



Sustainability transitions in agri-food systems: insights from South Korea's universal free, eco-friendly school lunch program

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Abstract

Government-sponsored school lunch programs have garnered attention from activists and policymakers for their potential to promote public health, sustainable diets, and food sovereignty. However, across country contexts, these programs often fall far short of their transformative potential. It is vital, then, to identify policies and organizing strategies that enable school lunch programs to be redesigned at the national scale. In this article, we use document analysis of historical newspapers and government data to examine the motivating factors and underlying conditions that allowed South Korea's universal free, eco-friendly (UFEF) school lunch program to become a tool for advancing social justice and ecological goals at the national scale. We analyze the socio-historical evolution and current status of the Korean school lunch program, combining the multi-level perspective with insights from environmental sociology and critical food studies, in order to shed light on the factors that enabled the program to become an innovative niche and articulate the opportunities and challenges it now faces. We identify the state-sponsored creation of what we call “precautionary infrastructure” as a key anchoring mechanism between the school food niche and agri-food regime. Precautionary infrastructure includes new supply chains, certification standards, and sourcing policies that provide a stable market for eco-friendly farms and small-scale producers, while minimizing the environmental health risks of school lunch by delivering organic and pesticide-free ingredients to on-site kitchens that serve free lunches to all students. This analysis offers insight into how public school-lunch programs can become protected niches that help drive sustainability transitions within agri-food systems.

Keywords School lunch · Sustainability transitions · Precautionary consumption · Corporeal citizenship · Korean school lunch policy · Food sovereignty

Abbreviations

UFEF	Universal free, eco-friendly
PNAE	Programa Nacional de Alimentação Escolar
MLP	Multi-level perspective
KINDS	Korea integrated news database system
KWPA	Korean Women Peasants Association
NAQS	The National Agricultural Products Quality Management Services

Introduction

School lunch has long been a contested political arena shaped by government agencies, civil society activists, and powerful agri-food companies concerned with what and how children are fed (Morgan and Sonnino 2013; Robert and Weaver-Hightower 2011; Gaddis and Coplen 2018). They are a public form of care (Gaddis 2019), which is best thought of as a “species activity that includes everything we do to maintain, continue, and repair our world so that we may live in it as well as possible” (Fisher and Tronto 1990, p. 40). Thus, in designing school lunch programs, governments must grapple with what political theorist Joan Tronto (2013, p. 139) describes as “the larger structural questions of thinking about which institutions, people and practices should be used to accomplish concrete and real caring tasks.”

The prevailing ideology that both food and care should be cheap has kept public school-lunch programs around

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the world locked into highly industrialized systems of production and consumption (Sonnino et al. 2014). Multiple factors—including global climate change, rising obesity rates, the decline of family-scale agriculture, continuing rural–urban migration, and the Westernization of food cultures—have motivated national governments and civil society organizations to leverage their public school-lunch programs to support *sustainability transitions*, or “long-term, multi-dimensional and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption” (Markard et al. 2012, p. 956).

As complex socio-technical systems of care provisioning, government-sponsored school lunch programs are not only an outcome of political processes, but also a historical achievement, established and negotiated in relation to local and global contexts. They have undergone three distinct phases of development in the global north (Oostindjer et al. 2016). From the 1850s–1950s, programs were created to reduce hunger and malnutrition and, in some cases, to redistribute surplus agricultural commodities. In the 1970s, some countries improved the nutritional quality of school lunches, while others sought to reduce costs by outsourcing food preparation, program management, or both. The third and contemporary phase encompasses a wide range of reforms motivated by concerns about public health, environmental sustainability, economic development, and social justice. It includes the United Nations’ efforts to support sustainable and equitable development in the global south through the Home Grown School Meals initiative (World Food Program 2016), which is grounded in the principles of food sovereignty, or “the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems” (Declaration of Nyéléni 2007).

Policymakers and development organizations have identified school lunch as a key arena for promoting *sustainable diets*, or “diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations” (Food and Agriculture Organization 2010). Yet the bulk of scholarship on school food, which occurs within the fields of nutrition and public health, does not offer guidance for planned transitions or engage with questions of how school food policy changes over time. Recently, however, scholars have begun to fill this gap by examining the relationship between school food and food sovereignty (Kleine and Brightwell 2015; Wittman and Blesh 2017; Powell and Wittman 2018; Stapleton 2019), documenting how farm-to-school programs can be designed in ways that prioritize equity and support cooperative regional economies (Lakind et al. 2016), and identifying viable transition pathways (Lehtinen 2012; Morgan and

Sonnino 2013; Galli et al. 2014; Bui et al. 2016; Ilieva and Hernandez 2018; Gaddis and Coplen 2018; Gilbert et al. 2018; Gaddis 2019).

Within this literature, Brazil’s Programa Nacional de Alimentação Escolar (PNAE) has emerged as a high-profile case study, with scholarship focusing on the program’s potential to strengthen food security/sovereignty (Sidaner et al. 2013; Sonnino et al. 2014; Wittman and Blesh 2017) and scale-up ethical consumption (Kleine and Brightwell 2015). The PNAE has undergone several programmatic redesigns over the past 70 years, the most recent of which occurred in the early 2000s with the enactment of a multi-sectoral food and nutrition security strategy designed to support sustainable rural development and food sovereignty (Sidaner et al. 2013). Since 2009, in response to demands from social movements and civil society activists, PNAE schools have been required to source at least 30% of their ingredients from local, small-scale, family farmers and/or organic producers (Kleine and Brightwell 2015). At present, the Brazilian constitution guarantees free school meals to the country’s 43 million public-school students through the PNAE.

South Korea’s universal free, eco-friendly (UFEF)¹ school lunch program is an equally compelling case, yet there is minimal English-language scholarship on the program besides Kang’s (2011) account of the partisan political debates surrounding its creation. Both the Brazilian and Korean programs provide free meals to all students and prioritize serving traditional dishes prepared from scratch with ingredients sourced from alternative food networks. However, in Brazil, a new 20-year budget severely caps public spending, which may have negative consequences for the PNAE and its broader impact.

Conversely, public support for the Korean UFEF school lunch program has increased since its creation in 2011. Korea’s capital, Seoul, announced it would triple the city’s school lunch budget by 2021 to include all elementary, middle, and high schools (Ilbo 2018). Moreover, the national government plans to replicate the model of procurement developed for public schools in other public institutions—including hospitals, social welfare facilities, and correctional facilities—which feed roughly 25% of the Korean population (Korea Agro-Fisheries & Food Trade Corporation 2017). Thus, it is especially important to understand the motivating factors and underlying conditions that allowed Korea’s UFEF school lunch program to become an innovative niche for sustainable agri-food policy development.

