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PROSPECTS FOR SUSTAINABLE AGRICULTURE IN RUSSIA

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Abstract: Industrial agriculture contributes to greenhouse gas emissions and is degrading agricultural land. To reduce the impact of agriculture on the environment, a transition to sustainable agriculture is necessary. The article assesses the prospects for sustainable agriculture in Russia. It examines three models for their applicability to Russia: food sovereignty, community supported agriculture, and business as usual.

Key words: Russia, sustainable agriculture, food security, food sovereignty, community supported agriculture

1. Introduction

Decades of industrial agriculture brought cheap food and full shelves to consumers in developed nations. The Green Revolution, based on industrial agricultural practices, reduced food insecurity in developing nations (Clapp, 2020, 39–49). But industrial agriculture also led to environmental degradation evidenced by declining water tables; soil leached of its nutrients; wind erosion; streams, rivers, and ponds polluted with animal waste; rivers fowled with chemical runoff; and a degradation in soil biodiversity. With regard to the last point, industrial agriculture kills harmful insects such as dung beetles that break down animal feces into organic fertilizer, whereas sustainable agriculture uses natural pest and weed control.

In an effort to reduce the impact of industrial agriculture on the environment, many countries are searching for alternatives to industrial agriculture, the dominant model for the past 100 years (Sachs, 2015). In the European Union (EU), for example, a 2030 Climate and Energy framework was adopted according to which member states pledge to reduce total greenhouse gas (GHG) emissions by 30% by 2030 (European Commission, 2019). Although the agricultural sector has no specific target for reduction, farmers are adapting their practices by choosing crops that are better suited to the local growing season and water availability; using water more efficiently by reducing losses and improving irrigation; improving soil management by increasing conservation of soil moisture and landscape management; introducing heat-tolerant livestock breeds; and improving the effectiveness of pest and disease control by better monitoring and using diversified crop rotations (European Commission, no date). In addition, climate change intersects with the EU's rural development policy. At least 30% of the budget for each rural development programme is reserved for voluntary, targeted measures that are beneficial for the environment and climate change (European Commission, no date).

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As a top-5 global emitter of greenhouse gases, Russia has incentives to reduce greenhouse emissions from agriculture and to expand its sustainable agricultural sector. Russia's agricultural sector accounts for 15–18% of greenhouse gas emissions and as much as 28% of emissions if food processing is included (Buzdalov, 2018, 78). For context, Russia's agricultural sector contributed less than 3% of GDP in 2018 (Uzun and Shagaida, 2020, 409). The transition from industrial agriculture will not be easy because of entrenched interests in the status quo; tens of billions of rubles in private and state investment are being sunk into industrial agriculture each year. Hundreds of billions of rubles in profits are generated by the industrial agricultural system from agroholdings and other large farm enterprises.

The purpose of this article is to think broadly about the prospects for expanding sustainable agriculture in Russia, a topic that is understudied but extremely important. My intent is to fill the void and to produce a policy-relevant analysis of a pressing concern that faces not just Russia but almost all developed states. Within the literature on Russian agriculture, there has been considerable scholarly attention paid to household income and employment (Lerman, 2006; O'Brien and Patsiorkovksy, 2006; Lerman, et al., 2008); to smallholders (Pallot and Nefedova, 2007); and to Russia's agricultural production and recovery (Liefert and Liefert, 2015; Rada, Liefert and Liefert, 2017; Uzun, Shagaida, and Lerman, 2019). Other scholars emphasise Russia's emergence as a food exporting nation (Wegren, Nikulin, and Trotsuk, 2018). And still others discuss abandoned agricultural land and marginal farmland, but do not take the next analytical step by linking care of the land to sustainable agriculture (Ioffe, Nefedova, Zaslavsky, 2006). This article contributes to the literature on Russian agriculture by presenting the first analysis specifically about sustainable agriculture beyond food sovereignty (which in this author's opinion is a fictional narrative). The overarching goal is to assess the prospects for a transition away from industrial agriculture toward an expanded sustainable agricultural system in Russia. Within that broad question, the article also examines two subsidiary questions: (1) What is the status of sustainable agriculture in Russia today? (2) What are alternative scenarios for a transition from industrial agriculture to expanded sustainability?

The article argues that a widespread departure from industrial agriculture in Russia is unlikely due to entrenched vested interests and current policy priorities. It also argues that in the short-to-medium term a business as usual model is most likely. While in Western nations sustainable agriculture is often a bottom up, grassroots initiative, in Russia the state also plays an important role. Going forward, sustainable agriculture in Russia may grow as a niche parallel to industrial agriculture but is unlikely to dislodge it. At some point, Russia's leaders may have to make a radical decision about their agricultural system, but there is little evidence that they are ready for that decision in the foreseeable future.

