

〔Review Article〕

An Overview of Nutrition and Sustainable Development Goals (SDGs): What Japan is Doing in the Context of Aging, Urbanization, and Globalization

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Abstract

Rapid and drastic paradigm shifts are changing Japanese society in visible and invisible ways. In particular, demographic changes and urbanization will have a great impact along with accelerating globalization. In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development and 17 Goals were addressed.

The present article focuses on Goal 2, which aims at ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture. The tasks of Japan toward achieving Sustainable Development Goals (SDGs) are summarized after reviewing global trends with respect to nutrition and the SDGs.

Key words: 2030 Agenda, Sustainable Development Goals (SDGs), nutrition, global health, Japan

1. Introduction

1-1. Overview of SDGs

Given the drastically changing global situation, the United Nations adopted the 2030 Agenda for Sustainable Development (the 2030 Agenda) in 2015. In the preamble to the 2030 Agenda, it is pledged that “no one will be left behind” and clearly stated that the 2030 Agenda is a plan of action for people, the planet, and prosperity¹⁾. To realize the 2030 Agenda, 17 goals termed Sustainable Development Goals (SDGs) were announced. Each of the goals encompasses several targets — 169 in total. They seek to build on the Millennium Development Goals (MDGs) and complete what the MDGs could not achieve by 2015¹⁾. A noteworthy characteristic of the SDGs is that they are targeted at both developed and developing countries²⁾ though MDGs are mainly targeted at developing countries^{3, 4)}. However, societal, economic, and environmental paradigm shifts have been occurring globally and we are confronting common issues regardless of the region in which we live. Further, the goals and targets of the SDGs are connected with each other and are thus indivisibly interrelated, and interdependent^{2, 5)}.

1-2. Transition of social issues in Japan

Japan is the world’s fastest aging society. An increasing number of people live longer owing to the improvement of sanitation, medical science, and so on. At the same time, awareness and prevention of chronic ailments such as dementia, frailty, and malnutrition are

increasing⁶⁾.

Urbanization in metropolitan areas and depopulation in rural areas are simultaneously accelerating in Japan⁷⁾. The lack of social capital, transportation, and mobilization of goods is of great concern as they can have a negative impact on people's daily lives and their ability to respond to disaster^{8,9)}. Agriculture is also declining because of demographic and industrial shifts.

As Japan responds to these issues, knowledge and expertise in how to deal with an aging society have been accumulated leaving unsolved health issues behind.

1-3. Social determinants of health (SDH) and the SDGs

Globally, a socioeconomic and environmental transition, as well as an epidemiological transition, has been observed for decades¹⁰⁾.

Acute infections are not usually fatal nowadays and people live longer in most developed places. On the other hand, an increasing number of people are suffering from non-communicable diseases (NCDs) such as dementia, and the need to respond to this situation is growing more urgent.

Further, there is an accumulation of scientific evidence for the social determinants of health (SDH). Specifically, a large number of studies have suggested an association between low income, socioeconomic status, or educational status and NCDs¹¹⁾.

Several studies have pointed out that reducing inequality and NCDs can be key to promoting and achieving the 2030 Agenda¹¹⁾. In order to resolve health-related inequality and to effectively prevent NCDs, interventions should be conducted after vulnerable populations such as adolescent girls, pregnant and lactating women, and elderly people as well as children under five years of age have been identified^{1,11)}.

1-4. Access to health care services and sufficient nutrition

In this demographically bipolarized global society, inequalities in access to resources for disease prevention and treatment are widening. Fundamentally, Universal Health Coverage (UHC) aspires to create societies in which “all individuals and communities receive quality healthcare services that they need, and are protected from health threats without suffering financial hardship”¹²⁾. Thus, it covers individuals across all economic strata. To achieve UHC, it is necessary to create an environment in which people can make informed choices about food and nutrition¹³⁾. Further, the affordable and nourishing food supply must be secure, sanitary, and environmentally sustainable. Only if these conditions are met will countries be able to achieve UHC and the SDGs¹⁴⁾. Both consumers and producers need to understand this. Relevant science-based nutritional education are necessary, especially for vulnerable population groups¹⁵⁾.