In the remainder of this article, we examine these factors and conditions, drawing from the multi-level perspective

¹ In the Korean context “eco-friendly” refers to healthy and traditional foods that are either organic or pesticide-free.

(MLP) (Geels 2002, 2011) and insights from environmental sociology and critical food studies. We trace the transition pathway and current status of what we call “precautionary infrastructure,” which includes new procurement policies, distribution hubs, certification standards, food preparation methods, and serving requirements underwritten by municipal, provincial, and national actors. The state-led development of precautionary infrastructure for the UFEF program is intended to protect children from the health risks of consuming agro-industrial chemicals, while providing a stable market for eco-friendly farms and small-scale producers. It represents one way that the precautionary principle can be embedded “across institutions at all levels of government, as well as in science and corporate research and development” (MacKendrick 2018, p. 168).

In this paper, we analyze key moments in which notions of risk, responsibility, and sovereignty within the Korean school food system were destabilized and renegotiated. After presenting our theoretical framework, we provide a review of the literature on agri-food sustainability transitions, explain our research methods, and contextualize our case study. Next, we analyze the historical evolution of Korean school lunch policy and develop the concept of precautionary infrastructure. We identify several factors that motivated the state to develop precautionary infrastructure, including: (1) policy demands at the niche level of the public school-lunch program, (2) challenges to the social legitimacy of the neoliberal agri-food regime posed by civil society activists and the philosophy of *sint'o puri* (body and earth are one), and (3) shifts within the larger landscape related to international trade relations, Korean political-economic conditions, and a change in consumer consciousness about the origins of risk within the food system. Lastly, we discuss implications for sustainability transitions within public school-lunch programs and offer suggestions for future research.

Sustainability transitions in agri-food systems

Sustainability transitions involve changes not only in technology, but also in government policies, consumer habits, business practices, cultural values, and infrastructure (Geels 2011). Such processes are often multidimensional, context-dependent, and subject to power dynamics (Kern and Mackard 2016). In the case of agri-food systems, El Bilali et al. (2019) have identified three main strategies for accomplishing sustainability transitions: (1) increasing the efficiency of food systems, i.e., sustainable intensification, (2) reshaping consumer demand, i.e., supporting sustainable diets, and (3) transforming food systems, i.e., fostering alternative food networks. Yet questions remain about the range of viable transition

pathways (Pitt and Jones 2016) and the conditions that enable transitions to occur in one place and not another (Hansen and Coenen 2015).

Scholars have increasingly studied agri-food transition pathways (Lawhon and Murphy 2012; Spaargaren et al. 2013; Kirwan et al. 2013; Hinrichs 2014; Bui et al. 2016; Ilieva and Hernandez 2018; Rut and Davies 2018; Rossi et al. 2019; O'Neill et al. 2019) using approaches that account for both power relations and place-specificity in determining the processes and outcomes (Hansen and Coenen 2015). It is vital to understand, for example, how different path dependencies (e.g., environmental, infrastructural, institutional, cultural, and economic) affect the viability of transitions across a range of places and scales.

The most prominent sustainability transitions framework within the agri-food systems literature is the MLP (El Bilali 2019), which conceptualizes sustainability transitions as systems changes that emerge dynamically from interactions and changes across the three analytical levels of niche, landscape, and regime. A niche is the space in which radical innovations are initially developed (e.g., municipal policy or direct-contracting with agricultural cooperatives) (Geels and Schot 2007). They can take a variety of forms, including technologies, new rules and legislation, programs, and organizations. The regime is where socio-technical structures are stabilized and become dominant systems that rarely undergo transformation or reconfiguration. Regimes are constituted of informal and formal rules, technologies, institutions, actors and social groups (Geels 2011). Their elements can be tangible (e.g., laws, procurement standards, certifications) or intangible (e.g., culture, social norms, and policy paradigms) (Geels 2011). Lastly, in the MLP the landscape plays a key role in structuring the relationship between niche and regime. It includes the economic, political, and cultural context beyond the influence of niche and regime actors (e.g., demographic trends, political-economic developments, international trade agreements, global climate change) and cannot be easily changed in the short-term (Lachman 2013).

Within the agri-food literature, scholars using the MLP typically conceptualize alternative agri-food systems (e.g., organic, fair trade, local) as niches (El Bilali 2019) that coexist with, and at times challenge, dominant food regimes. Niches enable innovation by providing some level of protection from the dominant rules of the regime, however they must be robust and mature enough to challenge the regime in order for a transition to occur. The MLP suggests that niche development in itself is not enough to cause a regime shift; theoretically, transitions can only occur when there is strong niche-regime-landscape alignment, however recent empirical work on niche-regime linkages within agri-food systems challenges this notion (Bui et al. 2016).

Changes within the socio-technical landscape that cause regime destabilization open up opportunities for niche-innovations to be integrated into or reconfigure the existing regime. To better articulate how niche-regime linkages begin, Elzen et al. (2011) introduced the concept of “anchoring,” which they define as an interaction that leads to a durable link between these two levels of the MLP. Niches can anchor to regimes by: (1) establishing new rules or institutions (institutional anchoring), (2) fostering new technical systems (technological anchoring), and (3) building new networks and social groups (network anchoring). There is some concern, however, that the “radicalness” of niche-innovations will be diluted as they scale up and out (El Biali 2019), which is particularly relevant given the Korean government’s plan to replicate and scale the UFEF school lunch program.

Notably, while the MLP doesn’t preclude discussions of social justice, it is underemphasized in the literature relative to considerations of economic and environmental goals. Our case allows for an integrated analysis of the social, economic, and ecological dimensions of sustainability since the UFEF school lunch program is the outcome of two parallel transition processes (i.e., making meals universally free *and* eco-friendly). We conceptualize the UFEF school lunch program as a protected niche within the mainstream Korean agri-food regime and consider both niche formation and development in our analysis, alongside changes at the regime and landscape levels. Agri-food transitions scholars have often devoted more analytical attention to understanding niche innovations, leaving processes occurring at the regime and landscape levels comparatively understudied. Thus, when tracing the historical evolution of Korean school food policy prior to the enactment of the UFEF school food policy, we pay careful attention to elements at both the regime and landscape levels that shaped this niche-in-the-making.