The global stakes in the transition from industrial agriculture to sustainable agriculture are high. Russia has become a significant player in world grain trade and in particular exports large volumes of wheat to Egypt, Iran, Turkey, and other countries in the Middle East, all of which are authoritarian and are vulnerable to food protests should supplies run short or if prices spike. Russia's wheat exports since the 2014/15 agricultural year and continuing through the 2019/20 agricultural year averaged more than 37 million tonnes. By volume, in the 2016/17 agriculture year Russia's wheat exports accounted for 14 percent of global wheat trade; in the 2017/18 agricultural year, Russia's wheat exports accounted for 18 percent of global wheat trade; 19 percent in the 2018/19 agricultural year; and 18 percent in the 2019/20 agricultural year (United States Department of Agriculture, 2020). During the 2019/20 agricultural year, Russia was second to the EU in the volume of wheat exports but led the world in four of the past five years. A widespread conversion to sustainable agriculture would impact global grain reserves in the short-term and could lead to price spikes and food riots in vulnerable states. Thus, the stakes are high for the world, not just Russia.

The source materials for this article consist of secondary sources in English; Russian language academic journals and online sources; Russian government statistical books; Russia's 2016 agricultural census; and observations from fieldwork in Russia.

2. Industrial agriculture

Russia's string of seven consecutive years (2014–2020) of grain harvests in excess of 100 million tonnes, its world-leading wheat exports, increasing grain yields per hectare, and rising meat exports all obscure the long-term problems that emanate from industrial agriculture, a system which contributes to greenhouse emissions that cause climate change.

Data from Russia's 2016 agricultural census present a portrait of industrial agriculture in Russia, shown in Table 1. The table depicts the number of dairy cows and beef cattle, and pieces of large farm equipment by federal district. The table shows the regions where industrial agriculture is most prevalent, but also reflects the fact that industrial agriculture is widespread throughout the country. The table shows only the number of cows and cattle, but nitrous oxide is released from all animals' manure and urine so other animals have similar effects but are not included due to space limitations.

The table quantifies and illustrates where agricultural activities are producing the most greenhouse emissions. The Volga, South, and Siberia Federal Districts have the most milk and beef cattle which means that these regions generate the most methane gases from livestock. The table also shows that the Volga, Central, and South Federal Districts have the most tractors and combines. Tractors and combines run on gasoline or diesel. Biofuel tractors exist but are not common in Russia. Older equipment is less fuel efficient and emits more carbon monoxide than newer models, which is important because according to Russia's 2016 agricultural census, 68 percent of all tractors and 51 percent of all grain combines were at least nine years old. Nationwide, only 12 percent of tractors and 19 percent of combines were less than four years old at the time of the 2016 census. By district: only 11 percent of tractors and 19 percent of combines in the Volga district were four years or less; 15 percent of tractors and 24 percent of combines in the Central district were four years or less; and 11 percent of tractors and 20 percent of combines in the South district were four years or less (author's calculations from Rosstat, 2018c). It is worth noting that tractors and combines are not the only carbon-emitters in the agricultural cycle. Farm activities such as grain drying, transportation of crops from the field to storage or processing; transportation of animals to slaughter; production of mineral fertilizers, feed production, milking, and transportation of commodities to retail or to export also emit carbon monoxide (FAO, 2019, 21).

Tab 1. Farm Animals and Farm Machinery by Federal District, 2016. Sources: Rosstat, 2018b, 14–16, 22–24; Rosstat, 2018c, 10–12, 50–52

	Number of dairy cows (thousands)	*Number of beef cattle (thousands)*	*Number of tractors (thousands)*	*Number of grain combines (thousands)*
Russian Federation	15,721	3,613	295.0	75.1
Central Federal District	2,341	585	66.1	14.1
Northwest Federal District	629	69	12.9	1.19
South Federal District	1,451	1,039	50.7	13.1
North Caucasus Federal District	1,852	437	17.7	5.51
Volga Federal District	4,812	509	79.1	20.0
Urals Federal District	865	121	16.9	4.52
Siberia Federal District	3,351	820	43.5	14.2
Far Eastern Federal District	421	34	7.74	2.22

Notes: a. Numbers have been rounded
b. Cows and cattle are for all categories of farming
c. Tractors and combines are for farm enterprises of all sizes, private farms, and individuals' farms.

