



## Viewpoint

## Food self-sufficiency: Making sense of it, and when it makes sense



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## ABSTRACT

Food self-sufficiency gained increased attention in a number of countries in the wake of the 2007–08 international food crisis, as countries sought to buffer themselves from volatility on world food markets. Food self-sufficiency is often presented in policy circles as the direct opposite of international trade in food, and is widely critiqued by economists as a misguided approach to food security that places political priorities ahead of economic efficiency. This paper takes a closer look at the concept of food self-sufficiency and makes the case that policy choice on this issue is far from a straightforward binary choice between the extremes of relying solely on homegrown food and a fully open trade policy for foodstuffs. It shows that in practice, food self-sufficiency is defined and measured in a number of different ways, and argues that a broader understanding of the concept opens up space for considering food self-sufficiency policy in relative terms, rather than as an either/or policy choice. Conceptualizing food self-sufficiency along a continuum may help to move the debate in a more productive direction, allowing for greater consideration of instances when the pursuit of policies to increase domestic food production may make sense both politically and economically.

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## 1. Introduction

Food self-sufficiency has moved higher on the policy agenda in a number of countries following the extreme food price volatility experienced during the 2007–08 food price crisis and its aftershocks. Countries as diverse as Senegal, India, the Philippines, Qatar, Bolivia, and Russia have all expressed interest in improving their levels of food self-sufficiency. This policy turn has been widely critiqued as being misguided. The *Financial Times*, for example, noted in a 2009 editorial on the topic that the “aim of self-sufficiency in food would be disastrous globally” (*Financial Times*, 2009). The debate over food self-sufficiency is often cast as one in which economic reasoning and political imperatives clash. On one hand, proponents of food self-sufficiency defend the political right of states to insulate themselves from the vagaries of world food markets by increasing their reliance on domestic food production. On the other hand, critics argue that there are high costs to states that prioritize political over economic considerations in setting their food policies.

This paper examines the concept of food self-sufficiency in the context of debates on trade and food security and makes the case that policy choice on this issue is far from a straightforward binary choice between the extremes of relying solely on homegrown food

and a fully open trade policy for foodstuffs. It shows that in practice, food self-sufficiency is defined and measured in a number of different ways. The paper argues that taking a broader understanding of the concept opens up space for considering food self-sufficiency policy in a more nuanced way, rather than as an either/or policy choice. Conceptualizing food self-sufficiency in relative terms, and policies to support it along a continuum between closed borders and fully open trade, allows for greater consideration of instances when the pursuit of policies to increase a country's food production for its own domestic consumption may provide both economic and political benefits.

The first section of the paper provides an overview of the concept of food self-sufficiency and the various ways in which it is typically defined and measured. Section two outlines recent trends in food self-sufficiency for both the world's population and for countries. The third section sketches out the evolution of policy debates on this question, showing that food self-sufficiency has long been a key concern of states, and how recent critiques of the idea have painted it in binary terms. Section four discusses how a conceptualization of the idea in relative terms, along a continuum, can help to open space to consider the ways in which the risks of food self-sufficiency, as outlined by its critics, might be weighed against the risks of relying too heavily on world markets to ensure an adequate and stable food supply.

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## 2. Defining and measuring food self-sufficiency

Food self-sufficiency is an often-used term, but it is frequently left undefined by those who employ it. This may be because there is more than one definition of the concept.<sup>1</sup> The FAO (1999) defines it in broad terms: “The concept of food self-sufficiency is generally taken to mean the extent to which a country can satisfy its food needs from its own domestic production.” This understanding is illustrated in Fig. 1. In the diagram, the diagonal line that indicates where food production is equal to food consumption represents 100% food self-sufficiency. The diagram could be further refined by plotting individual countries onto it to show where they fall relative to the 100% self-sufficiency line. Some countries would fall over the line, indicating that they are more than self-sufficient, and some countries would fall below it, indicating that they are in food deficit.<sup>2</sup>

This basic definition—a country producing sufficient food to cover its own needs—is how people typically understand the idea of food self-sufficiency, but some aspects of it are still fuzzy. It is unclear, for example, whether a country that pursues food self-sufficiency still engages in food trade with other countries. Determining how trade fits into the food self-sufficiency policies of individual countries requires further refinement of the definition of the concept and clarification with respect to how it guides government policy choice.