Korea’s universal free, eco-friendly school lunch program

South Korea offers an ideal site to examine potential pathways through which national school lunch programs can become protected policy niches that foster the development of eco-friendly agri-food systems and universal social welfare provisioning. During the country’s first direct election of superintendents of education and local boards of education in June 2010, progressive candidates campaigned on a platform that included a promise to convert the existing school lunch program—which provided free lunches only to basic livelihood security recipients—into a universal program that would serve free, safe, eco-friendly meals to all students. The progressives won in most provinces and refused to compromise on their vision for a universal free program, even though fiscal conservatives severely criticized this aspect of their proposal.

Since then, the proportion of students participating in Korea’s UFEF school lunch program has increased both within and across municipalities, from 56.8% in 2012 to 76.2% in 2017 (Ministry of Education 2018). In 2017, 4.28 million students participated in the program, which was initially implemented in elementary and middle schools and has subsequently been introduced to high schools in four provinces (Monthly Nutriand 2018). With a total budget of ₩2942 billion (roughly 2.6 billion USD), the program provides elementary- and middle-school students with a standardized meal (Fig. 1) consisting of rice, soup, kimchi, vegetables, and fish or meat (Ministry of Education 2018).

The Korean government finances the program through a cost-sharing agreement that relies on national, district, and local contributions, but lunch prices vary by municipality and type of school. In Seoul, for example, the price of lunch during the 2018–2019 school year was ₩3628 (3.13 USD) in public elementary schools, ₩4649 (4.01 USD) in private



Fig. 1 Examples of Korean school lunch consisting of rice, soup, kimchi, vegetable, and protein

elementary schools, and ₩5406 (4.66 USD) for middle and high schools. The Korean Office of Education pays 50% of the cost, while the District Office of Education contributes 20% and the City Office of Education covers the remaining 30% (Ministry of Education 2018).

Social movement activism in support of food sovereignty and food safety pushed the Korean government to align school food policy with the “Food from Somewhere” regime (McMichael 2002; Campbell 2005, 2009; Friedmann 2005), which includes both local food networks and the corporate environmental food regime. This emergent regime operates in complex opposition to the “Food from Nowhere” regime (McMichael 2002) that has dominated global agriculture and food policy since the mid 1990s. In Korea, social movement opposition to globalized, industrial food production was instrumental in creating the enabling conditions for the UFEF school lunch policy to pass in the late the 2000s. Likewise, consumer concern about the human health risks of the Food from Nowhere regime put pressure on regime actors to change school food policy, as Koreans increasingly recognized the limitations of “precautionary consumption” (MacKendrick 2014, 2018) as an individualized, consumer-based approach to risk management.

Precautionary consumption entails a variety of individualized actions to address both real and perceived risks, including but not limited to: researching potential risks, comparing available products, purchasing items that may be sold only in specialty stores or farmers markets, and preparing a greater percentage of food and other household items from scratch. People turn to precautionary consumption, a form of gendered care-work (Cairns et al. 2013), in order to compensate for weak regulatory systems that fail to adequately mitigate chemical body burdens (i.e., the total accumulation of environmental chemicals like pesticide residues and plasticizers in an individual’s body). In addition to requiring more time and money than some individuals have, precautionary consumption may elicit a false sense of security that inadvertently undercuts public support for government action, while allowing companies to profit from the sale of “safe” products (Szasz 2007).

Moreover, precautionary consumption is “likely to exacerbate health disparities along social modalities of race/ethnicity, education levels, and socio-economic status” (Scott et al. 2016, p. 327), while adding to women’s already disproportionate share of household reproductive labor (MacKendrick 2014; Castellano 2015, 2016). These multiple shortcomings led MacKendrick (2018, p. 156) to suggest that societies reject precautionary consumption in favor of environmental justice, which requires “a shift from seeing the government as a stumbling block to innovation and progress to seeing it as a democratic institution that can and should provide collective protection from environmental health risks.”

In Korea, niche actors have successfully managed to enroll the state in creating *precautionary infrastructure* that incentivizes Korean farmers and food companies to adopt eco-friendly production practices in order to access the multi-billion-dollar school lunch market. Precautionary consumption within the school food environment is no longer a class-based project since the Korean government guarantees all students the right to a free, eco-friendly school lunch. As such, the UFEF school lunch program is an especially fruitful case study for understanding how sustainability transitions can address environmental and social justice concerns in tandem.

Methods

The MLP is a widely used framework within sustainability transitions studies, but it does not adequately account for the role of power relations or human agency in motivating sustainability transitions within agri-food systems (Hargreaves et al. 2013). Scholars have responded to such criticisms by enriching the MLP with other frameworks (Bui et al. 2016; Elzen et al. 2011; Ilieva and Hernandez 2018; Kuokkanen et al. 2018). We enhance the MLP with insights from environmental sociology and critical food studies—a combination that allows us to take advantage of the analytical perspective of the MLP, while addressing some of its weaknesses, specifically in relation to the role of political economy and civil society activism in transition processes.

The data for this paper is drawn from a content analysis of primary and secondary sources. A Korean member of the research team conducted a literature review of Korean and English-language peer-reviewed articles and books on the Korean school lunch program. Factual information contained in Korean articles was cross-referenced with the original primary sources in order to establish a comprehensive history of school lunch in Korea and an accurate description of the current UFEF program. Next, we compiled and analyzed primary documents pertaining to school lunch, including newspaper articles and governmental documents, from online archives such as the Korea Integrated News Database System (KINDS) and Naver news library (dna.naver.com/search/searchByDate.nhn).

We collected and reviewed: (1) all newspaper articles in the KINDS database published between 1990–2018 that mentioned the search term “school lunch program” (and variations thereof), (2) all newspaper articles published between 1953–2000 in South Korea’s four major presses (Kyunghyang Shinmoon, Donga Daily, Maeil Economy, and Hangyurae Shinmoon) and archived by the Naver news library, and (3) government documents accessed electronically via the online archive of the National Archives of Korea (archives.go.kr) and Seoul Metropolitan

Government's public information disclosure portal (open-gov.seoul.go.kr).

School lunch as a niche-in-the-making

South Korea's school lunch program began in the early 1950s after the Korean War as a mechanism for distributing international food aid to poor, rural children (Gyunghyang Newspaper 1957, 1963). At the regime and landscape levels, economic instability and the potential for widespread famine were viewed as the major sources of risk within the Korean food system, until 1977 when a massive outbreak of food poisoning alerted the public to the need for a more robust set of food hygiene laws and practices. In one of the most publicized episodes impacting the school lunch program, 7872 students experienced vomiting and diarrhea, while another 948 required hospitalization after eating a cream bread made from donated milk powder and wheat flour. The Korean government supplied this bread free-of-charge to 13,000 of Seoul's poorest students and at a discounted price to the remainder of the city's 97,000 elementary and secondary students (Gyunghyang Newspaper 1977).