2.1 Consequences

Industrial agriculture contributes to the degradation of Russia's land in several ways: water erosion; wind erosion; leaching of nutrients from soil; salination of soil; and overwatering (Edel'geriev, 2019, 71–72). The net effects are soil degradation and lower productivity, in some cases even to the point where the land cannot be used productively. Although Russia is a large country, commercialised agriculture can only be conducted on 13% of Russia's total land (Edel'geriev, 2019, 78). The most favourable climatic and soil conditions for grain production are found in Russia's south, the Central European part of Russia that lies west of the Urals, Altai krai in Western Siberia, and along Russia's border with China in the black earth areas of Amur oblast and Primorskii krai in the Russian Far East. According to one study, favourable agricultural areas comprise only 6% of Russia's agricultural land and therefore it is important to protect and preserve them (Edel'geriev, 2019, 83).

In addition, drought is becoming more frequent. During the decade 2010–2019, Russia experienced drought in seven years and extreme flooding occurred in two years. These weather anomalies affected more than 37 million hectares and caused losses to agriculture valued in excess of R100 billion by my calculations. Going forward, some Russian scholars predict that grain yields will decline in Russia's south, an occurrence that would impact domestic food security and grain exports. For example, Academician Andrei Paptsov predicts that as a result of climate change, grain yields in Russia's south could decline by 8%, by 13% in the Volga region, and by an astounding 26% in the Urals region, all of which are significant grain growing regions (Paptsov, 2018). By 2050, grain yields may fall by 17% for the nation (Paptsov, 2018).

Extreme weather-related events are especially damaging because a very small percentage of agricultural land is insured against losses, which means that a farm enterprise or private farmer bears the direct hit to profitability. In 2019, according to Russia's national union of agricultural insurers, only 4.8 million hectares of cultivated land were insured, compared to 80 million hectares of sown land throughout the country (NSA, 2020). Through September 2020, Russia's food producers lost agricultural production valued at R7.5 billion due to weather anomalies, of which only R555 million was covered by insurance (Sokolova, 2020). The effects, therefore, are that food production is lost and uninsured crops represent a direct financial loss to the farm.

3. Russia's Sustainable Agriculture Today

Sustainable agriculture embodies an ethos that land is to be protected and nature should be nurtured, not conquered (Lengnick, 2015). In short, sustainable agriculture is environmentally friendly. In Russia, most sustainable forms of food production in Russia involve small plots of land operated by individuals or households. Russia's sustainable agricultural sector is at a distinct disadvantage vis-à-vis corporate interests that have considerable influence in governmental bodies and committees due to formal and informal ties. Further, using data from Russia's 2016 agricultural census, the amount of agricultural land used sustainably is considerably less than that used by industrial agriculture, as shown in Table 2.

Tab 2. Arable Land Used by Traditional Agriculture and Sustainable Agriculture, 2016 (in hectares). Sources: Rosstat, 2018a, 8, 12, 36, 62, 86; Maksimova, 2020

	Traditional agriculture	*Sustainable agriculture*
Russian Federation	94.6 million	--
Farm enterprises	64.8 million	--
Private farms and individual entrepreneurs	26.8 million	--
Household gardens (urban and rural)	--	2.4 million
Dacha plots	--	7.5 million
Greenhouses	--	2.6 million

Notes: a. Numbers have been rounded
b. Data for greenhouses is for 2019

Russia has several forms of sustainable small-scale agriculture operated by individuals, the best known are dacha plots and household gardens (*lichnoe podsobnoe khoziaistvo*). From the data in the table, of its 94.6 million hectares of arable agricultural land (*pashnia*), dacha plots used 8% and household gardens used 2.5% in 2016 (Rosstat, 2018a). The household garden is the most economically important form of smallholder farming in Russia. This form of sustainable agriculture is based on manual labour, uses organic fertilizer, and produces food mainly for self-consumption (Pallot and Nefedova, 2007). According to the 2016 agricultural census, *lichnoe podsobnoe khoziaistvo* had an average plot size of .8 hectares in rural areas and .3 hectares in urban locales (Rosstat, 2016, 7). In 2019, according to government data, 28% of the ruble value Russia's agricultural production came from *lichnoe podsobnoe khoziaistvo*, consisting of unprocessed vegetables and potatoes, milk, eggs, honey, and meat (Rosstat, 2020, 355). The economic importance of *lichnoe podsobnoe khoziaistvo* does appear to be in decline, however, as its relative contribution to the national food supply has declined significantly since 2004.

A quasi-form of sustainable agriculture that produces 'green' products is the greenhouse (*teplitsa*). I call greenhouses quasi-sustainable because their environmental footprint is relatively small and production is intensive, although they may use mineral fertilisers. *Teplitsi* (plural) exist in two forms. The first type is used by individuals on their dacha plots or *lichnoe podsobnoe khoziaistvo* and consists of a primitive structure made from plastic and wood to protect vegetables from frost. These greenhouses typically range in size between 20–30 square metres, so they are not large. Food production from this type of greenhouse is normally consumed by the individual or household.

