

## Food Consumption to Embody Multidimensionality: The Role of Information

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This paper is a short version of the paper published in *Nogyo Keizai Kenkyu* in Japanese (Shimokawa, 2020). The paper first proposes recommendations for a healthy and sustainable diet in Japan under the context of multidimensionality and clarifies the gaps between the diet and Japan's current diets. Second, it explores potential difficulties to achieve the healthy and sustainable diet by considering consumers' bounded rationality. Lastly, it discusses how we can tackle the difficulties by taking advantage of information and communication technologies.

**Key words:** Food Consumption Behavior, Bounded Rationality, Healthy and Sustainable Diets

### 1. Introduction

A healthy and sustainable diet has been increasingly important worldwide following globalization and urbanization which caused an increase in the physical and mental distance between farmers and consumers, an international dependency in food supply, and the complexity of the global food system. These phenomena made it more difficult for consumers to recognize food origins, food production processes, and food losses and environmental burdens due to long-distance transportation. Accordingly, consumers tend to be unaware of how their diets can influence the societies and natural environments in other areas and countries, which may lead to environmental destruction at the global level. To mitigate such destruction, it is important to shift consumers' diets toward a more healthy and sustainable diet. Moreover, the shift in consumer demand may also promote food supply that emphasizes the diet.

This paper explores how to promote a healthy and sustainable diet in Japan by focusing on the importance of multidimensionality in food consumption among consumers. It also discusses potential difficulties and how to tackle the difficulties using the advantages of information and communication technologies. At the same time, it is unrealistic to expect that all consumers emphasize multidimensionality in their food consumption. Thus, as the second best strategy, we also need measures that change consumers' food choices toward a healthier and

more sustainable one regardless of their perception. For example, previous studies find that food consumption behaviors are substantially influenced by information such as media and labels (McCluskey et al., 2019). However, providing information does not always have a desirable influence on consumers' diets, and it is important to design how to provide information. Thus, to explore an effective strategy to promote a healthy and sustainable diet, this paper employs the framework of bounded rationality.

### 2. Multidimensionality in Food Consumption

Following the guidelines for a healthy and sustainable diet proposed by FAO (2018) and FAO (2019), the paper proposes recommendations for a healthy and sustainable diet in Japan. Because not all the FAO's guidelines are suitable to Japan's situations, the paper modifies and localizes the guidelines specifically for Japan. Table 1 summarizes the recommendations for Japan by focusing on the three criteria, improve health status, reduce environmental burdens in food production and transportation, and reduce environmental burdens in food consumption.

### 3. Food Consumption Patterns in Japan

We describe recent food consumption patterns in Japan using the National Health and Nutrition Survey in Japan in 2001 and 2016. We illustrate how food intake amount

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**Table 1. Recommendations for a Healthy and Sustainable Diet in Japan**

<b>1. Selected FAO Guidelines</b>
<b>(1) Improve health status</b> <ul style="list-style-type: none"> <li>• Have a balanced diet from a wide variety of foods.</li> <li>• Balance between energy intake and energy requirement.</li> <li>• Eat cereals, tubers, pulses, vegetables, and fruits every day.</li> <li>• Eat salt free nuts for protein.</li> <li>• Minimize the consumption of foods that contain a lot of fat, sugar, and salt and little minerals.</li> <li>• Increase the proportion of n-3 fatty acids and decrease the proportion of n-6 fatty acids.</li> </ul>
<b>(2) Reduce environmental burdens in food production and transportation</b> <ul style="list-style-type: none"> <li>• Choose food items that are easy to transport and need less energy to transport.</li> <li>• Choose less-processed and/or less-purified food items.</li> <li>• Minimize the consumption of ultra-processed foods.</li> <li>• Consume a moderate amount of foods that cause high environmental burdens and health risks (e.g., meats, seafoods, and dairy foods).</li> <li>• Consume a small amount of seafoods with certification.</li> <li>• Drink tap water.</li> </ul>
<b>(3) Reduce environmental burdens in food consumption</b> <ul style="list-style-type: none"> <li>• Minimize the use of plastic bags and packaging.</li> <li>• Choose vegetables and fruits grown outdoors rather than those grown in greenhouses.</li> <li>• Reduce the gender gap in cooking and grocery shopping.</li> </ul>