Many parents had opted to purchase the government-supplied bread because they thought it was safer than what they could purchase on the open market, but the mass food poisoning incidents shattered this illusion. The school lunch program was not yet operating as a protected niche. Lack of food safety infrastructure at the regime level meant schools had little ability to gauge the bread's freshness. The bread company did not print the manufacturing date on the packaging and inadequate temperature control during distribution and storage could cause cream bread to spoil. Without the political-economic resources to fix the problem, Korean officials discontinued the bread program in late 1977 (Gyunghyang Newspaper 1977).

Regime-level constraints nearly destroyed the viability of the niche program as parents increasingly reverted to packing their children's lunches. In 1981, over 97% of Korean students brought their own lunches to school (Kim 2013). However, public health experts argued that the public school-lunch program should be expanded and strengthened, not disbanded. "Food poisoning in 1977 was the problem of unethical suppliers and corrupted school officers, not the problem of the policy itself," one such advocate wrote in a national newspaper (Dong-Ah Daily 1979). Supporters used the rhetoric of nation-building and international competition, pointing to high-income countries with robust public school-lunch programs, to argue that school lunch would improve public health while simultaneously bolstering economic development

and innovation within the agriculture and food sectors (Dong-Ah Daily 1979).

The Korean government didn't disagree. As early as 1975, policymakers had begun debating the merits of creating a national school lunch program that would ensure Korean children were as healthy as their counterparts in high-income countries. In 1981, the Korean government passed the School Lunch Act of 1981, to support the "healthy growth of students' minds and bodies" and the widespread "improvement of people's dietary life" (Ministry of Education 1981). Ultimately, however, the legislation provided more in rhetoric than resources.

The timing of the 1977 food poisoning incidents and a lack of financial resources for public projects under President Doohwan Jeon's harsh military regime (1980–1987) restricted the expansion of Korea's school lunch program. At the same time, landscape-level factors like the rapid Westernization of the Korean diet in the 1980s—marked by a dramatic increase in the consumption of meat (especially beef) and fast food—sparked a consumer movement to protect "traditional foods," along with the economic and cultural vitality of the country's rural agricultural communities (Yang 2010).

Food sovereignty activism and landscape shifts: 1970s–1990s

Civil society organizations (as new niche actors) leveraged the food safety scares of the 1970s, which illustrated the state's inability to provide safe food through the dominant agri-food regime, as an opportunity to propose an alternative model of school food provisioning. Under the banner of the Women Catholic Peasants Association, and later the Korean Women Peasants Association (KWPA), small-scale women farmers urged the Korean government to purchase their locally grown produce and locally raised livestock for use in school lunches. They believed food safety was about more than hygiene and argued that women peasant-farmers could be trusted to provide schools with a reliable supply chain of safe, high quality ingredients produced using traditional agricultural practices (Park and Jeong 2010). Their proposal was rejected, but it indicates an important shift in the country's agri-food landscape.

For much of Korea's post-war history, peasant farmers had advocated with little success for protectionist trade policies and financial support for domestic agriculture. In the 1970s, a social movement of peasant farmers rallied against state economic programs that threatened the economic viability of Korean agriculture and livestock producers. Some farmers committed suicide by ingesting agricultural chemicals, while thousands more engaged in public demonstrations against global trade agreements

(Abelmann 1996). During this time, the KWPA organized against both the global food regime and the disproportionate workload that patriarchal rural culture placed on their shoulders. As early as 1977, local women's organizations (which later merged under the national umbrella of the KWPA) had begun to advance the interests of "independent women peasants" by bringing a sophisticated class and gender analysis to their diagnosis of the multiple problems facing Korean farmers in general, and women farmers in particular (Park and Jeong 2010, p. 109). They believed that true independence for women farmers could only be achieved by breaking free of the imperial global agricultural system (i.e., achieving food sovereignty), upending the patriarchal structure of Korean society, and erasing the social boundaries that restricted women's empowerment (Jung 2005; Park 1995).

As the food sovereignty movement gained strength in the early 1990s, the KWPA once again petitioned the Korean government to purchase locally produced agricultural products for the country's school lunch program. However, the KWPA and their allies, including the National Farmers Association (*Jeon-nong*), were never able to overcome the hurdles posed by limited finances and lack of investment, particularly at the local level (Park 2008). At the time, local offices of education administered lunch programs using funding supplied by the central government and revenue from children's fees. It was illegal for provincial governments to provide supplemental funding because of how the governance and budgetary systems were structured. And even if schools had been able to increase their lunch budgets, the Uruguay Round multilateral trade negotiations (1986 to 1993) prevented the government from incentivizing public schools to give preference to local producers (Kim 2009).

Paradoxically, as the Korean government was entering into this new international trade agreement and the Korean population was becoming more dependent on food imports, the National Agricultural Cooperative Federation (Nonghyop Chung'ang hoe) and the Ministry of Agriculture, Forestry, and Fisheries (Nonglim Susanbu) began to incorporate nationalistic slogans like "healthy eating—just eat our rice" and *sint'o puri* (body and earth are one) in food advertisements and official dietary advice (Cwierka 2013). This publicity campaign helped to cement a new public belief that food from Korean soil (i.e., Food from Somewhere) is best for Korean bodies because it is better tasting and healthier than imported food. Regime-actors encouraged urban Koreans, who made up nearly 80% of the country's population by the end of the twentieth century, to purchase food grown by their farmer-compatriots in the countryside.

In sum, food sovereignty activism and *sint'o puri* ideology generated pressure for regime change. However, the niche school food program was not yet robust enough to take advantage of the opportunity.

Niche developments and constraints: *wei-tak egupsik* and austerity politics

School lunch was a hot-button political issue in the early 1990s, especially among mothers employed outside the home who found preparing school lunch boxes to be a burdensome task (Lee et al. 1994). During Korea's 1992 election, every presidential candidate pledged to expand the school lunch program to all Korean elementary schools (Kang 2011). Soon after, the national government passed the 1996 School Lunch Act Amendment, which partially subsidized the cost of building new kitchens (Ministry of Education, Science, and Technology 2011) and passed a controversial policy that allowed schools to outsource food preparation to for-profit catering firms (*wei-tak geupsik*).

This public-private partnership helped to rapidly expand the national school lunch program from 11.3% of Korean elementary schools in 1992 to 99.2% in 1998 (Kang 2011). By 2004, 99.9% of elementary schools, 97.8% of middle schools, and 98.7% of high schools provided school lunch (Kang 2011). During the late 1990s and early 2000s, catering companies competed for market share within the two trillion-won (roughly 2 billion USD) market for prepared lunch boxes (Maeil Economy 1997). Most students paid about ₩2500 per meal (roughly 2 USD) (Gyunghyang Newspaper 1997). Only ten thousand students qualified for the government's free lunch subsidy.