A second type is operated as a standalone business or as part of a farm enterprise – in essence, corporate greenhouses – and these have federal support. These are large, permanent structures, made from steel and glass, are mechanised and automated. In 2019, corporate greenhouses occupied 2.65 million hectares (Maksimova, 2020). This aspect is interesting because it means that the government is involved in sustainable agriculture. In particular, the government promotes the construction of greenhouses in the Russian Far East (Litvinova, 2020b). During a visit to the Far East in August 2020, Prime Minister Mikhail Mishustin spoke in favor of greenhouses and supports local vegetable production (TASS, 2020b). In one example from the Russian press in 2020, a greenhouse is being constructed in the region of Magadan, located in the far northeast corner of Russia where winters are long and cold, with short, cool summers. Annual temperatures range from -20º C to +16º C. The greenhouse complex, called Talaia, occupies 1.5 hectares and is expected to produce 1.1 tonnes of cucumbers, tomatoes, berries, and lettuce (Agrovestnik, 2020). In September 2020, the ministries of agriculture, economic development, and finance submitted a plan to the government to promote the construction of greenhouses in the Far East (TASS, 2020c). Also in September 2020, Minister of Agriculture Dmitrii Patrushev announced that the ministry would transfer part of its budget to the Ministry for Economic Development of the Far East to be used to subsidise the construction of greenhouses in the Far East (Shokurova, 2020). The ministry estimates that the construction greenhouses will allow the Far East to triple its vegetable output, and thus there is are definite food security and import substitution impulses behind the support for *teplitsi* (Minsel'khoz, 2020c).

Investors in Russia are eligible to receive government-subsidized loans for the construction or modernisation of corporate greenhouses. In July 2020, Russia's federal government decided to allow the repayment of government-subsidised loans for the construction of greenhouses over 12 years; the normal repayment period for investment loans with government funding is eight years (Agrarii smogut, 2020). Large-scale greenhouses can extend 100 hectares or more, which is small compared to megafarms that are hundreds of thousands of hectares. Smaller complexes are also common. These greenhouses produce vegetables (bell peppers, cucumbers, and tomatoes) and flowers for commercial markets. Their operation is quasi-sustainable because the environmental footprint is small and large areas of land are not degraded, but food production may not be organic because mineral fertilizer is often used, although pest control methods are natural.

The growth in food production from large-scale greenhouse complexes has been dramatic since 2014 and should be understood as part of the government's strategy to reduce imports and improve regional food security. During the first eight months of 2020, greenhouse vegetable

production was up by nearly 20% over the analogous period in 2019 (Minsel'khoz, 2020a). Tomato production is especially important. During the past five years, greenhouse tomato production has increased its share of domestic supply from 25% to 40% (Litvinova, 2020a). This increase allowed tomato imports to decline from $1.1 billion in 2014 to $639 million in 2019, a 42% decrease (Minsel'khoz, 2020b). Overall, however, the economic impact of corporate greenhouses is not especially large. In aggregate, greenhouses produced 1.14 million tonnes of vegetables in 2019 (V 2020 godu, 2020) compared to total vegetable production that was just over 14 million tonnes (Rosstat, 2020, 356–358). For 2020, greenhouse vegetable production is projected at 1.25 million tonnes.

Another type of agricultural activity that may be sustainable is organics, about which it is necessary to say a few words. Russia's federal government has embraced the development of a 'green' brand for Russia's food. In July 2020 the Ministry of Agriculture submitted a bill concerning how to promote 'green' products from Russian producers (RIA Novosti, 2020). The term 'organic' does not necessarily mean 'sustainable' because industrial farm techniques are used to produce organic food.[2] That said, there is an emerging organic food sector in Russian agriculture. Russia's law on organic food came into effect in January 2020 that defines standards for production, transport, and sale of organic food. Organics have their own special label and must be certified as organic, plus the seller must be registered with the Ministry of Agriculture before being allowed to sell (Pravila, 2020). At present, Russia's organic food market is modest – Russian consumers purchased organic foods valued between €160–180 million in 2019 (Pravila, 2020). It is increasingly common to see an 'organic' foods section in supermarkets, especially in large cities. The 2020 law is expected to give a boost to organic food production in Russia by expanding the amount of land cultivated organically, and by creating a Russian certification infrastructure that will assure consumers that what they buy is actually organic.

Russia's Ministry of Agriculture plans to become a player in the global organic food market, hoping to increase the export of organic products to $15 billion USD by 2025–2030 (Zueva, 2020). In this endeavor, a symbiotic relationship between the state and organic producers is developing, with the state providing tax abatements that are hoped will spur higher organic production and also increase the percentage of organic food that is processed for domestic consumption or export (TASS, 2020a). For context, the global organic market is expected to rise to $224 billion USD by 2024 (Cision PR Newswire, 2020).

