance.



2020	2021	2022	2023	2024
Milestone				
Indonesia sustainable food system and mechanism.	Metric system for sustainable food performance in Indonesia.	Responsible food consumption.	Sustainable food production.	World leading state in sustainable food performance.
Strategic Goals				
Indonesia sustainable food system and mechanism are set, approved, and implemented in a participatory manner by all food stakeholders.	<ul style="list-style-type: none">• Metric system on sustainable food performance (measurement, monitoring, evaluation and improvement) is established and implemented in Indonesia.• The formation of stakeholder consolidation in order to materialize Indonesia Sustainable Food.	<ul style="list-style-type: none">• Responsible food consumption pattern becomes food top of mind and food lifestyle in Indonesia.• Most food actors in Indonesia continuously implement responsible food consumption.	<ul style="list-style-type: none">• Sustainable food production system is implemented by most of food actors at every stage of food life cycles.• Most food actors in Indonesia continuously implement sustainable food production.	<ul style="list-style-type: none">• The biggest proportion of national food budget is allocated for responsible food consumption and production.• Indonesia sustainable food management model is the benchmark for other countries.• Indonesia is no longer included in the Global Hunger Index Annual Report

2020	2021	2022	2023	2024
Strategic Initiatives				
<ul style="list-style-type: none">• Indonesia sustainable food vision as national shared vision.• National policy of Indonesia sustainable food system (based on eight principles of sustainable food systems) in participatory approved by all stakeholders.• Sustainable food planning that is carried out in a holistic participatory upstream-downstream (by engaging all stages of relevant food life cycles) for various administrative levels (district, city, provincial, and national).• Planning and strategic programs on Indonesia sustainable food interventions and innovations.• Massive publishing of sustainable food content (printed and digital).• Big scale and continuous promotion of Indonesia sustainable food.	<ul style="list-style-type: none">• National policy in metric system (measurement, monitoring, evaluation, and improvement) of sustainable food performance in Indonesia at village, district, city, provincial and national levels.• National policy on real-time national food dashboard.• Food indicators are used as key performance indicators on the whole food focal points.• Issuance of the annual report on Indonesia sustainable food performance to public (district, city, province, national).• Formation and development of human resources in the field of sustainable food with its competency and recognition systems (certification).• Annual food symposium (district, city, province, and national) covering all groups of food actors in Indonesia as part of measurement, monitoring and evaluation over sustainable food performance.	<ul style="list-style-type: none">• Massively empowering ambassadors and influencers for sustainable food as trend-setter of responsible food consumption at district, city, provincial and national levels.• Establishment and development of sustainable food start-ups in massive scale.• Indonesia sustainable food annual awards.• Issuance of annual reports on management over food loss and food waste at district, city, provincial and national levels.• Issuance of mandatory annual reports on management over food loss and waste for large-scale food businesses (hotels, caterers, restaurant chains, distributors and retailers).• Indonesia Food Responsible Consumption and Production Expo.	<ul style="list-style-type: none">• Regeneration of food farmers through the establishment and development of young entrepreneurs (including young farmers and millennial start-up) on sustainable food.• Development of industrial facilities for organic-based farming production.• Incentives and subsidies for sustainable food production followed by disincentives for chemical-based food production systems.• Asia Food Responsible Consumption and Production Expo.	<ul style="list-style-type: none">• Budgeting for responsible food consumption and sustainable food production.• Comprehensive evaluation over ISFS and its formulation and dissemination of learning citations from ISFS performance.• Development and formulation of ISFS 2.0.• World Food Responsible Consumption and Production Expo.

2020-2024 Indonesia Sustainable Food Roadmap

Year 2020

The year of 2020 is the year for establishing a solid foundation for sustainable food in Indonesia through a formal policy in the form of a Governmental Regulation or Presidential Regulation of the Republic of Indonesia concerning Indonesia Sustainable Food System (ISFI). The national policy is established based on eight principles of sustainable food systems, namely: (1) common goals, (2) holistic, (3) inclusive, (4) local, (5) interdependency, (6) food life cycle, (7) environmental and natural resources system, and (8) sustainability.

Other than that, a comprehensive system and mechanism on Indonesia sustainable food is arranged, approved and implemented in participatory and sustainable manner by all food stakeholders. Food management integrately, from upstream to downstream, by unanimous common goals. Each focal point will carry out its respective duties and functions but on inter-dependent basis, leading to the common goals. A vision of Indonesia sustainable food requires to be determined as the ideal condition which will be achieved simultaneously.