Schools lagged behind other sectors of the Korean agri-food economy in reducing the risk of food poisoning. School lunches were responsible for 19.4% of Korean food poisoning cases in 1996, 30.3% in 1998, and 70% in 2001 (Lee, E. H. et al. 2016). Students and parents both considered lunches prepared in on-site school kitchens to be far superior to catered lunches in terms of hygiene, nutrition, and taste (Park et al. 1997). In one 1997 survey of 541 middle school parents, 89% said they only let their children eat *wei-tak geupsik* because it reduced the amount of cooking they had to do at home; 70% of these parents said meal quality should be improved (Park et al. 1997). Only about 11% of students who ate *wei-tak geupsik* said their lunches were delicious, in contrast to the 70% of students who ate lunches prepared in on-site school kitchens. Yet the majority of Korean schools lacked on-site kitchens for meal preparation.

Teachers and parents told the media that they could not trust the safety and quality of school lunches delivered through this system (Munhwa Newspaper 2002). The option to feed students attending *wei-tak geupsik* schools "better" homemade lunches put pressure on parents (especially mothers) to practice precautionary consumption. Students eating *wei-tak geupsik* often complained about finding hairs and bugs in their soup and said they would rather purchase cheap ramen from the school market than eat the catered meals

(Kyung-In Daily 2002). There were nutritional concerns, however, associated with giving children pocket money to purchase instant-cup ramen or other convenience foods that caused some mothers to experience guilt and stigma (Kyungnam Newspaper 2002). As one mother explained: “I cannot simply look over my kids eating ramen every day, instead of eating warm lunch boxes” (Munhwa Newspaper 2002).

Deep reforms were needed, but no major policy changes happened until 2006. The massive economic crisis that impacted East Asia in the late 1990s put a significant strain on the Korean government’s ability to respond. The International Monetary Fund (IMF) lent South Korea 58 billion USD in 1997 and placed the country under a structural adjustment program that catalyzed major neoliberal reforms to Korea’s financial institutions, labor markets, and public service sectors (Rodier 2014). Many of the country’s nationalized companies were privatized in favor of small government.

The continued reliance on the privatized model of school lunch provisioning using *wei-tak geupsik* aligned with neoliberal free market logic. So, too, did the government’s response to concerns about food safety. In place of a robust regulatory and inspection regime, the Ministry of Education published in 2000 the “Guidelines of Hygiene Control for School Lunch,” a manual designed to instruct catering firms in hygiene control and general food safety protocol (Kang 2011).

Civil society activists wanted the government to provide more than a set of guidelines. They wanted an entirely different school lunch program—one that would rely on eco-friendly agriculture, promote socio-cultural and economic exchanges between rural and urban areas, and advance democracy by preserving local autonomy (Choi 2006). At the provincial level, the Chonnam Christian Peasants Association convinced local officials to pass a 2003 ordinance that included a 5-year plan for purchasing eco-friendly agricultural products from Chonnam producers using a subsidy provided by the provincial government (Kim 2009; Yoon 2018).

At the national level, a coalition of leftist political parties, labor unions, and roughly 650 civil society organizations pushed for change (Kang 2011). School Lunch Network Nationwide, one of the coalition’s leaders, put forward a proposal for a universal free lunch program that would use locally grown, organic foods. They had reason to hope that the government would act on their demands since the IMF loan was fully repaid in August 2001 and public support was on their side. However, the Korean economy was still in recovery. During structural adjustment, jobs had become increasingly precarious and government social services had been rolled back. This macroeconomic context prevented the Korean government from investing in a new model of school lunch provisioning. Instead, policymakers issued a stricter

set of regulations for private caterers in 2004, requiring all *wei-tak geupsik* factories to implement a Hazard Analysis Critical Control Point (HACCP) management system.

A stronger regulatory response was necessary. All of the food poisoning cases that took place in Seoul schools between 2003–2006 were linked to *wei-tak geupsik* caterers, some of whom had even bribed teachers and school administrators in order to renew their contracts and avoid health inspections (Kang 2011). In the most high-profile incident, fifteen-hundred students were sickened at 23 Seoul-area schools after consuming meals supplied by one of Korea’s largest catering companies (Hankook Economy 2006). Parents and civil society organizations demanded an end to the widespread practice of contracting out meal preparation to for-profit *wei-tak geupsik* caterers—a change that was subsequently codified into national legislation with the 2006 amendment to the 1981 Korean School Lunch Act.

The 2006 amendment dramatically expanded the government’s role in financing and managing the school lunch program. It removed a prior rule that capped the government subsidy for poor students at 50% of the total meal cost, required schools to assume responsibility for managing their own lunch programs, and earmarked money to help schools build their own kitchen and cafeteria facilities. The central government subsequently provided funding to employ school nutritionists (in a position equivalent with teachers) to work in each of the nation’s schools (Ministry of Education 2014). Nutritionists were expected to design menus that: (1) relied on various cooking methods and ingredients, (2) promoted traditional Korean food culture, (3) maximized the use of seasonal and natural ingredients, and (4) reduced the prevalence of salt, fat, monosaccharides, and food additives in school lunches.

In sum, the 2006 amendment switched the Korean school lunch program onto a new policy track—one of increased social welfare spending and tighter regulatory controls—that departed from the neoliberal laissez-faire approach favored by Korean policymakers throughout the 1980s and 1990s (see Table 1). High-profile food poisoning accidents alerted the public to the limits and hidden dangers of cheapness and privatization as strategies for organizing government programs and managing risk in the food system. This led to an investment and strengthening of the school food niche, via the widespread development of kitchen infrastructure and managerial expertise in schools that had previously contracted with *wei-tak geupsik* companies, as overall public interest in eco-friendly food and food sovereignty continued to grow.