The takeaway from this discussion is that myriad forms of sustainable and quasi-sustainable agriculture exist in Russia. Except for vegetables from corporate greenhouses which engage in commercial production, sustainably produced food tends to be consumed by the individual or household.

4. Models for Expanding Sustainable Agriculture

A wholesale conversion to sustainable agricultural practices is unlikely due to the array of vested interests that benefit from industrial agriculture. But there are variants for sustainable agriculture to expand its presence. We start the analysis with least likely to occur and end with most likely going forward.

4.1 Food sovereignty

The food sovereignty model is the *least* likely pathway to expanded sustainable agriculture in Russia. The food sovereignty model is the most radical departure from the present food system *and* it infringes upon the interests of the most powerful and important actors in the agri-food system. Food sovereignty rejects industrial agriculture, the domination of mega-farms and agribusiness, and its links to international markets (Bernstein, 2014). It instead emphasizes local

[2] Organic food does not use growth hormones, antibiotics, pesticides, herbicides, feed additives, and chemical fertilizers. But organic does not necessarily mean sustainable. Industrial farming techniques – fossil fuel burning and carbon emitting processes during the growing of food – may be used to produce organic food (Pollan, 2006).

food production using sustainable methods of production that are 'in harmony with local culture and traditions' and based on local resources (Schanbacher, 2010, 53–54). Food sovereignty arose as a grassroots movement called *La Via Campesina* in response to the domination by industrial agriculture domestically and in international food trade, and to the alienation of smallholders from their land as a result of those processes (Clapp, 2020, 205–210). From the beginning, therefore, food sovereignty was intended to be more than merely localized food production. Instead, it was a strategy for collective action that would change the power relationship between agribusiness to common people. It was based on three core elements: (1) a *movement* that merges political and economic grievances *in response* to industrial agriculture; (2) the abolition of industrial agriculture as the dominant food system; and (3) the emergence of sustainable agriculture as the new food system.

Spoor et al. (2013), followed by Visser et al. (2015), maintain that food sovereignty exists in Russia and may be a viable path for a sustainable future, although they never explore exactly how that would occur. They argue that 'quiet' food sovereignty exists in Russia, that is, without a movement. Russia has an authoritarian political system in which civil society is underdeveloped, and participation in social and protests movements is sporadic and often revolves a single issue of local concern. Spoor and Visser argue that the primary behavioural evidence for quiet food sovereignty is small-scale food production from *lichnoe podsobnoe khoziaistvo* (household garden). In essence, to make the concept of food sovereignty apply to Russia, Spoor and Visser choose an element of food sovereignty that is convenient to their argument while ignoring aspects that are inconvenient. In doing so, the original premises of food sovereignty from *La Via Campesina* are fundamentally distorted. There is a lot to be said about the notion of quiet food sovereignty in Russia, perhaps warranting a separate article, but due to space constraints I limit the discussion to several problems with notion that food sovereignty exists in Russia and offers a pathway forward.

• Problem of conceptual boundaries. If we accept the idea that food sovereignty is *primarily* defined by smallholder production based on manual labor and sustainable practices without regard to resistance, movement, or organization, it means that food sovereignty exists *everywhere in the world by any smallholder engaged in agricultural production*, thereby making the concept analytically unusable. If virtually all smallholder production is food sovereignty, then what smallholder production is not? Logically, if all smallholder production equals food sovereignty, then the food sovereignty model should be globally dominant, which means that industrial agriculture would be displaced. But we know that is not true. In fact, Clapp presents strong evidence that industrial agriculture is growing stronger (Clapp, 2020).

• Problem of instrumentality. Food sovereignty was never intended to be 'quiet'. Rather, from the beginning the intent was for a loud movement to expose the inequities of the capitalist food regime to the rest of the world and its oppression of smallholders. 'Loudness' was intended to be an instrument to mobilize support and to cohere social and environmental movements under the *La Via Campesina* banner (Edelman et al., 2014). Thus, to assert quiet food sovereignty is to fundamentally alter the intent and purpose of the original peasant movement. Visser argues that it is *better* that food sovereignty is not a social movement in Russia because if it were it would likely be suppressed (Visser et al., 2015, 526), an idea that stands the original *La Via Campesina* position on its head, which saw cross-national organization of peasant interests as the best method to combat global agribusiness.