Some analysts define food self-sufficiency as a country eschewing all food trade and relying 100% on domestic food production to meet its food needs. This definition can be characterized as a country closing its borders and adopting complete autarky for its food sector. An extreme policy stance such as this is very rare in practice. All countries rely on imports for at least some of their food consumption, including large food exporters that produce far more food than they consume. Even, North Korea, the country with policies that most approach autarky, still imports food and accepts international food assistance (FAO, 2015a).

Given the prevalence of trade in today’s global economy, a more pragmatic understanding of food self-sufficiency is domestic food production that is equal to or exceeds 100% of a country’s food consumption. Trade is not ruled out within this definition, as food self-sufficiency is defined by the ratio of food produced to food consumed at the domestic level. Understood this way, food self-sufficiency is not necessarily focused on where specific foods are grown, but rather on a country’s domestic food production capacity. Under this definition, self-sufficient countries may still pursue a degree of agricultural specialization in order to trade these foods with other countries. The key point is that food self-sufficient countries produce an amount of food that is equal to or greater than the amount of food that they consume. A key indicator that captures this more practical understanding of the concept is the self-sufficiency ratio (SSR), which expresses food production as a ratio of available supply, as depicted by the following equation (FAO, 2012: 360):

$$SSR = \text{Production} \times 100 / (\text{Production} + \text{Imports} - \text{Exports})$$

The SSR can be further refined to include fluctuations in the level of domestic food stocks (Puma et al., 2015). The SSR can be measured in either calories or in volume of food produced by a country, although it can also be calculated based on monetary values. The SSR is typically calculated for a specific commodity or class of commodities—such as rice, wheat, maize, or cereals. The FAO recommends caution in applying the SSR concept to the overall food situation of a country, because it may mask instances where a country produces one food commodity in abundance

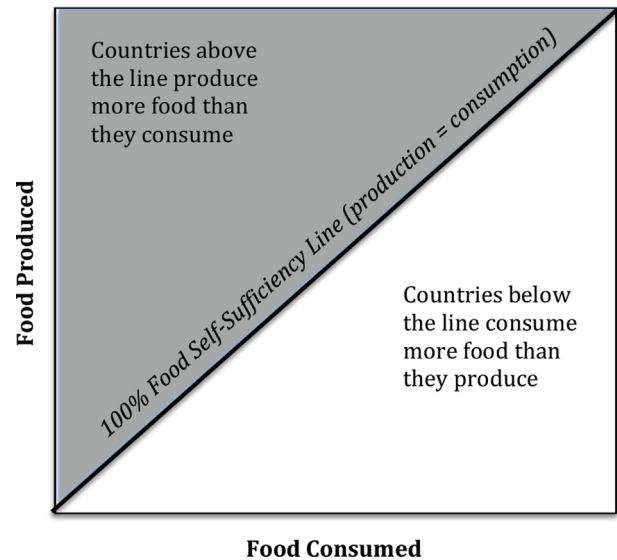


Fig. 1. Basic representation of food self-sufficiency. Source: Clapp, 2015a.

while needing to rely on imports for other food commodities (FAO, 2012: 361). Most SSR analyses focus on key staple crops, such as cereals and starchy roots, in order to give an approximation of food self-sufficiency of a country.

Food self-sufficiency can also be measured in terms of a country’s dietary energy production (DEP) per capita. Countries that produce 2500 kcal (kcal) or more per person per day are typically considered to be self-sufficient, as consumption of at least this many calories per day is seen by most nutritionists to be necessary to ensure an adequate diet (Porkka et al., 2013).<sup>3</sup> Analysis by Porkka et al. (2013: 3), classified food production between 2000 and 2500 kcal per person per day as “insufficient”, and production below 2000 kcal per day as “low”.

These various indicators of food self-sufficiency give some clues as to the trade and food security status of countries, but they are not the same thing. Under both the SSR and DEP measures of food self-sufficiency, for example, a self-sufficient country can be an active importer and exporter of food. Most net food exporting countries are typically also self-sufficient, and most net food importing countries are not self-sufficient, but this is not necessarily always the case.<sup>4</sup> Similarly, food self-sufficiency does not guarantee food security within a country, although the two concepts relate to one another. A country is considered food secure if food is available, accessible, nutritious, and stable across the other three dimensions (FAO, 2008). But food security as a concept does not distinguish whether that food is imported from abroad or grown domestically (Clapp, 2014). Food self-sufficiency, on the other hand, is focused on the supply, or availability component of food security, and is concerned with ensuring that the country has the capacity to produce food in sufficient quantities to meet its domestic needs. Some analysts also see food self-sufficiency as supporting stability in the food supply, while others contend that it can contribute to instability.