The policy must be translated into a sustainable food plan which is also carried out in a holistic and participatory covering from upstream to downstream (involving all stages of relevant food life cycle) at various administrative levels (district, city, province, and national).

In term of food consumption, massive promotion and socialization must also be carried out continuously in order to change the top-of-mind and food lifestyle of Indonesian people. All kinds of possible media and communication contents as well as relevant stakeholders need to be actively engaged. Publication regarding the contents of sustainable food (printed and digital) must be conducted on a massive scale.

Year 2021

By this year, a single metric system of Indonesian sustainable food for measuring, monitoring, evaluating, and improving the overall food system and performance will have already been established and implemented. This metric system will be the food dashboard of online and real-time networks by utilizing the latest information technology (big data, internet of things, blockchain, etc.)

In 2021, all food managements in Indonesia have been based on a single quantitative and qualitative information, from upstream to downstream of the food life cycle. On the other hand, food indicators must be used as key performance indicators (KPI) for all food focal points. An incentive and disincentive system for achieving the KPI must have been prepared.

A consolidation among stakeholders in order to realize Indonesia sustainable food also must have been materialized as one of integrated and holistic upstream-downstream food practices. Annual symposium in order to evaluate and improve food system and practices in Indonesia will need to be done in tiered from district, city, provincial and national levels. This event constitutes a mode for stakeholders to inclusively and actively participate in advancing food practices and system in Indonesia.

This year of 2021, a human resource development system in the food sector and its competency mechanism must have been formulated. One of its main objectives is recognition towards sustainable food competency throughout its life-cycle. Competency certification in sustainable food must have already been begun on a continual basis.

As a form of transparency, an Indonesian Food Annual Report must have been published periodically. This report is consolidative, containing food performance from upstream to downstream, by all food focal points (ministries and institutions related to food).

Year 2022

In the year of 2022, responsible food consumption pattern will have been becoming the food top-of-mind and food lifestyle in Indonesia. This condition is the result of massive and continuous campaigns and socializations that will have been conducted.

At this point, most of food actors in Indonesia will have already been implementing responsible food consumption consistently in their daily dietary pattern. This pattern of consumption is expected to encourage the formation of local, healthy and diverse food markets. For that purpose then synergy from the perspective of sustainable food suppliers will need to be established in order to achieve balanced demand and supply.

As the leverage of responsible food consumption pattern, food ambassadors and influencers must have been selected and empowered at various levels (district, city, province, and national), both in real life and virtually. On the supply side, sustainable food start-ups will need to be massively developed and facilitated in order to establish thousands of start-ups per year. A continuous yearly program such as: "10,000 Responsible Food Consumption Ambassadors and Influencers per Annum" and "5,000 Sustainable Food Start-Ups per Year" are not too magniloquent to be introduced every year.

In order to be able to manage food loss and waste transparently, an annual report on food loss and waste management at the district, city, provincial and national levels must have been published and addressed to public annually. Similar reports are also obligatory for business sector to publish especially those who produce abundant of food loss and food waste, such as food processing industry, big hotels, catering networks, restaurant chains, food distributors, food retail chains, and others. Aside from that, a food waste reduction target in accordance with SDG 12.3 must have been established and implemented.

A large-scale food event must have already been held in 2022, such as "Indonesia Responsible Food Consumption and Production". In this event sustainable food awards will be rewarded to sustainable food practitioners by the President of Republic of Indonesia.

Year 2023

In 2023, a sustainable food production system will have already been implemented by most actors at every stage of food life cycle.

Incentives and subsidies to shift the food cultivation system from chemical-based to organic-based system are expected to have been showing positive results. Food farmers will have already been implementing the system, either partially or comprehensively, and obtaining organic certification from an independent certification agency.

In terms of distribution of organic labels for food products, various application levels as mentioned above are required to be given acknowledgement for their food cultivation efforts which are more sustainable rather than chemical-based cultivation systems. Industry for organic-based farming production facilities must also have been established and able to support the organic cultivation system.

Regeneration of food farmers must have also been carried out, among other through program on the establishment and development young sustainable entrepreneurs (including young farmers and millennial start-ups). For that purpose, working conditions on food cultivation and processing must be made so as appealing to younger generation. Application of the latest technology, competitive wages, decent work system, and future guaranty must be realized in order to attract more young people to this field.