• Problem of causality. In its original conception, the food sovereignty movement was 'caused' by exploitation of smallholders in the global food regime that arose after 1944 (Friedmann, 1988). In this regime, smallholders lost control over which crops were grown, over their land, and ultimately, over their livelihoods. Logically, a small producer in Russia would have to be exposed to the global food regime and to international markets in order to partake of food sovereignty. In past and present Russia, smallholder food production is largely for self-consumption. A small percentage of food is sold in local markets. Some is bartered. But smallholder exposure to the international food regime has been and remains virtually nonexistent. The point is that exploitation of smallholders by a global food regime and international markets *did not* occur during the Soviet period and *is not* occurring during the post-Soviet period. Therefore, the causal element – the independent variable that propels smallholders to certain behavior – is absent.

• Practical reasons. A food system based on food sovereignty asks agroholdings, regional leaders, and various ministries to give up a good portion of their power and influence. It is not clear what their incentive to do so would be. The natural reaction would be to protect their power and control over resources, similar to the multilevel bureaucratic resistance during land privatisation in the 1990s (Allina-Pisano, 2008). Further, there is little money to be made for oligarchs from food sovereignty if national supply chains and links to international markets are replaced with localised food systems. Since these are the people who run Russia's economic system, the question once again is what their incentive would be to give up their power and the perks.

Further, a food system based on food sovereignty makes the 'power vertical' (control from the Kremlin downward) more difficult to implement. The trend since 2000 has been for *more* centralisation of power in the Kremlin, not less. The process of decentralisation or deconstruction of the power vertical is not clear. Fourth, localised food systems will be difficult to implement in certain regions of Russia where food imports, both domestic and foreign, are necessary to feed the population. Russia's northern regions, the far north, and the far east have never been food self-sufficient and still are not (Tikhomirov, 1997). Finally, a food system based on food sovereignty does little to advance regime aspirations for global influence and would likely lead to a step backwards in that international linkages would be weakened if not severed. Why the political leadership in the Kremlin would want to give up the enhanced international prestige that comes from being the world's leading wheat exporter is not clear. For all of these reasons, food sovereignty does not have a present or a future in Russia.

4.2 Community Supported Agriculture

The community supported agriculture (CSA) model is more likely to expand sustainable agriculture in Russia than food sovereignty, although there are limits. The CSA model is somewhat similar to food sovereignty but not as radical. Unlike food sovereignty, CSA is not based on a political movement and does not require political organization, two factors which are weak in rural Russia (Mamonova and Visser, 2014). Unlike food sovereignty, CSA exists parallel to industrial agriculture and does not try to replace industrial agriculture, which means that it does not challenge vested economic and political interests. The CSA model does, however, allow producers who engage in sustainable agriculture to receive local support and thus those farmers may experience an increase in their economic influence.

CSA is a community-based, local food system. The community model for agriculture took hold in Europe in the 1960s and spread to the United States in the 1980s (Kleppel, 2014). Residents of a community become 'members' (subscribers) by purchasing 'shares' from a local farm. A share is essentially a part of the harvest; the consumer pays in advance and in return receives a weekly box/basket of produce during the growing season. In this way, members become shareholders in a farm (although consumers have no legal claim to farmland or any of its assets). A box typically contains vegetables, although shares for other produce may be purchased if offered by the farm: fruits, meats, cheese, eggs, milk, homemade bread, or flowers. There are variations in the model as practised in the United States. One variation permits members to pick their own vegetables according to preference, with each box allowing up to a specified weight. Another variation is to offer a subscription for specialty products, for example, heirloom tomatoes. A third variation on the model is delivery. Because it is likely that consumers will have to shop elsewhere for to fulfill their food needs, busy professionals may not have time to visit a farm to choose their vegetables. In this variation of the CSA model, weekly delivery is made to the consumer's workplace.

The larger point is that CSA connects consumers to a specific farm and farmer (Kleppel, 2014). Some call it a relationship, others call it an alliance. Whichever terminology is used, this arrangement benefits the farmer because he receives cash in advance that helps to cover expenses during the growing season. Consumers also benefit by getting to know 'their' farmer, which may include an annual visit to the farm; they benefit from fresh vegetables that are grown locally; and consumers benefit by learning how their food is grown. A common selling point of the CSA model is the use of sustainable practices and growing organic food. As Kleppel notes, 'the future of sustainable farming is certainly to be tied to CSA and similar tools that help farmers

manage risk, while ensuring consumers the freshest, safest, most nutritious and tasty food available' (Kleppel, 2014, 125).

Russia's version of CSA is somewhat different. At present there are no pre-paid subscriptions directly to a farmer for an entire growing season. Instead, there are pre-paid direct online orders for a one-time purchase. Food companies and stores also offer online ordering in the cities of Moscow, Kazan, and St. Petersburg, but these lack the relationship between grower and consumer that is inherent to the Western CSA model. The closest to the American CSA model in Russia is a farmer-composed list of products and the amount available for each; customers can place a pre-paid order, a process that allows the consumer to develop a relationship with his favorite supplier. This system is for a one-time purchase, but it is not a big conceptual leap from one-time purchases to a seasonal subscription. For now, however, Russia's CSA model is small in scale and captures a tiny portion of the domestic food market.