Part of what makes food self-sufficiency a complex issue is that different countries face diverse situations that make policy generalizations very difficult. For example, some countries that are more than self-sufficient in food at the country level can still have high

<sup>3</sup> There are different interpretations of what constitutes an adequate diet in terms of caloric intake. Other factors besides calories also matter for adequate diets, including the nutritional content of the food. The caloric focus here merely captures the macronutrient needs for an adequate diet.

<sup>4</sup> Some countries may import and re-export food items which may affect these measures. This is an issue with seafood, for example. See Asche et al. (2015).

<sup>1</sup> For a discussion, see O’Hagen (1975).

<sup>2</sup> For a representation from the 1970s, see O’Hagen (1975) and Josling (1975). For a more recent representation, see Porkka et al. (2013).

**Table 1**  
Comparing SSRs to hunger levels in different countries: some examples. Source: FAO Data (Food Balance Sheets 2007–2011 and FAO, 2015b Hunger Map 2009–2011).

	Countries with SSR < 85%	Countries with SSR = 85–115%	Countries with SSR > 115%
Consumption at or above adequate nutritional intake	These countries produce less food than they consume and yet easily meet domestic dietary needs with very low hunger levels <5%  <i>Examples:</i> Japan; South Korea; Greece; Italy; Mexico; Kuwait	These countries produce close to the same amount of food that they consume and easily meet dietary needs with very low hunger levels <5%  <i>Examples:</i> South Africa; Brazil; Germany; Turkey; Sweden; Austria	These countries produce more food than they consume and easily meet domestic dietary needs with very low hunger levels <5%  <i>Examples:</i> Canada; Australia; Argentina; United States; Russia; Kazakhstan; Hungary
Consumption below adequate nutritional intake	These countries produce less food than they consume and have high levels of hunger >25%  <i>Examples:</i> Liberia; Bolivia; Zimbabwe; Namibia; Yemen; Mongolia; Haiti; Mozambique	These countries produce close to the same amount of food that they consume and have moderate (5–25%) to high (>25%) levels of hunger  <i>Examples:</i> India; Tanzania; China; Guinea; Cambodia; Malawi; Chad; Zambia	These countries produce more food than they consume and have low to moderate levels of hunger at 5–14.9%  <i>Examples:</i> Guyana; Vietnam; Thailand; Paraguay

levels of hunger and malnutrition among their population. Countries in this situation may produce more than enough of some food crops, but too little of others that are required for a healthy diet. High levels of poverty in some self-sufficient countries may hinder food access for certain segments of the population. Other self-sufficient countries, on the other hand, have little difficulty in ensuring that their populations have access to an adequate and nutritious diet.

Likewise, some countries that have SSRs well below 100% may have no problem in securing adequate food supplies for their population through a reliance on international trade. High-income countries, for example, can easily afford imported food even when food prices on world markets are high and/or volatile. Yet other countries with SSRs below 100% may find it very difficult to secure adequate food imports for their population. Each country faces a unique set of circumstances regarding its ability to command food for its population, depending on its productive capacity, ability to import food, and ability to equitably distribute food domestically (Clapp, 2015a). There are many different possible situations, as outlined in Table 1.

### 3. Recent food self-sufficiency trends

Per capita food production on a global scale stood at 5359 kcal per person per day in 2010, which far exceeds the levels required for everyone on the planet to consume enough calories to maintain a healthy life (FAO, 2012: 174). After accounting for food waste, animal feed and other non-food uses of food crops, there were approximately 2870 kcal per capita per day available for food consumption in 2011 at the global scale, which is well above the 2500 kcal per capita per day DEP level required to be considered food self-sufficient. This figure is up from the 1961 average of around 2196 kcal per capita per day available for food consumption (FAO, 2015d: 24). Although in principle the world as a whole is self-sufficient in food, there is wide variability in self-sufficiency across different regions and countries, and nearly 800 million people are chronically undernourished.