1-5. The monitoring and evaluation of SDGs

In order to grasp whether progress is being made globally toward achieving SDGs, relevant methods that are internationally compatible of evaluation are essential to sustain transparency and ensure accountability. Though some regions lag behind, great effort has been made to understand global progress more accurately¹⁶⁾. Evaluation within and across countries is effective for understanding the ongoing situation and useful for scaling redistribution of such efforts in a balanced manner¹⁴⁾. For example, successive analyses have identified major gaps when data are disaggregated by gender, geography, and so on¹⁷⁾. An external evaluation identified several issues such as limited focused efforts with respect to specific problems such as stunting and wasting in children^{14, 17, 18)}. The findings of these medical articles suggest that improvement in the indicators of undernutrition, such as stunting among children, is very slow, while the negative health outcomes caused by being overweight or obese are increasing across many regions over the world^{14, 17)}. By conducting relevant evaluations an ideal resource allocation and a balanced achievement of the SDGs would be realized.

2. Nutrition and the SDGs

Over the past decades, a global framework for better nutrition has been established. The Lancet's Series on Maternal and Child Nutrition, published in 2008 and 2013, provided global insights into nutrition^{19, 20)}. The Scaling Up Nutrition (SUN) movement was developed in 2010 and the "Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition" was adopted at the 65th World Health Assembly^{21, 22)}. In 2014, a common vision for global action to eradicate hunger and end all forms of malnutrition was defined by the ten commitments of the Rome Declaration on Nutrition at the Second International Conference on Nutrition (ICN2) (**Appendix 1**). In the 2030 Agenda adopted in 2015, Goal 2 has ambitious targets that partially overlap with the ten commitments of the Rome Declaration (**Appendix 2**). For example, ending hunger, ending all forms of malnutrition, promoting sustainable food systems, and awareness of healthy nutritional needs throughout people's lives are addressed in both frameworks.

Furthermore, in 2016, following a recommendation in the Rome Declaration, the "Decade of Action on Nutrition (2016–2025)" was declared by the UN General Assembly¹³⁾. Thus, nutrition has been recognized as one of the highest global priorities.

Not only malnutrition among children, including stunting and obesity, but also the nutritional needs of adolescent girls, pregnant and lactating women, and older people are addressed in Target 2.2 of Goal 2 (**Appendix 2**). For situation analysis, strategies and achievements have been widely recognized since the MDGs era^{3, 4, 22-26)}, here, we focus on adolescent girls, pregnant and lactating women, and older persons.

3. Nutrition among adolescent girls and pregnant and lactating women

According to a report by the United Nations Development Programme (UNDP), health and education are the key determinants of gender equality and women's empowerment²⁷⁾. Globally, there is a high economic cost when women are not able to engage fully in their nations' economies. The UN report estimated, for example, that the total annual economic losses due to gender gaps between 2010 and 2014 could exceed \$90 billion in sub-Saharan Africa²⁷⁾.

The health and nutritional status of adolescents has seen limited improvement over the decades²⁸⁻³⁰⁾. With respect to adolescents, the "dual burdens" of malnutrition and high body mass index (BMI) have been noted globally²⁸⁾. Adolescence is characterized by profound physical growth and development^{14, 28)}. Because adolescents are still developing critical thinking skills, they are vulnerable to unreliable information and knowledge, and are heavily influenced by their surrounding social, economic, and cultural environments. Thus, SDH attaches a great deal of importance to better nutrition and health among this age group³⁰⁾. It has been suggested that the strong desire for thinness has resulted in a high prevalence of underweight women (body mass index: $<18.5 \text{ kg/m}^2$)¹⁵⁾, and that this desire to be thin is partly caused by social and media pressure. In 2010, twenty-nine percent of women aged 20-29 years old were classified as underweight in Japan³¹⁾. Whether information related to lifestyle, body image, or fashion in a society is harmful to adolescents' health is an important consideration.

Depressive symptoms during pregnancy and the postpartum period are also a social concern in Japan. For example, the prevalence of suicide among pregnant women and postpartum women was reported to be 28.6% during 2015 and 2016 in Japan, according to research conducted by the National Center for Child Health and Development. Among the 357 cases studied, the leading causes of deaths were: suicide (n=102, 28.6%), cancer (n=75, 21.0%), heart disease (n=28, 5.3%), and other causes. Health and physical condition as well as poor socioeconomic factors can worsen the situation. Community-based integrated care should be strengthened in order to detect suicide risk early and improve the situation.

Although the system to support so-called marginalized age groups and populations has been established, there are still few effective interventions or solutions^{11, 15, 29, 30)}. Improving the nutritional situation of adolescent girls is known to be important for preventing negative health outcomes, including nutritional deficiency, anemia, osteoporosis, and impaired fetal growth^{11, 15)}.