Table 1 Characteristics of the School Lunch Act of 1981, 1996 amendment, 2006 amendment, and 2011 UFEF school lunch policy

	School Lunch Act of 1981	1996 Amendment	2006 Amendment	Post-2011
Purpose	To mobilize the healthy growth of students' minds and bodies and improve people's dietary life	To mobilize the healthy growth of students' minds and bodies and improve people's dietary life	Improve the quality of school meals, mobilize the healthy growth of students' minds and bodies, and improve people's dietary life	Improve the quality of school meals, mobilize the healthy growth of students' minds and bodies, and improve people's dietary life
Law restricting management of school lunch program	Not stated	External catering service providers or direct management by schools allowed	Only direct management by schools (with minor exceptions) allowed	Only direct management by schools (with minor exceptions) allowed
Managers of lunch program	School principals	External suppliers or school committee	Committee on school meals (led by local superintendent of education) and schools' own meal preparation staff	Committee on school meals (led by local superintendent of education) and schools' own meal preparation staff
Government subsidy for lunch program	Commodity donations to elementary schools in rural areas	50% financial subsidy for poor students	100% financial subsidy for poor students	Universal free meals in most provinces
Funding mechanism	Facilities and infrastructure: paid by parents Other expenditures: paid by parents	Facilities and infrastructure: paid by parents Ingredients paid for by parents or national/local government Other costs: paid by schools or parents	Facilities and infrastructure: paid by schools or national/local governments Ingredients: paid by parents or national/local government Other costs: paid by schools or parents	All costs paid by either national or local governments on behalf of caregivers* *The term "parents" was changed to "caregivers" in a 2008 amendment

Corporeal citizenship and the early stages of alignment

A well-being craze spread through Korean society in the early 2000s, leading to an increase in producer–consumer activism in support of agri-food regime change (Yang 2010). The volume of domestic agricultural products (excluding livestock) that the Korean government certified as eco-friendly jumped from 87,279 metric tons in 2001 to 2,188,311 metric tons in 2008. This change in producer activity was accompanied by an evolving consumer consciousness. By the end of the decade, producer–consumer activism began to take on the characteristics of what Gabrielson and Parady (2010) call “corporeal citizenship.” Precautionary consumption rests on the assumption that human bodies can be isolated from their natural environments and protected from exposure to chemical risks. Corporeal citizenship instead acknowledges the permeable boundaries between bodies and the environment, pushing individuals to expand their sphere of responsibility to encompass care for others (human and nonhuman) both in proximity and at a distance (Scott et al. 2016).

This more sophisticated understanding of risk and responsibility—a key change in landscape conditions—is apparent in the coordinated social and political resistance of Korean agri-food producers and consumers against American beef imports in 2008 (Chang 2010). By 2006, sixty-five nations, including Korea, had adopted restrictions on importing American beef products due to concerns about the neurological risks associated with mad cow disease (bovine spongiform encephalopathy, or BSE). Yet in 2008, the Korean government committed to importing American beef as a pre-condition of the Korea-US Free Trade Agreement.

Korean mass media depicted American beef, along with the Food from Nowhere regime, as inherently risky. For example, *PD Notebook*, a popular liberal-leaning television news program, broadcast a segment entitled “American beef, is it safe from BSE?,” which included a clip of downer cows. *PD Notebook* told its viewers that the trade agreement would allow specified risk materials—tissues in cattle that are considered to be of high risk for prion contamination, such as brains, eyes, spinal cord, and skull (United States Department of Agriculture 2019)—to enter the Korean food system (MBC 2008). Conservative pundits argued that anti-free trade liberals were using graphic imagery to intentionally manipulate public support for the trade agreement (Chae 2009). Regardless, Koreans took to the streets in a series of 2398 candlelight protests between 2008 and 2009, culminating in a gathering of one million protesters on June 10, 2009. Their direct action continued until President Myung-Bak Lee apologized and promised to renegotiate the trade agreement (Bak 2012).

BSE was a focal point for Korean’s concerns about food safety and globalization, but it was not the only food product or process subjected to heightened public scrutiny. According to the 2011 Korean general social survey, 80% of Korean adults were concerned about residual pesticide contamination on imported produce and 75% were worried about the effects of consuming genetically modified organisms (Korean Social Statistics 2011). However, less than 6% of Korean agricultural products were grown using eco-friendly methods in 2006 and only 0.4% with organic methods (Kim and Lee 2011). This mismatch between supply and demand posed a problem for the many Koreans who believed it was healthier for their families to consume fewer agricultural chemicals.

At the provincial level, some policymakers recognized the need to take a more active role in supporting eco-friendly agriculture and identified the school lunch program as a viable focus of their efforts. In April 2009, Sanggon Kim, a progressive candidate for the Superintendent of Education of Gyunggi, Korea’s largest province, launched a campaign for a “free for all, organic school lunch system.” Roughly 60% of Gyunggi citizens approved of the policy, which attracted strong support from the Korean Teachers and Educational Workers Union, but conservative members of the Gyunggi provincial school board blocked Kim’s proposal due to budgetary limitations. Gyunggi Governor Moonso Kim, a radical conservative, argued that Kim’s proposal was nothing more than shallow populism. However, Kim’s proposal motivated similar policy debates in other political jurisdictions, the largest and most controversial of which took place in Seoul, a city with 1,162,000 schoolchildren (Seoul Metropolitan Office of Education 2013).

UFEF school lunch policy and precautionary infrastructure in Seoul

On December 1, 2010, a group of leftist city counselors backed by Seoul’s Superintendent of Education enacted a local “free for all, organic school lunch” ordinance through the Seoul city parliament. Schoon Oh, the city’s conservative mayor, immediately vetoed the ordinance (Maeil Economy 2010). Citing recent events in Greece, Mayor Oh insisted that such “politically-motivated populism” could ruin the country’s economy since the Korean pension fund and welfare budget were already operating in crisis mode (Oh My News 2011). He suggested that Seoul citizens vote directly on the matter and vowed to resign if the election results upheld the ordinance. Turnout for the August 2011 special election was so low—only 25.7% of eligible voters—that quorum was not reached. The ordinance was therefore upheld and Mayor Oh resigned his post. Wonsoon Park, a former social movement activist, human-rights lawyer, and co-founder of People’s

Solidarity for Participatory Democracy (one of Korea's largest NGOs), won the election to replace Oh and immediately enacted the school lunch ordinance (Ju 2016).

At the time, a majority of Koreans (62%) believed social welfare should be prioritized over economic growth (Korean Gallup 2014). Even so, the proposal to convert the existing means-tested school lunch program into a universal social service was much more controversial than the proposal to source pricier, eco-friendly ingredients. The tax burden of the program was widely discussed, but the Korean Democratic Party successfully argued in favor of both measures, thereby practicing corporeal citizenship by extending care to all students and making the program fully public.

Seoul Mayor Wonsoon Park believed that investing in UFEF school lunches would have positive social, economic, ecological, and community impacts (Kang 2016). He envisioned using school lunch funds to contract directly with farmers and incentive them to use eco-friendly practices. This aligned with broader government attempts to revitalize the communal character of rural areas and enhance the profitability of small-scale farming (Choi and Kim 2015). Accomplishing Mayor Park's vision, and satisfying the city's 2010 ordinance for schools to purchase only certified eco-friendly and organic food, meant using *Orbon*—an aggregation, certification, and distribution center built in 2009 by Seoul Agro-Fisheries & Food Corporation (a public enterprise funded by the Seoul Metropolitan Government)—to develop a new supply chain.