Examining trends in food self-sufficiency over time can help to give insights into the regional and country variations, although these trends can also be measured in different ways. According to O'Hagan (1975: 358), in the 1970–72 period, 62% of the world's population was living in countries that were approximately self-sufficient in caloric terms (with DEP at 95–105% of what is necessary for an adequate diet). At that time, around 19% of the population lived in countries that were over 105% self-sufficient, and 19% lived in countries that were below 95% self-sufficiency. One could look at these data in two ways. On one hand, around 80% of the world's population lived in countries that were only just

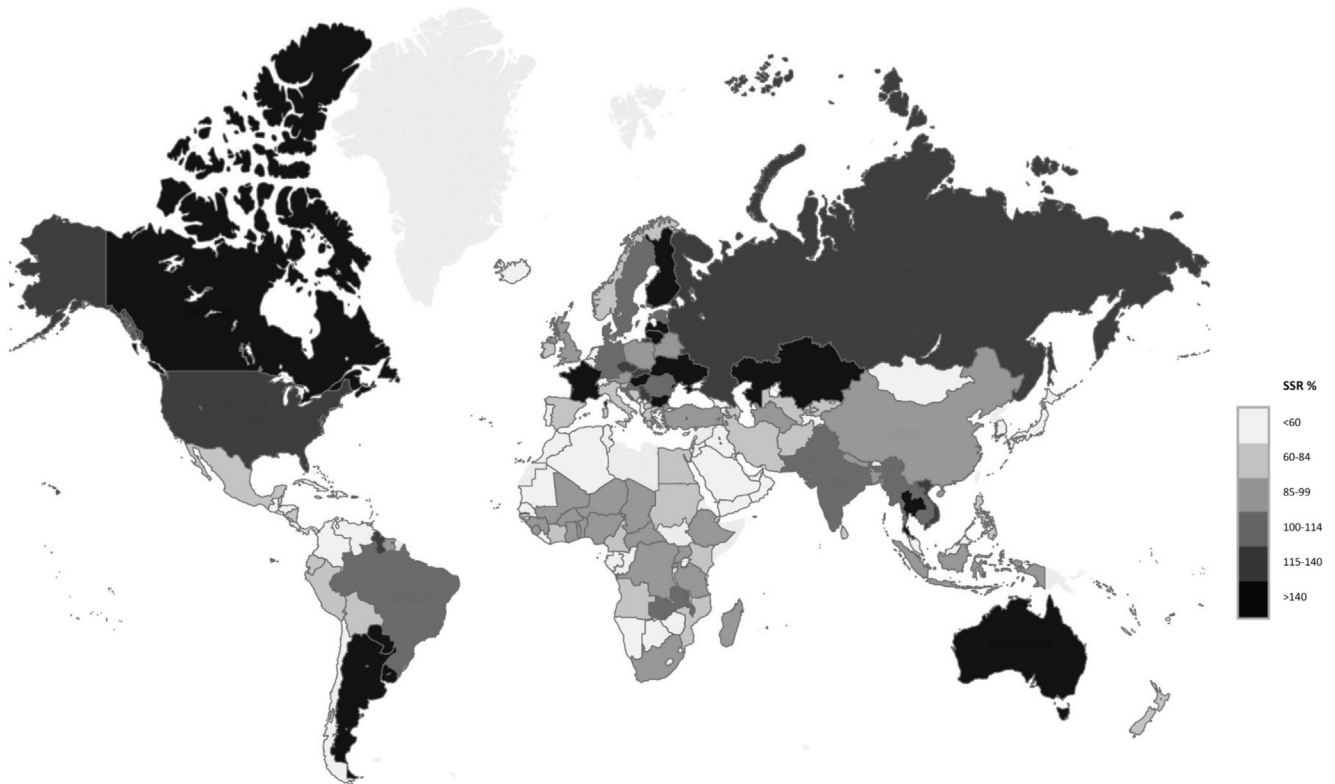
self-sufficient or fully self-sufficient. On the other hand, around 80% of the world's population lived in countries that were only just self-sufficient or not self-sufficient at all.

More recently, Porkka et al. (2013) found that the percentage of the world's population living in self-sufficient countries was fairly stable in the 1965–2005 period. In that period, around 25% of the world's population lived in countries that produced over 2500 kcal per person per day, while 75% resided in countries that produced under that threshold (Porkka et al., 2013: 4). This study also shows, however, that the percentage of the world's population living in countries that produced under 2000 kcal per person per day dropped significantly since the 1960s. In other words, more people are now living in countries that produce between 2000 and 2500 kcal per person per day. Looking at the percentage of countries that are self-sufficient, rather than the percentage of the population, Davis et al. (2014) estimated that around 77% of the world's countries are in calorie deficit. Puma et al. (2015) tracked trends in countries' self-sufficiency ratios and concluded that 83% of countries have low or marginal food self-sufficiency (SSR under or just equal to 100 for the 2005–2009 period), which is similar to the rate reported by O'Hagan 40 years earlier.