An expansion of CSA model in Russia is possible because it is portable and flexible. The CSA model or a facsimile can be transplanted to almost any locale or region. The is no single model of CSA so variations can adapt to local conditions, local produce, and preferences of the population. The model can be generated locally on the initiative of local farmers. That said, sustainable agriculture and sustainable rural development are more likely to be successful where certain socioeconomic conditions are met: household demographic structure is favourable (older persons and those with low income are less likely to order food online through a subscription service); employment and household income is high; housing is adequate to high quality; education level of consumers is high; and regional infrastructure is good (Shcherbakova, 2020).

The CSA model in Russia faces two main questions. First, can it avoid 'capture' by corporate interests. Advocates of the CSA caution about what happened when Walmart, the largest grocery chain in America, announced that it would sell 'local food'. To make money and keep prices low for consumers, Walmart found it economical to utilise existing supply chains that transport food long distances (Lengnick, 2015). Local food became intermixed with transported food, partly due to fuzziness about what constitutes 'local'. How far does food have to be transported before it is no longer local? There is no concrete definition or standard (Kleppel, 2014). 'Local food' became indistinguishable from factory farm food that was transported long distances.

A similar takeover process occurred in the U.S. with organic foods. Corporate farms moved into this niche once it became clear that there was money to be made. The definition of organic food reflected corporate interests and is produced using industrial agricultural techniques, meaning that even though chemical fertilisers and growth hormones were absent, production processes are based on fossil fuel burning, carbon producing machinery. Pollan argues that, 'the word organic has been stretched and twisted to admit the very sort of industrial practices for which it once offered a critique and alternative' (Pollan, 2006, 157). Further, the factory farm could produce organic food cheaply, plus stores would rather deal with one large producer than dozens of smaller producers. A similar slippery slope may have begun in Russia, as in June 2020 organic food producers asked for financial support and tax concessions from the federal government (TASS, 2020a). If organic producers lose their financial independence, they may become vulnerable to the influence of large corporate farms in federal and regional levels of government who may change standards for 'organics' in ways that are most profitable for them.

The second question is whether local food is able to feed a large urban population. Food security has been a priority of Russia's federal government since at least 2008 and the government's food security doctrine, adopted in two versions in 2010 and 2020, stipulate the percentage of the nation's food supply that should come from domestic production. Thus, any viable food system must ensure food security. Initially, it may seem that CSA would have difficulty feeding large urban populations. However, it is easy to forget that only about 100 years ago consumers began to depend on food transported long distances; previously, local food predominated and fed local and regional populations. Thus, an expanded CSA would be a return to historical patterns.

There are concrete policies that either Russia's federal government and/or regional governments could adopt to expand sustainable agriculture using the CSA model. At the federal level, one measure would be wider application of the 'Far Eastern Hectare' law, originally introduced in 2016 in Russia's Far East that distributed free land for the operation of small-scale agriculture. In

the original program, recipients received use rights for one hectare for a period of five years, after which the plot is transfers to ownership or leased if the individual used the land properly, which included household gardening (Wegren, Nikulin, Trotsuk, 2018, 127–129). This law was adopted in three other regions in 2017 and 2018 but could be expanded nationwide, a move that President Putin supports. The Ministry of Agriculture maintains that there are at least 40 million hectares of agricultural land that are unused or abandoned that could be allocated to individuals.

A second policy is an increase in the number and size of urban farmers' markets where individuals could sell their produce. It was not long ago – the 1990s – that consumers depended on farmers' markets for a high percentage of their food purchases. Farmers' markets have less importance today but remain in the collective memory of urban consumers and thus a re-emphasis would not be too radical. Supporting farmers' markets will not put the local supermarket out of business, but it will redirect revenue to farmers that will help them stay in business and allow them to provide fresh, nutritious food.

A third step to help expand CSA would be for municipal governments to create and administer a website where local private farmers and individual producers would list their contact information and products for sale and price for consumers who are interested. Such localised central databases would lower the transaction cost for consumers who are searching for sustainable producers. Finally, municipal governments and regional governments could increase financial support for sustainable forms of food production such as greenhouses, hydroponics, and vertical farming in densely populated urban areas. Thus, there are no inherent reasons why CSA model cannot spread and in doing so expand sustainable agriculture, although none of the steps outlined here would completely replace industrial agriculture.

