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Editorial

Introduction to the special issue on "sustainable food consumption in China"

The United Nations set its "Sustainable Development Goals" (SDGs) in 2015, containing 17 interrelated goals and 169 targets for the world community to reach by 2030. Though sustainability has many definitions from different perspectives, the central question is, "What kind of future do we want?" As the largest population and the second largest economy in the world, China is obliged to actively respond to this question. The current literature finds that human activities, mainly driven by consumption, shaped and are shaping the biosphere environment. In company with demographic change and global growth, consumption patterns are drastically changing globally. China is no exception. How to use resources efficiently for consumption, minimize negative impacts on the environment, and not jeopardize the well-being of future generations are the central issues for the concept of "Sustainable Consumption". There are two general pathways to achieving sustainable consumption: (1) increase resource use efficiency, and (2) reduce resource-intensive goods consumption.

We organized a call for papers for a special issue on "Sustainable Food Consumption" in *Xiaohua Yu* at the end of 2015, as food is closely related to all goals in SDGs. After the peer-review process, six papers were accepted and are now presented to readers. The six papers address the major issues in "Sustainable Food Consumption" in China from different dimensions.

China has had continuously rapid economic growth for 40 years, with average annual growth rates over 8% since the economic reform launched in 1978, and has crossed the threshold of becoming a middle-income country. Along with rapid economic growth, Chinese dietary patterns have changed significantly. Diets that were dominated by traditional fibrous foods have been replaced by ones with high-protein animal products such as meat and milk. China has also increasingly imported a large volume of food and livestock feed during the past two decades. Meat is reared on feed, and its production is highly resource intensive. Such trends cast a shadow on "Sustainable Development" not only for China, but for the whole world. Where and when are the end of the dietary transformation in China and a leveling off of food and feed imports?

In an era of globalization, sustainable food consumption has broader dimensions of interest to researchers. Given the sheer size of China's population, we think the following four issues related to food consumption and dietary change are of particular interest: (1) what is the impact of dietary change in China on global food security? Will China starve the poor in other countries? (2) What are the impacts of dietary change in China on the environment and ecological systems, such as the emissions of greenhouse gases and other toxic materials? (3) What are the impacts on human health, such as obesity and other noncommunicable diseases? (4) What are the reactions of Chinese consumers to emerging ethical issues in modern agriculture, such as animal welfare and biotechnology?

In other words, sustainable food consumption implies that our food consumption should NOT (1) harm the livelihoods of other people, (2) harm the right to live of future generations, (3) harm our own health, (4) abuse the lives of animals used in agricultural production.

The six papers present a timely overview over these four issues in China. We here briefly summarize the findings of these papers.

First, the two papers by Hasiner & Yu (in press), and Zhou, Yu, Abler, & Chen (in press) shed light on the meat consumption and the impact of food consumption in China on global food security.

Hasiner & Yu (in press) analyze the linkage between meat consumption and democratic governance from a cross-national perspective. Increasing meat consumption in China has drawn a lot of attention in the world, as meat demands more water and land resources than grains. Though there is a large volume of literature on meat consumption, the institutional dimension of food consumption is often neglected. Food is a basic human right, while democratic institutions and freedoms can potentially better safeguard this and other basic human rights. From a cross-national perspective, they find that a one-unit improvement in the democracy score, as measured by Freedom House, increases per capita total meat consumption by 3.6%. The effect varies according to meat product. A one-unit improvement in the democracy score increases the consumption of bovine, pig, poultry, and mutton and goat meat by 2.9%,

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2.5%, 3.8% and 3.2% respectively. Though the figures do not seem large, the impact could still be sizable if democratic governance were improved in China.

The paper by Zhou et al. (in press) projects meat and cereals demand for China based on a meta-analysis of 143 and 240 income elasticity estimates for cereals and meat products, respectively, from 36 primary studies. Consistent with our common wisdom, income elasticities for most cereals (general cereals, rice, and coarse grains) and all meat products (general meat, pork, poultry, beef & mutton) tend to decline as per capita income increases, except for wheat, which increases. Taking this into account, projections of future food demand in China with declining income elasticities will not be so large as projections assuming constant elasticities. Taking into account economic growth, population growth, urbanization and other factors, cereal and meat demands are projected to be 400 million tons and 118.5 million tons in 2030, respectively. Compared to 2015, cereal and meat consumption will increase by 21% and 50%, respectively. Such figures show that the impact of dietary change to 2030 in China on global food security will be significant but not as large as some have thought.