Other studies have focused on examining trends in the food self-sufficiency of specific regions, or individual countries, over time. Luan et al. (2013), for example, found that Africa's food SSR had declined from 100% in 1961 to 80% in 2007. Japan also saw its self-sufficiency in overall caloric terms fall from approximately 80% in 1960 to around 40% more recently (Kako, 2009), even while the country achieved 92% self-sufficiency in its key staple rice in the 2007–11 period.<sup>5</sup> At the same time, food self-sufficiency rose in other countries. For example, the SSR has increased since the 1980s in Russia, China, and Brazil (Puma et al., 2015; Porkka et al., 2013). Fig. 2 depicts the SSRs of different countries for cereals and starchy roots over the 2007–2011 period, the most recent period for which the FAO has consistent data for most countries for these staples. Countries shaded in darker colors are more food self-sufficient, while those in lighter colors are less food self-sufficient.

Several recent studies show that some countries will face challenges if they seek to increase their level of food self-sufficiency because they lack the necessary natural resource base. Fader et al. (2013), for example, conclude that 66 countries are currently unable to achieve food self-sufficiency because their endowments of available land, water, and fertile soil cannot support sufficient agricultural production. Countries in this situation are likely to continue to rely on imports to meet their food needs, and international food trade has indeed continued to rise in recent decades. According to D'Odorico et al. (2014), for example, the percentage

<sup>5</sup> Calculated from FAO Food Balance Sheets for the 2007–2011 period.



**Fig. 2.** Food self-sufficiency ratios for cereals and starchy roots, 2007–2011. *Source:* FAO Food Balance Sheets, 2007–2011 data for cereals and starchy roots by volume produced, imported and exported; Countries not outlined in the graphic did not have sufficient data to calculate SSR; Starchy roots converted to cereal equivalent at 1t starchy roots = 0.26t cereals (following Luan et al., 2013).

of world food production that is traded on international markets rose from 15% in the mid-1980s to 23% in 2009. According to Fader et al. (2013: 3), approximately 16% of the global population consumes food that is internationally traded to meet their consumption needs, with North African, Arabic and Andean countries being the most dependent on imported foods. Trade can thus provide an important source of food for those countries that are not able to achieve self-sufficiency. At the same time, however, food import dependence is not simply the result of natural resource constraints. Rising reliance on imported foods in Africa, for example, reflects a combination of a number of factors, including drops in domestic food production, dietary and demographic shifts, cheap subsidized food available on world markets, and a change in export earnings (Luan et al., 2013; Rakotoarisoa et al., 2011).

As a growing proportion of the world's food production is traded on global markets, certain exporting countries have come to dominate international markets for key staple crops such as maize, wheat and rice. The United States, for example, accounts for around 53% of the world's maize exports, and 23% of the world's wheat exports, while Thailand accounts for around 36% of the world's rice exports (IFPRI, 2011: 9). The concentration in supply of key crops from some countries, when combined with rising import dependence in other countries, results in a heavy reliance of some countries on others for nearly all of their supply of certain crops (MacDonald, 2013). Several recent studies have highlighted the way in which the high degree of concentration in sources of food imports can result in a more fragile global food system that is highly vulnerable to instability triggered by both natural and economic disturbances (Suweis et al., 2015; Puma et al., 2015; MacDonald et al., 2015). There are also environmental consequences for those countries that dominate export markets for certain crops (MacDonald et al., 2015; Hertel et al., 2014). Some crops, such as maize, for example, are often associated with a high use of

agrochemicals and irrigation (Nadal and Wise, 2004). Others, such as palm oil and soybeans, are often associated with deforestation (Vijay et al., 2016).

#### 4. An increasingly binary debate

The merits and downsides of food self-sufficiency as a national policy goal have long been subject to debate in international policy circles. Historically, governments have prioritized self-sufficiency as a key means of safeguarding national security. Food self-sufficiency can insulate countries from international supply disruptions that may arise in the context of war or political tensions, production shortfalls in other countries, or sudden and sharp rises in food prices (FAO, 1996). Food self-sufficiency is also viewed by many states as a politically important objective, not only as a strategy for building national pride, but also as a means by which to reduce vulnerability on the world political stage stemming from over-reliance on other countries for key supplies (O'Hagan, 1975: 359). Some countries also promote food self-sufficiency as part of their broader economic development strategy, and in particular to strengthen their domestic farm sector.