  

<b>2. Recommendations for Japan</b>
<b>(1) Improve health status</b> <ul style="list-style-type: none"> <li>• Eat rice at least once every day.</li> <li>• Increase the proportion of brown rice.</li> <li>• Eat vegetables, fruits, and soybean products (e.g., <i>tofu</i>, <i>natto</i>, <i>kinako</i>, and soybean milk) or dairy products, every day.</li> <li>• Increase the proportion of sesame oil, linseed oil, rapeseed oil, and rice oil in oil consumption.</li> <li>• Eat tubers, pulses, and nuts every week.</li> </ul>
<b>(2) Reduce environmental burdens in food production and transportation</b> <ul style="list-style-type: none"> <li>• Choose local foods, domestic foods, and products of the nearby sea if possible.</li> <li>• Eat seasonal vegetables and fruits.</li> </ul>

<ul style="list-style-type: none"> <li>• Eat seafoods with eco-label, if possible, instead of other seafoods.</li> <li>• Eat chicken or eggs rather than beef and pork.</li> <li>• Eat chicken, seafoods, or eggs about three times a week.</li> <li>• Eat beef or pork about three times a month.</li> <li>• Minimize the consumption of ultra-processed foods and drinks.</li> </ul>
<b>(3) Reduce environmental burdens in food consumption</b> <ul style="list-style-type: none"> <li>• Plan a menu for the week and check what ingredients you need before grocery shopping.</li> <li>• Bring an eco-bag and avoid overpacking.</li> <li>• Have men do more cooking and grocery shopping.</li> </ul>

and frequency changed from 2001 to 2016 for 12 food groups. The results clarify that there are substantial gaps between the current diet and the healthy and sustainable diet in Japan, and the gaps are particularly large for meat, vegetable, and fruit consumption. Japanese people eat too much meat, and meat consumption (particularly pork consumption) increased substantially after 2001. In addition, Japanese people need to consume more vegetables and fruits, and vegetable and fruit consumption has been decreasing substantially since 2001.

#### 4. Toward a Healthy and Sustainable Diet in Japan

We overview what we need to promote a healthy and sustainable diet in Japan. First, we need to increase the proportion of consumers who emphasize multidimensionality in food consumption. However, food choices are too complex and too familiar for many consumers to think carefully about what they should choose. Thus, second, we need to motivate consumers to emphasize multidimensionality in food consumption such as health, environment, and culture. Third, we need institutional arrangements that facilitate multidimensionality in food consumption regardless of consumer types.

#### 5. Challenges Due to Bounded Rationality

We discuss potential difficulties to facilitating the social changes proposed in the previous section and potential strategies to tackle the difficulties by focusing on consumers' bounded rationality. That is, we assume that consumers' cognitive ability is limited, and it is important to take the limitation into account when we promote a healthy and sustainable diet. For example, bounded

rationality includes a self-control problem, a default effect, and optimistic bias. The bounded rationality makes it difficult to change consumers' mindsets or their behaviors even when we are able to change consumers' mindset.

A potential solution for the difficulties would be intervening in consumers' initial perception and choices about diet through, for example, dietary education and food education at elementary schools and default healthy menus at canteens. While many consumers consume foods thoughtlessly, such consumers' food choices tend to be responsive to small environmental changes such as displays, stress, noise, light, container size and shapes, and who eats together (Just, 2011). Thus, we may exploit the consumers' responsiveness to change their food choices by changing their environment.

## 6. Roles of ICT and Digital Technology

We examine two important roles of information and ICT technology to implement the measures proposed in the previous section. First, information and ICT technology are expected to compensate for consumers' limited cognitive ability. Second, they are expected to help in designing and implementing social interventions to promote a healthy and sustainable diet.

## 7. Conclusions and Discussion

Lastly, we discuss the future direction of research and policy for promoting a healthy and sustainable diet in Japan. While there are multiple aspects in sustainability and multidimensionality in food consumption, the aspects

should be examined simultaneously although previous studies tend to examine each aspect separately. Similarly, the recommendations for a healthy and sustainable diet in Japan are closely related, and some recommendations are complements to or substitutes for each other. Thus, it may be more effective to promote multiple closely related recommendations together rather than promote each recommendation independently.

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