Beside productivity and efficiency, food loss is one of the main issues in sustainable food production. Within five years, food loss must have been cut significantly, at least 25% left by 2024 (from 2020 basic year) and at least 50% by 2030. For that target, in-depth research to determine the baseline of food loss and food waste must have been carried out comprehensively. It is important to remember that cutting down losses on the food production chain signifies directly increasing food supply, without having to make additional efforts for the food cultivation itself. The cost of reducing food loss will be lower than the cost of adding production.

2020-2024 Indonesia Sustainable Food Roadmap

Year 2024

This year of 2024 is the milestone, when the state will have been most leading in the sustainable food performance on the world. One of the key indicators is that Indonesia will have been no longer included in the annual report on Global Hunger Index. More even, Indonesia sustainable food management model will have to be able to become the benchmark for other countries.

In this year of 2024, the largest proportion of national food budget must have been dedicated for responsible food consumption and production. This constitutes the reflection of the government's political will to materialize the sustainable food. Other support is in the form of public procurement system. Procurement related to food carried out by government must have also been fully allocated only for sustainable food products and services.

The performance in the entire food life cycle will have already been improved significantly: (1) Food germplasm banks network will have already been formed and operating properly. (2) Inclusive access to food sources (including forests and seas) will have already been realized. (3) Food cultivation will have already been implementing sustainable production. (4) Food granaries network (in real life and virtually) from village to national level will have already been formed and operating properly. (5) Food fair trade system will have already been applied consistently. (6) Responsible food consumption patterns will have been becoming the lifestyle of the Indonesian people. (7) Food loss and food waste will have been cut significantly and be in the achievement trajectory of SDG 12.3 or better.

In the second semester of 2024, a thorough evaluation towards Indonesia Sustainable Food System will have to be carried out inclusively, involving active participation of the stakeholders in the learning, evaluation and improvement of the ISFS performance. Based on this evaluation, the development and formulation of ISFS 2.0 for the next five years will have to be set. The ISFS must always be implemented, maintained and continuously improved in order to make every individual's life be healthy, active, and productive.



Local cuisine of indigenous community in Krayan, North Kalimantan • (Photo: Cristina Eghenter)

Chapter 5 Conclusion

It is a fact that the first food self-sufficiency achieved by Indonesia in 1984 obviously has not yet become a guaranty for the country to be free from food problems. Thirty-five years since recognition granted by FAO for the "success", there have still been some indigenous communities experiencing hunger, millions of food farmers living in poverty, food prices fluctuating, food losses and food wastes in large amount, staple food getting less and less diverse, and the most crucial thing has turn out been the health risks associated with food dietary, which have been increasing and becoming the number one health risk.

The absence of holistic and inclusive food system seems to be the main cause. The management of food value chain series from upstream to downstream have not been carried out integratedly, and in fact there has been no single institution in the country dealing with overall food aspects. Each food focal point in Indonesia has been only dealing with one part. The ministries and institutions have only been managing partially of such important aspect for the nation. Food is indeed the life itself, there will be no life existing in this country without food.

Thus, the overall thing has to be fundamentally changed. It is obligatory to change the basic paradigm of food.

Food management must be holistic from upstream to downstream and inclusive, by engaging active participation and dialog of stakeholders, including vulnerable groups. The type of staple foods might no longer be focused at merely quite a few plants. Food diversity in accordance with local food resources in each region of Indonesia should be empowered. Cultivation system using chemical-based production facilities must be shifted to organic in order to be always within the limits of natural and environmental carrying capacities. Lastly, the complexity of the food issues in Indonesia has also been triggered by the absence of demand side management. Without this approach, the ultimate goal of food fulfillment as a means of improving the quality of nutrition and health so as resulting active, healthy and productive Indonesian people will never be achieved.

A holistic and inclusive Indonesia Sustainable Food System (ISFS) must be constructed as an integrated response towards various food problems occurred in Indonesia. A system for balanced demand and supply sides management, accommodating the genetic food diversity in each area in Indonesia along with their local wisdoms and must be able to harmonize with environmental, economic and social welfare aspects.