The National Agricultural Products Quality Management Service (NAQS) coordinates a nationwide eco-friendly certification system, encompassing multiple criteria, including: where the food is produced, antibiotic usage, HACCP certification, and the presence of pesticide residues (Gyunggi Province 2018). In Seoul, *Orbon* workers oversee the NAQS certification process and conduct their own independent testing to ensure the government's food safety standards are met. As of 2018, 67% of the foods served in Seoul schools were domestic products with NAQS eco-friendly certification (Seoul Metropolitan Office of Education 2018).

During the early years of the UFEF school lunch program, procurement policies privileged price over a more holistic set of social, cultural, or ethical values (Kim 2013; Lang et al. 2009). Until 2015, schools in Seoul were prevented from direct contracting with small-scale farmers, unless they offered the cheapest prices through the Electronic Agriculture Trade procurement system that schools are required to use.² This policy disadvantaged small-scale farmers with high land and labor costs (Korean Rural Economic News 2019). In 2015, the Electronic Agriculture

Trade procurement system was redesigned to penalize vendors whose prices are too far below the average of other firms. In addition, *Orbon* now allows schools to contract directly with small-scale farmers (for purchases up to 20,000 USD) instead of requiring them to take the lowest competitive bid.

Despite its limitations, the rapid development of this precautionary infrastructure is impressive. Early signs suggest the UFEF school lunch policy is helping to facilitate a sustainability transition since it encourages Korean farmers to reduce their use of antibiotics and pesticides in order to become NAQS certified (Kim et al. 2014). The number of newly certified organic farms has increased consistently, from an 11.6% annual increase in 2014 to a 15.5% increase in 2018 (Jung et al. 2019). Likewise, domestic production of organic food has grown in market size from 170 million USD in 2007 to 380 million USD in 2018.

However, it is too soon to tell whether recent changes will fully integrate Korea's most marginalized farmers into the precautionary infrastructure that Seoul and other municipalities are building for their public-school-lunch programs. The government could facilitate this process by underwriting the expansion of the KWPA's *toet bat* (kitchen garden) initiative to schools. This initiative helps women farmers sell seasonal produce and traditional processed foods such as tofu and red pepper paste to urban households (Burmeister and Choi 2012). Alternatively, the government could align school lunch procurement criteria with the KWPA's 2010 policy platform, which includes a rice-price guarantee, gender equality on rural farms, the realization of women peasants' rights to protect seeds, and an increase in farmers' participation in the production, processing, and distribution of agricultural goods (Park and Jeong 2010).

Another primary shortcoming of the UFEF school lunch program has to do with the outsourcing of culinary labor to for-profit food companies that rely on part-time workers and the subsequent deskilling of the country's 74,079 school kitchen and cafeteria workers. In 2016, these workers prepared approximately seven million lunches per day in the country's 11,389 school kitchens. While labor efficiency is already quite high in Korean schools—with each worker providing lunches for over one hundred students (Maeil Economy 2019)—it is not high enough to satisfy the tight fiscal constraints that government-employed nutritionists are expected to work within. Schools have less than 4.66 USD to spend per lunch, which makes it difficult to pay for both the higher cost of eco-friendly ingredients and the on-site labor necessary to transform minimally processed ingredients into ready-to-eat lunches. As a result, nutritionists are increasingly choosing NAQS-certified semi-prepared foods over basic ingredients that require additional on-site processing and preparation.

² The electronic system was established in 2010 to reduce the opportunity for corruption within the school lunch procurement system.

The economy of scale provided by private-sector factories helps schools serve NAQS-certified lunches. However, in prioritizing the public health and ecological dimensions of eco-friendly food, this certification deflects attention away from the poor job quality in Korean school kitchens that makes it challenging to recruit and retain enough workers. Recent surveys of frontline kitchen and cafeteria workers show the physical and emotional demands of the job are contributing to high rates of emotional exhaustion, job burn-out, and workplace injury (Lee, O. et al. 2014; Lee, D. et al. 2016).

While most nutritionists are directly employed by the government in full-time positions, the majority of frontline kitchen and cafeteria staff are part-time workers. Only 2100 out of 74,079 kitchen and cafeteria workers were full-time employees in 2018. These workers are part of the precautionary infrastructure that Korean schools are developing to provide children with safe, eco-friendly lunches, yet they receive little compensation for the mental, manual, and emotional labor they perform. In protest of their job conditions, non-permanent cafeteria workers staged a nationwide strike in July 2019 and at least 4601 schools stopped serving lunches for several days (BBC Korea 2019).

To date, social equity concerns related to the receivers of public care (i.e., children) have been much more strongly integrated into UFEF school lunch policy than social welfare concerns related to the providers of care (i.e., kitchen and cafeteria workers). Efforts to localize Seoul's school-lunch supply chain have operated largely within a market-based system that is slow to incorporate labor and social justice concerns, much like farm-to-school programs in the United States, which Allen and Guthman (2006) have criticized for reproducing neoliberalism and inadvertently restricting a politics of the possible (Harris 2009).

Thus, the next step in advancing food sovereignty and corporeal citizenship via Korea's UFEF school lunch program would be to extend the sphere of ethical and political responsibility to attend to the lives and livelihoods of food- and farm-workers across Korea's global and domestic school-food supply chains. The 2015 UFEF school food procurement policy reforms and the 2019 nationwide cafeteria worker strike suggest that such social justice concerns will continue to be raised and potentially integrated into the rules governing the niche, which, may, in turn, have a larger impact on both the regime and landscape.

Discussion and Conclusion

In this article, we have analyzed the socio-historical context of Korea's UFEF school lunch program, combining the MLP with perspectives drawn from environmental sociology and critical food studies, in order to equip scholars,

policymakers, and civil society activists with fresh insights about how public school-lunch programs can become protected niches that help drive sustainability transitions within agri-food systems.

First, our analysis of Korea's UFEF school lunch program underscores the importance of alignment for the transition process (see Table 2). It was only after the Korean school lunch program became fully public in 2011, with the government assuming fiscal and administrative responsibility for providing free lunches to all children, that it became a protected space (partially removed from the market-based economy) conducive to the development of precautionary infrastructure. This confirms and extends existing theories of how and when sustainability transitions occur by placing niche-regime interactions within a country-specific socio-historical context and demonstrating that structural conditions can be both enabling and constraining (Slingerland and Schut 2014).