Second, the paper by Wang, Cai, & Zhang (in press) sheds light on the dimension of sustainable food consumption by studying the impact of dietary transition in urban China on food-related carbon emissions per capita between 1992 and 2007. They use an input-output model and surprisingly find that food-related carbon emissions per capita in 2007 had decreased nearly 21% compared to emissions in 1992, while emissions from other types of consumption have increased significantly, such as residence, transportation, and education and entertainment. The reduction of carbon emissions in the food sector could be explained by technological innovation. However, only indirect carbon dioxide emissions from energy inputs throughout the entire food system have been evaluated; methane emissions from paddy and ruminants used for meat and nitrous oxide emissions from the crop growth stage were not evaluated due to data limitations. Nonetheless, this paper provides some concrete evidence on the carbon footprint of the Chinese food sector.

Third, the two papers by Zhang, Xu, & Liu (in press) and Lei & Shimokawa (in press) analyze the nutrition and health dimension of sustainable food consumption.

The paper written by Zhang et al. (in press) investigates the relation between the number of children in a family and childhood obesity in China. Being raised in a one-child family significantly increases the weight, body mass index, and probability of being overweight or obese for children. By examining mothers' care-taking behaviors and their children's dietary habits and nutritional intake, they identify the following channels linking one-child families with childhood obesity. (a) In one-child families, parents prefer spending money to using their time to care for their children. (b) In one-child families, children eat more high-sugar, high-fat, and high-protein food. A time–money trade-off could be a plausible mechanism. The overweight children could have a higher probability suffering from noncommunicable diseases in the later stage of their life. Such a research provides us with some policy tools to intervene into overweight or obesity of children at the early stage.

Lei & Shimokawa (in press) shed light on the effect of Chinese Dietary Guidelines (CDGs) on sustainable food consumption. Compared with the CDGs, over-consumption of meat and eggs and under-consumption of fruits, vegetables, and dairy products are generally observed for Chinese consumers. If Chinese consumers followed CDGs, greenhouse gas emissions, energy use, and blue water footprints would be significantly reduced. Lei & Shimokawa (in press) find that the key socioeconomic factors causing consumption patterns to deviate from the CDGs are urbanization and increasing income, with urbanization having the largest influence, and these changes are inevitable following recent economic growth. To mitigate the impacts of the inevitable changes, reducing cereal and fruit prices (e.g. by subsidies) could help move consumption patterns closer to the CDGs.

Finally, the paper by Gao, Li, Bai, & Fu (in press) studies Chinese consumers' perceptions of milk quality and preferences regarding sustainable milk. Annual per capita milk consumption in China is only about 40 kg, which is relatively low compared with 240 kg consumption of some western countries (e.g. US and Germany). The dairy industry has good business prospects in China. However, it has also attracted attention regarding sustainability, such as animal welfare and environmental impacts. Understanding consumer perceptions and preferences for sustainable food provides critical information for Chinese policy makers to identify barriers and develop policies to reach the goal of sustainability. Gao et al. (in press) show that most Chinese consumers do not clearly understand the meaning of sustainability, and lack knowledge about sustainable food production. The premium that consumers are willing to pay for sustainable milk is about 40%. Consumers who do not perceive the linkage between sustainable production and food quality have a significantly lower willingness to pay for sustainable milk. Interestingly, people with children are more willing to pay for sustainable milk, suggesting a potential future-generation concern among consumers about sustainable development.

As the guest editors of this special issue, we hope that these six papers provide insight into the debates over sustainable food consumption in the policy and academic arenas. Sustainable food consumption faces many potential trade-offs: between own consumption and the consumption of other people in the world; between current consumption and future consumption; between food consumption satisfaction and nutritional consequences; and between human food consumption and the welfare of animals used in food production. Hence, it would be difficult to give a general conclusion about sustainable food consumption here.

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