4.3 Business as Usual

The business as usual model (BAU) is the most likely scenario for Russia for the foreseeable future. It is the model that aligns best with the political, administrative, and financial power structure in the agrifood system. This model retains economic influence in the Ministry of Agriculture and other administrative bodies at the regional level. It allows banks to retain their financial influence in the agrifood system, including the state-owned agriculture bank called *Rossel'khozbank* which is the primary conduit for state subsidies, credits, and investment loans to farms. Business as usual provides and supports food security for urban consumers. And BAU allows the federal policymakers to pursue their ambitions for Russia as a food superpower. In short, there are myriad actors in the agrifood system who support the industrial agricultural model.

In this scenario, industrial corporate farms will continue to receive the majority of state financial support and will produce most of the nation's food. Industrial farms will operate their business as usual which means that farm remechanisation continues to advance; chemical fertiliser, pesticides, and herbicides remain widely used; crop rotation remains monocultural; greenhouse gas emissions from agriculture increase; and agricultural output remains increasingly susceptible to weather anomalies. This scenario also means that control over the key aspects of the food system – seed; chemicals; livestock herds and animal breeding; grain storage, transportation and processing; and the meat and poultry industry – will remain highly concentrated in a small number of companies, thereby mimicking the West (Lengnick, 2015; Clapp, 2020). In short, the BAU model entails minimal change in government policy or farm behaviour. In this scenario, sustainable agriculture remains a niche sector, although with the possibility of slowly expanding its output but not to the point where it seriously challenges the dominance of industrial agriculture.

5. Conclusion

Small-scale, non-commercialised sustainable agricultural is widespread but will not dislodge industrial agriculture. Production from greenhouses is increasing but this is a niche market and the contribution is modest. Numerous entrenched interests benefit from the current production, distribution, and retail agrifood system, strongly suggesting that a transition by corporate farms to sustainable agriculture is unlikely in the short-term to medium-term. Most agricultural production will continue to come from industrial farms. Further, it is highly unlikely that a transition to anything

that remotely threatens food security and Russia's status as the top wheat exporter will be adopted.

Looking farther out, however, as the consequences of climate change become more severe and potentially affect food production levels and exports, the prospects may change. While admittedly speculative, an expansion of sustainable agriculture in Russia is possible but depends upon two variables. The first variable asks to what extent Russia's farming community has moved into a post-materialist phase. A sustainability ethos holds that farmers (of all size farms) are caretakers of agricultural land. According to this ethos, land should be protected, not degraded in pursuit of profit. This ethos says to farmers that preservation of the land is equally important to profitability. A sustainability-as-equal-to-profitability ethos is a post-materialist value. Materialist values are primarily interested in economic growth and economic security. Material values – profitability – are undoubtedly central to farming. Twenty years ago, almost 90% of farm enterprises in Russia were unprofitable; in 2019, 80% of farm enterprises were profitable, but higher profitability has come at the cost of rapidly escalating farm debt and dependence on state financial support which has expanded significantly since 2008. Without the myriad forms of state support, farm profits and profitability would be much lower. It is not clear that farms' financial condition is such that the sustainability ethos has risen to equal status with profitability.

Post-materialist values proceed from economic security – the hierarchy of basic human needs are met – and are more concerned with the quality of life, the environment, democracy, and human rights (Inglehart, 1999). Evidence suggests that an ethos of the farmer-as-caretaker of the land does not appear to be widespread, at least as it pertains to corporate farms. Arable agricultural land in the North Caucasus and Siberian Federal districts experience high degrees of wind erosion, while the South and Volga Federal districts experience high water erosion (Edel'geriev, 2019, 93; Sorokin, et al., 2015). According to one study, almost 14% of Russia's arable agricultural land is overgrazed (Sorokin et al., 2015, 543). A sustainable ethos prescribes preventive measures to avoid farming abuse of agricultural land.

The second variable considers where Russia's consumers are on the *psychological* continuum about their food security. In the 1990s, Russia experienced mass poverty and hunger. Since 2000, Russia has undergone a food revolution in production and food supply, which speaks to food accessibility; a food revolution in distribution, which speaks to availability; and a food revolution in consumption, which speaks to unprecedented food security in the post-Soviet period. The question is to what extent have Russian consumers moved *permanently* past anxiety about having enough to eat and are ready to prioritise how food is grown. Russia's food revolution has increased awareness about sustainability and about how food is produced, but this mentality appears to be concentrated around large cities such as Moscow. Russian consumers may never get to the point that they want a 'relationship' or 'alliance' with their farmer as in the Western CSA model, but it is not inconceivable that they should care about how their food is grown. If sustainable agriculture is to expand in Russia, pressure from consumers (from below) should combine with a sustainability ethos in corporate farms (from above). It does not appear that Russia is there yet.

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