In the Korean case, some factors (e.g., consumer perception of risk within the food system, *sint'o puri* ideology, and food sovereignty activism) helped launch the school lunch program along a viable transition pathway, while others (e.g., structural adjustment, trade liberalization, and neoliberal social policy) prevented the national school lunch program from operating as a radical niche. The process of decoupling Korea's school food procurement from neoliberal market logic appears to have only begun after the government stopped the widely used practice of outsourcing meal preparation to for-profit catering firms and began providing free meals to all children. Thus, it seems that addressing the social equity dimensions of the school food program helped to create space for ecological and economic development goals to be more aggressively pursued at the niche level.

Second, this paper responds to criticisms of the MLP's lack of attention to agency and power dynamics by providing a full account of how consumer consciousness, social movement activism, and direct action in opposition to the Food from Nowhere regime eventually brought the niche, regime, and landscape into sufficient alignment to enable the UFEF school food policy to be implemented. Women's social movement activism, through organizations such as the KWPA and during critical moments of social movement mobilization (e.g., to expand the national school lunch program in the 1990s and later to prevent the import of American beef in 2008), played an especially important role in enabling Korea's UFEF school lunch program to develop as a radical niche. This confirms findings from Ilieva and Hernandez (2018) about the importance of women's groups in bringing about sustainability transitions in agri-food systems.

From 2008 to 2011, civil society activists, who were later joined by progressive politicians (many with social movement backgrounds), used mass street protests and national

Table 2 Summary of the MLP analysis of Korean school lunch policies from the 1960s–2010s

	1960s-80s	1990s	2000s	Post 2011
Niche level	Niche-in-the-making International aid distribution and creation of the national program	Niche-in-the-making Growth of the national program through private-public partnership	Niche developments Deprivatization of the national program and investment in school-based infrastructure	Precautionary Infrastructure Public health, social welfare, educational, economic, and ecological goals are simultaneously pursued through the UFEF school lunch program operating as a protected niche
Regime level				
Enabling	Food sovereignty activism	Food From Somewhere regime	Growth of organic food market and the movement for food sovereignty	
Constraining	Poor risk management	Food from Nowhere regime		
Landscape level				
Enabling			Economic prosperity Corporeal citizenship Welfare state expansion	
Constraining	Military dictatorship Economic hardship	Financial crisis Neoliberal trade policy Precautionary consumption		

media coverage to shift the narrative about risk and responsibility. Policymakers subsequently reshaped market conditions and regulations for the public school-lunch program to align with the Food from Somewhere regime and leveraged tax dollars to build precautionary infrastructure for Seoul and other municipalities/provinces.

Institutional, technological, and network anchoring (Elzen et al. 2011) occurred in Seoul as the Korean government, civil society activists, and private sector actors developed precautionary infrastructure for the UFEF school lunch program. Evidence of this niche-regime linkage is visible in changes to municipal school food policy, the creation of new supply chains and certification schemes, and collaborations with a wider range of stakeholders including farmers using (or willing to use) eco-friendly production practices. These niche activities are leading to a gradual reconfiguration of the agri-food regime through a two-fold process (Bui et al. 2016): first, by establishing a shared vision (i.e., for public food programs to act as drivers of food sovereignty, sustainable diets, and social welfare) and second, by embedding this vision into public policy (i.e., the plan to develop precautionary infrastructure for cafeterias serving hospitals, correctional facilities, and government workers).

Third, this paper adds nuance to theories of niche development—specifically in relation to public school-lunch programs—and their potential to catalyze regime-change by documenting how regime- and landscape-level factors affected the niche based on its maturity and ability to function as a protected space. Other scholars have examined niche development of school food policy at multiple scales using the MLP with examples from Brazil, New York, and Senegal (Ilieva and Hernandez 2018). They identified a number of factors that can act as potential levers for sustainability transitions, which we also see in Korea. These include the ability of niche actors to: (1) respond to environmental

pressures, (2) frame their innovations as political tools, (3) remain open to experimentation, (4) create new markets, (5) engage in partnerships and coalition building, (6) build and maintain autonomy while working with public institutions, (7) mobilize women's groups, and (8) impact and participate in the policy process. Notably, we also found that provincial- and municipal-level innovation and policymaking played a critical role in scaling up the niche innovation of a municipal-level UFEF school lunch program to the national level.

Lastly, scholars using the MLP to analyze sustainability transitions within agrifood systems have warned about the dilution of niche-innovations (El Biali 2019). There is evidence to suggest that Korea's UFEF school lunch policy is helping to establish new markets for domestically grown eco-friendly food and reducing children's overall consumption of agricultural chemicals. However, the UFEF school lunch program now operates at a much higher standard of environmental and social justice than the Korean agri-food regime. Therefore, applying the MLP framework to this case suggests that future multi-regime interactions (e.g., labor market policies, public education budgets, sustainable rural development) and landscape-level changes (e.g., gender dynamics and neoliberal ideology) will be necessary in order to overcome the current shortcomings of the UFEF school lunch program and further allow this niche-innovation to support a society-wide sustainability transition in the agri-food sector.

Future Research

Results from this paper are not generalizable beyond the specific socio-historical conditions of Korea, however this does not preclude the possibility that findings may be relevant to other countries' public school-lunch programs or agri-food

transition pathways. Future research on how national government-sponsored school-lunch programs may or may not contribute to sustainability transitions within agri-food systems would benefit from delving deeper into how transition processes unfold within the subcomponents that constitute the niche (e.g., school building, municipality, region, state). For instance, while Seoul's Orbon is constantly expanding its partnership with small-scale organic farms, other municipal provinces are still compromising their UFEF agendas due to budget constraints (Korean Agricultural Policy News 2020).

Thus far, the government-led creation of precautionary infrastructure and the continuous strengthening of social policy have bolstered the nationwide implementation of the UFEF school lunch program. However, it is unclear whether the radical potential of this protected niche will be maintained as UFEF policies are scaled up and out to additional public food programs. The niche-regime-landscape alignment present in the formative years of the UFEF school lunch program may become de-aligned and potentially re-aligned at a lower or higher level of sustainability. Future research is needed in order to understand this process and guard against the dilution of the program's radical potential. Likewise, research that supports cross-country comparison of public school-lunch programs at all scales (e.g., school building, municipality, state, nation) would help clarify best practices for program design and shed light on factors that make sustainability transitions more or less likely to occur. Pursuing such a research agenda has the potential to equip governments and civil society activists with a multiplicity of ideas and approaches for ensuring that school food becomes increasingly safe, healthy, eco-friendly, and fair.

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Compliance with ethical standards

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