For the better part of the past century, mainstream economists have critiqued the goal of food self-sufficiency because they view the policies that support it as being inefficient and market distorting (Naylor and Falcon, 2010: 710). Certain policies that are often associated with food self-sufficiency because they might encourage greater reliance on domestically grown foods—such as export bans, tariffs, and subsidies—are seen by most traditional economists to be costly and dangerous ventures. These types of policies are widely seen by economists as threatening to the long-term goal of food security because they undermine the efficiency gains that are typically associated with international trade. Market distortions, they argue, can weaken incentives for food production in

areas most suited to it, leading to higher food prices in the long run. Similarly, some empirical studies point out that developing countries can benefit from orienting their agricultural sector toward cash crops, such as cotton, and use their export earnings to acquire food imports (Hassan et al., 2000). Others are concerned that too much focus on the goal of national food self-sufficiency diverts government attention from pressing food security concerns at the household level (Von Braun and Paulino, 1990).

Although food self-sufficiency policies have faced heavy criticism over the past 30 years, the idea was widely accepted in rich and poor countries alike as recently as the 1960s–70s (e.g. Barker and Hayami, 1976; O'Hagan, 1975; and Sarma, 1978). In the 1960s, for example, the Common Agricultural Policy of the European Economic Community made food self-sufficiency an explicit goal (Margulis, 2017: 12). During the 1970s when food prices rose quickly and sharply over the 1973–75 period, many developing countries sought to boost domestic food production. There was broad international support for food self-sufficiency as a policy goal at that time, as demonstrated by the adoption of Resolution II of the 1974 World Food Conference, which explicitly stated that: "... striving in accordance with each country's respective conditions for the maximum possible degree of self-sufficiency in basic foods is the fundamental approach to the solution of the food problem of developing countries" (Quoted in O'Hagan, 1975: 360, emphasis added).

The 1980s to early 2000s saw a sharp turn away from food self-sufficiency as a legitimate goal in international policy circles. During most of this period, agricultural commodity prices were historically low and falling, and neoliberal economic policies promoting trade liberalization became popular among governments. Negotiations to liberalize agricultural trade under the Agreement on Agriculture (AoA) of the General Agreement on Tariffs and Trade (GATT) took place from 1986 to 1994. During this period, a number of developing countries gradually became net food importers. This growing reliance on imported food was especially evident in Africa where governments undertook programs of structural adjustment that encouraged them to focus their production on goods for which they have a comparative advantage, often export crops such as a coffee, cocoa and cotton (Clapp, 1997; Rakotoarisoa et al., 2011). Other countries—notably China, India, and South Korea—did not abandon their food self-sufficiency goals at this time, but were subject to heavy criticism for their policies (e.g. Yang, 1989; Sen et al., 2002; Martin and McDonald, 1986).

The launch of the Doha Round in 2001 sought to further liberalize agricultural trade. The original AoA that came into place with the World Trade Organization on January 1, 1995, was widely seen to be unbalanced and in need of correction. In particular, the original agreement allowed high levels of agricultural subsidies among rich countries, while requiring the opening up of agricultural markets in developing countries through the removal of tariffs and other trade restrictions (Bukovansky, 2010). The talks quickly became mired in debate over how best to reduce the imbalances in the AoA, with developing countries calling for reduced subsidies in the rich countries, as well as increased policy space to allow developing countries to protect rural livelihoods and domestic food security. Developing country coalitions in the trade talks, including the G20 agriculture and the G33, have proposed rules that would allow developing countries to implement a Special Safeguard Mechanism and to designate Special Products as a means by which to shield themselves from surges in imports of cheap, subsidized staple crops, that they saw as undermining incentives for domestic food production. Rich countries have consistently resisted these proposals from the developing countries, resulting in a negotiation stalemate over the better part of the 15 years since the Doha Round was launched (Clapp, 2015b).