4. Nutritional issues among older persons

Among older people, there are many issues relating to nutrition such as undernutrition, obesity, sarcopenia, frailty, osteoporosis, hip fracture, impaired cognitive function, Alzheimer's disease, and so on^{32, 33)}. In particular, frailty and impaired cognitive function are two geriatric syndromes that significantly affect health and the ability to live independently³⁴⁾. The

effectiveness of oral health to prevent the onset of impaired cognitive function has been known for years³⁵⁻³⁷). Traditionally, women have been the major caregiver in many cases in Japan. Nevertheless, little research has been carried out about their psychosocial burden until recently³⁸⁻⁴⁰). Earlier intervention and implementation of long-term care will lead to a decrease in the prevalence of ailments caused by stressful conditions as well as lighten the burden on the caregiver.

4-1. Frailty and negative health outcomes among older persons

The importance of the awareness of frailty has been increasing in Japan's rapidly aging society. Although many physicians and medical personnel are aware of frailty among older people, there has been no clear consensual definition for decades^{32, 41}). Recently, it was reported that there are two phenotypes of frailty: the physical and multidomain phenotypes^{32, 41}). The well-known concept of the physical frailty phenotype includes slowness, weakness, exhaustion, low activity, and weight loss⁴²⁻⁴⁴). On the other hand, the multidomain frailty phenotype includes the cognitive, functional, and social domains^{32, 41}).

The cause of frailty is difficult to identify^{45, 46}). However, early detection through the signs or symptoms of frailty is effective in preventing negative health outcomes such as disability, long-term care, hospitalization, and death^{42, 44, 47, 48}). Previous studies that analyzed data from the Japanese Gerontological Evaluation Study (JAGES) and health screening data have provided practical methods to enable the early detection of frailty among community-dwelling older adults⁴⁶). In Japan, community-level health screening has been implemented regularly as a public service, and clinical biomarkers are collected^{46, 49}). The research concluded that the albumin, hemoglobin, and high density lipoprotein (HDL) data collected at regularly conducted health screenings could effectively validate the physical phenotype of frailty among community-dwelling older people in earlier stages⁴⁶).

However, with respect to the effectiveness of health promotion interventions including a nutritional intervention for mild or pre-frailty community-dwelling older adults, a systematic review and meta-analysis found scarce significant results, possibly because of smaller sample sizes⁵⁰). Further accumulation of an evidence base is anticipated.

4-2. Frailty and malnutrition

A previous systematic review and meta-analysis suggested that malnutrition and physical frailty in community-dwelling older adults are interrelated³⁴). However, malnutrition and physical frailty were not interchangeable. According to a study published in 2017, 68% of the malnourished older adults were physically frail, whereas only 8.4% of the physically frail population was malnourished³⁴).

4-3. Frailty and dietary pattern

Because Japan is the most aged society in the world, it possesses significant knowledge, expertise, and scientific evidence related to geriatric issues. Regarding the association of frailty and dietary pattern in the community-dwelling older population, an increasing number of findings have been reported.

In a cross-sectional study conducted in Japan, the association of high dietary protein and high dietary total antioxidant capacity (TAC) with frailty concluded that both of them were inversely associated with frailty individually among old Japanese women⁵¹⁾. Furthermore, the dietary pattern that had both high dietary protein and high dietary TAC worked strongly against the prevalence of frailty in this population group⁵¹⁾.

Another cross-sectional analysis showed a positive association between dietary acid load and the prevalence of frailty, particularly for slowness, weakness, and low physical activity among older Japanese women⁵²⁾.

In Japan, research based on the Tokyo Oldest Old Survey on Total Health (TOOTH) study targeted at the very old Japanese population (average age of participants: 87.8 ± 2.2 years, N=542) reported that there were two dietary patterns in the community-dwelling very old population in Japan: a “traditional Japanese” dietary pattern and a “noodles and confectioneries” dietary pattern²⁴⁾. Oral function was a significant predictor of dietary pattern compared to the other health-related factors such as ability of daily living (ADL) and cognitive function²⁴⁾. Therefore, maintaining oral function may be essential to sustain chewing ability, which enables the intake of vegetables, seaweed, and legumes that are often used in the “traditional Japanese” dietary pattern and are also good sources of dietary fiber. Accordingly, oral health checkups and counseling by dental professionals are essential.

4-4. Other topics relating to long-term care prevention

Impaired cognitive function and hip fracture are the major causes of long-term care among community-dwelling older people⁴⁷⁾. A cross-sectional study suggested that a diet with high intakes of the “Plant foods and fish” would have a beneficial effect on cognitive function among the community-dwelling older population in Japan⁵³⁾.