Salt farm in Rembang, Central Java • (Photo: Hartaty)

Glossary

AJI (Aliansi Jurnalis Independen)	Alliance of Independent Journalists
AMAN (Aliansi Masyarakat Adat Nusantara)	Indigenous Peoples’ Alliance of the Archipelago
APBN (Anggaran Pendapatan dan Belanja Negara)	The State Budget
APRINDO (Asosiasi Pengusaha Ritel Indonesia)	Indonesian Retailers Association
ASPPUK (Asosiasi Pendamping Perempuan Usaha Kecil)	Association for Women in Small Business Assistance
ATR (Kementerian Agraria dan Tata Ruang)	Ministry of Agrarian Affairs and Spatial Planning
Bappelitbang (Badan Perencanaan Pembangunan, Penelitian dan Pengembangan)	Development Planning, Research and Development Agency
Bappenas (Badan Perencanaan Pembangunan Nasional)	National Development Planning Agency
Bekraf (Badan Ekonomi Kreatif)	Creative Economy Agency
BKKBN (Badan Kependudukan dan Keluarga Berencana Nasional)	National Population and Family Planning Board
BKP (Badan Ketahanan Pangan)	Food Security Agency
BPN (Badan Pertanahan Nasional)	National Land Agency
BPJS (Badan Penyelenggara Jaminan Sosial)	Social Security Provider
BPOM (Badan Pengawas Obat dan Makanan)	National Agency of Drug and Food Control
BULOG (Badan Urusan Logistik)	State-owned Logistics Affair Agency
CSO	Civil Society Organization
DM	Diabetes Mellitus
FAO	Food and Agriculture Organization
GAIN	Global Alliance for Improved Nutrition
GAPMMI (Gabungan Pengusaha Makanan dan Minuman Seluruh Indonesia)	Indonesian Food & Beverage Association
GBDI (Generasi Baru Dapur Indonesia)	New Generation of Indonesian Cooking
Hivos	Humanist Institute for Cooperation with Development Countries
HNRC-IMERI-UI	Human Nutrition Research Center- Indonesian Medical Education and Research Institute- University of Indonesia
IBCSD	Indonesia Business Council for Sustainable Development
IPB (Institut Pertanian Bogor)	Bogor Institute of Agriculture
ISFS	Indonesia Sustainable Food System
Isi Piringku	My Plate Initiative, government program on healthy diets designed to support food diversity
KEHATI (Keanekaragaman Hayati)	Biodiversity
Kemenag (Kementerian Agama)	Ministry of Religious Affairs
Kemendag (Kementerian Perdagangan)	Ministry of Trade

Kemendagri (Kementerian Dalam Negeri)	Ministry of Home Affairs
Kemendikbud (Kementerian Pendidikan dan Kebudayaan)	Ministry of Education and Culture
Kemenkes (Kementerian Kesehatan)	Ministry of Health
Kemenkeu (Kementerian Keuangan)	Ministry of Finance
Kemenperin (Kementerian Perindustrian)	Ministry of Industry
Kemensos (Kementerian Sosial)	Ministry of Social Affairs
Kementan (Kementerian Pertanian)	Ministry of Agriculture
KKP (Kementerian Kelautan dan Perikanan)	Ministry of Marine Affairs and Fisheries
KLHK (Kementerian Lingkungan Hidup dan Kehutanan)	Ministry of Environment & Forestry
Kominfo (Kementerian Komunikasi dan Informatika)	Ministry of Communication & Information Technology
KPI	Key Performance Indicator
KPPPA (Kementerian Pemberdayaan Perempuan dan Perlindungan Anak)	Ministry of Women’s Empowerment and Child Protection
KRKP (Koalisi Rakyat untuk Kedaulatan Pangan)	The People’s Coalition for Food Sovereignty
MSME	Micro, Small and Medium Enterprises
NTFP-EP	Non Timber Forest Product – Exchange Programme
OKKP (Otoritas Kompeten Keamanan Pangan)	Competence Authority for Food Safety
Pajale (Padi, Jagung dan Kedelai)	Rice, maize and soybean
Pangan Bijak Nusantara	Wise Foodways of the Archipelago
PKK (Pemberdayaan Kesejahteraan Keluarga)	Family Empowerment and Welfare
Posyandu (Pos Pelayanan Terpadu)	Integrated Service Post - a monthly clinic for children and pregnant women, providing vaccinations and nutritional supplements
PUPR (Kementerian Pekerjaan Umum dan Perumahan Rakyat)	Ministry of Public Works and Public Housing
Puskesmas (Pusat Kesehatan Masyarakat)	Community Health Center
RPJMN (Rencana Pembangunan Jangka Menengah Nasional)	National Medium-Term Development Plan
Saprotan (Sarana produksi pertanian)	Farming production facilities
SDGs	Sustainable Development Goals
SUN	Scaling Up Nutrition
Unpad (Universitas Padjadjaran)	Padjadjaran University
USA	The United States of America
WAIBI	Indonesia Initiative For Blue Economy Foundation
WWF Indonesia	World Wildlife Fund Indonesia

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