The 2007–08 food crisis was overlaid on this broader context, and ushered in a heightened level of uncertainty on world food

markets (Daviron et al., 2011). Many countries expressed renewed interest in food self-sufficiency in the wake of the crisis, as a means to insulate themselves from higher and more volatile world food prices. These sentiments were only compounded by their frustration that the Doha Round failed to secure adequate policy space that would enable them to promote food security and defend rural livelihoods in the face of what they perceived to be heightened risks associated with more liberalized food trade. Among the countries making food self-sufficiency a priority at that time were the Philippines, Malaysia, France, Iran, India, Indonesia, Qatar, Egypt, Russia, Bangladesh, Senegal, China, and Kazakhstan.<sup>6</sup>

Governments' renewed interest in food self-sufficiency during and after the 2007–08 food crisis was accompanied by the growing popularity of the food sovereignty social movement. The food sovereignty movement, promoted by La Via Campesina and other producer organizations, first emerged in the 1990s and provided a strong critique of the global food system. Food sovereignty promotes the right of countries and communities to shape their own food policies, and explicitly calls for a greater reliance on domestically produced foods (Wittman et al., 2010). The food sovereignty movement has taken a critical stance on trade, and has advocated to get the "WTO out of agriculture" (Rosset, 2006). Although the food sovereignty movement does not dismiss all trade, calling instead for any trade that does take place to be fair, some within the movement have been explicit about their preference for improving rates of food self-sufficiency (Burnett and Murphy, 2014). Over the past decade, a number of developing countries have embraced the idea of food sovereignty in national policy documents, including Bolivia, Ecuador, Mali, Nepal, Nicaragua, Senegal, and Venezuela (Shattuck et al., 2015).

The reestablishment of food self-sufficiency as a policy goal, in particular among developing countries, has roused fresh critique of the concept. At the height of the 2007–08 food crisis, the *Financial Times* (2008) editorialized that food self-sufficiency is "...entirely the wrong lesson to draw from the global food crisis". At the time of the 2009 World Food Summit, a top Cargill executive stressed that the idea that countries "can be self-sufficient in every single food is a nonsense" (Quoted in Blas, 2009). Similarly, the *Economist Magazine* in 2013 called the idea of food self-sufficiency for China "nonsensical". Critics' arguments have tended to highlight the risks to food security associated with the extreme, isolationist version of self-sufficiency that envisions completely closed borders. Four key risks have typically been highlighted in these critiques.

The first risk is that *production variability can lead to disruptive fluctuations in domestic food supplies*. Drought or natural disaster can lead to severe shortfalls in production, leading to periodic episodes of hunger for countries that do not engage in food trade. Openness to trade, on the other hand, creates opportunities to import food in times of shortage, and export in times of abundance. As the *Financial Times* (2008) warns: "Food autarky is not food security. For Africa, beset by highly variable harvests and unproductive, largely rain-fed agriculture, attempting self-sufficiency today is a recipe for regular famine." In addition to weather variability, other forces can disrupt domestic production, such as crop diseases, conflict, and health epidemics.

A second key risk frequently highlighted is that *market intervention designed to insulate domestic markets, more often than not, results in inefficiencies and distorts markets in ways that can result in lower production and higher food prices*, thereby harming long-term food security. The *World Bank* (2012: 124) in a recent report, for example, stressed that trade-distorting food policies "reduce

<sup>6</sup> As reported in the media; this list is drawn from various news items in the *Financial Times* over the 2005–2015 period.

the efficiency of agricultural production and make it less resilient to exogenous shocks.” It also explicitly critiqued policies that impose agricultural import bans in good years, and export restrictions in lean years: “While these policies are often implemented ostensibly to promote food security in the form of self-sufficiency, they rarely work and can exacerbate food insecurity rather than reduce it” (World Bank, 2012: 121). Trade interventions designed to reduce price volatility in domestic markets are also seen to exacerbate international food price volatility by distorting market signals (Naylor and Falcon, 2010: 710). Many economists stressed the negative impact of export bans on rice prices in the 2007–08 food crisis (e.g. Blas, 2008).

A third risk to food security from a food self-sufficiency policy is that it *can harm incentives for farmers producing for export, which denies them income that would enhance their food security*. For the agricultural sector, the World Bank has long called for an agricultural trading system based on comparative advantage that would enable developing countries to gain access to overseas markets for their agricultural exports (World Bank, 1982: 56). This sentiment is echoed in recent critiques, which stress that the imposition of trade barriers in the name of self-sufficiency act as a disincentive for developing countries to invest in agricultural production and export capability, which seriously curtails the income of poor farmers. As the *Financial Times* (2008) noted in its critique of food self-sufficiency, “Improving farm productivity, and the ability of growers to get their produce to market, is an imperative. Snatching away export markets that could reward such improvements is utterly perverse.”