For the prevention of fractures and related complications among older adults, fall prevention is one of the major public health issues^{47, 54)}. A meta-analysis emphasized the importance of supplemental vitamin D to reduce the risk of falling, but its efficacy and appropriate dosage are still controversial⁵⁴⁾. The strengthening of multidimensional interventions including the improvement of nutrition, group exercise programs, and living arrangements such as “barrier free housing” is important^{47, 55, 56)}.

4-5. Interventions to prevent malnutrition in Japan

In addition to the typical services provided by the health and welfare sector, there are new

campaigns for the improvement of nutrition among socially vulnerable people such as “restaurant for kids (*kodomo shokudou*),” “health consulting room (*minnano-hokenshitsu*),” “food delivery service for kids (*kodomo-takushoku*),” and “Salon for older persons in the community,” in addition to the encouragement of volunteer activity for older persons, utilization of entertainment programs or facilities for better health and welfare, and so on. These frameworks are correlated with the new movement of community-based integrated care and would contribute to scaling up the movement.

5. Sustainable agriculture in the era of globalization

The SGDs address the promotion of sustainable agriculture in Goal 2 (Appendix. 2). There are several global certification systems of agriculture, fishery, and forestry. Globally the motivation to obtain these certifications has increased recently, for example at the London Olympic and Paralympic Games held in 2012⁵⁾. These certifications assure that the environment and sustainability will be addressed^{57, 58, 59)}. However, the coverage of such certifications is still quite low in Japan^{5, 57)}. Moreover, bottlenecks in obtaining them have been reported. For example, Good Agricultural Practices (GAP) is a well-known certification for agricultural products^{58, 59)}. However, the implementation of Global GAP, which is given to safe and sustainable food that meets global standards, is low in Japan⁵⁷⁾. The result of the following research conducted by Japan Finance Corporation (JFC) shows details of these bottlenecks: 1) 59.1% of those surveyed do not think it is important, 2) it takes time and the cost is prohibitive (51.7%), 3) does not lead to financial merit (45.6%), 4) does not agree with the framework of certification (7.9%), 5) reluctant to introduce the new system (5.6%), and 6) others (8.4%) (n= 6,187, multiple answers were possible)⁵⁷⁾.

Further, there is an increasing need for ethically sound supply chains, responsible production and consumption, and diverse types of food in this era of globalization.

Given this situation, not only producers, but also consumers should be aware of the relevance of sustainability and globalization, as well as food security and nutrition.

6. Summary

We are confronting new and unexpected social issues with respect to aging, urbanization, and globalization. We cannot dismiss and ignore these trends. The need to exchange knowledge and experience across countries is drastically increasing. Further, novel efforts and collaboration between different sectors are required for a better future, such as the acceleration of technology in the field of health and nutrition, reasonable resource allocation, and transversal collaboration for innovation. This would contribute to the multi-partnership addressed in Goal 17 among the SDGs and scale up the achievement of the 2030 Agenda.

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(Appendix. 1)

The ten commitments made through the Rome Declaration on Nutrition	
<ol style="list-style-type: none">1. Eradicate hunger and prevent all forms of malnutrition.2. Increase investments for effective interventions and actions to improve people's diets and nutrition.3. Enhance sustainable food systems.4. Raise the profile of nutrition with national strategies and align national resources accordingly.5. Strengthen human and institutional capacities to improve nutrition.6. Strengthen and facilitate contributions and action by all stakeholders.7. Ensure healthy diets throughout the life course.8. Create enabling environment for making informed choices.9. Implement these ten commitments through the Framework for Action.10. Integrate the Declaration's vision and commitments into the post- 2015 development agenda process.	

(Source: Conference Outcome Document: Framework for Action. Second International Conference on Nutrition. Rome: FAO, WHO; 2014¹³), summarized.)

(Appendix. 2)

Goal 2.	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
2.1	By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round
2.2	By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons
2.3	By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment
2.4	By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
2.5	By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed
2.a	Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries

2.b	Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round
2.c	Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility

(Source: Transforming our world: the 2030 Agenda for Sustainable Development. New York: United Nations; 2015¹⁾.)

(Abbreviation)

ADL	Ability of Daily Living
BMI	body-mass index
GAP	Good Agricultural Practice
ICN2	Second International Conference on Nutrition
JAGES	Japanese Gerontological Evaluation Study
MDGs	Millennium Development Goals
NCDs	non-communicable diseases
SDGs	Sustainable Development Goals
SDH	social determinants of health
SUN	Scaling Up Nutrition
TAC	total antioxidant capacity
TOOTH	Tokyo Oldest Old Survey on Total Health
UHC	Universal Health Coverage
UN	The United Nations
UNDP	The United Nations Development Programme

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