*Environmental constraints to food self-sufficiency* are a fourth risk that is often cited by economists. As noted above, some studies have stressed that not all countries have the natural resource base that would allow them to supply all of their own food needs domestically (Fader et al., 2013). The environmental constraints faced by food importing countries were stressed by former Director General of the WTO, Pascal Lamy, who, for example, considers food trade to be an “environmental obligation” (2012). In a speech he delivered at the height of the food crisis he stressed the ecological argument for trade. “. . . if a country such as Egypt were to aim for self-sufficiency in agriculture, it would soon need more than one River Nile. International trade in food is water-saving” (2008).

Overall, a policy of food self-sufficiency, according to critics, risks perverse outcomes for food security. As Naylor and Falcon (2010) sum up in their critique, “most attempts to become more fully self-sufficient have been expensive, created market uncertainties, exacerbated domestic price instability, and curtailed benefits deriving from the principle of comparative advantage.” In the popular press, the critique has been put in very strongly worded terms with rhetorical flair:

“Rejecting international trade as a solution to hunger, championing instead a vision of impossible local food self-sufficiency, is just plain wrong”.

[(Blas, 2008: 22)]

“The notion that free trade precludes food security is plainly wrong-headed”.

[(Economist Magazine, 2008)]

“This [food self-sufficiency] is not just a bad idea. It is a potentially lethal one. It should be discarded”.

[(Financial Times, 2009)]

These broad swipes against food self-sufficiency are presented in a binary way, comparing complete autarky to an ideal trading system with no distortions. Often these kinds of strong rhetorical statements mask what is a much more complex situation upon a closer look.

## 5. The need for a more nuanced approach

The binary understanding of food self-sufficiency as presented by its critics has perpetuated the debate in ways that are counter-productive. Strong rhetorical statements that declare food self-sufficiency as “utterly perverse”, “impossible”, and “lethal”, are launched with the aim of shutting down dialogue. Indeed, the choice of words used in recent media articles on the topic mirror Hirschman’s (1991) analysis of political rhetoric. Hirschman argued that rhetorical arguments denouncing the opposing side’s ideas typically fall into three categories: perversity, futility, and jeopardy. In other words, they make a case that their opponent’s policies will: result in the opposite outcome to that intended; will never work; or will risk undermining past achievements. These types of arguments, Hirschman noted, have intrinsic appeal because they draw on powerful myths and formulas. In the case of attacks on food self-sufficiency, these types of arguments appeal to economic trade theory and the promise of efficiency gains that arise from comparative advantage. But as Hirschman also pointed out, these arguments are often faulty in their application to real world situations (Hirschman, 1991: 166). They also tend to shut down meaningful policy dialogue by being absolute in their assessment. To be sure, the risks raised by the critics are potentially genuine, and must be evaluated carefully by countries when setting their food policies. But, as outlined below, rejecting the idea of food self-sufficiency out of hand also carries risks.

A more nuanced understanding of food self-sufficiency could open up space for more fruitful dialogue in policy settings that addresses countries’ desire to promote greater domestic food production. One way to infuse nuance into the debate is to consider food self-sufficiency policies along a continuum, rather than as an extreme policy stance, as illustrated in Fig. 3. Thinking about food self-sufficiency in this way more accurately reflects real-world policy applications of the concept, which are rarely absolute autarky or absolute open borders (Clapp, 2015a). In practice, most countries pursuing food self-sufficiency goals aim to increase the ratio of domestic food production to overall food consumption, and most countries engage in some trade even while pursuing that goal. Situating food self-sufficiency policies along a continuum better reflects practice and allows consideration of a mix of policy choices, helping to move the discourse beyond a rigid, “either, or” debate.

A more open and nuanced policy dialogue on food self-sufficiency could create space for an objective assessment of the types of circumstances under which some governments may wish to pursue it as a policy goal. For most countries, the choice and mix of policy tools for their food and agriculture sector depends on their own unique circumstances. The World Bank stresses that “Food self-sufficiency should be weighed against the benefits of cheaper imports” (2012: 117). But as the *Food and Agriculture Organization* (1996; 1999) stresses, it is also important that countries weigh the risks of reliance on international markets for a significant proportion of their caloric needs. When it comes to food self-sufficiency, most countries do weigh these various concerns, yet they often come up against critique or trade rules that constrain their policy choices. A number of scenarios stand out as instances in which countries might benefit from promoting policies that support greater food self-sufficiency because the risks associated with uncertainty in global food markets could cause excessive damage to domestic food security.

*Poor countries with high levels of food insecurity* see benefits in reducing their reliance on global markets as it enables them to minimize the costs and risks associated with volatile world food prices (Chang, 2009: 6). Food is a basic human need, and the amount of food needed for an adequate diet is constant. When food

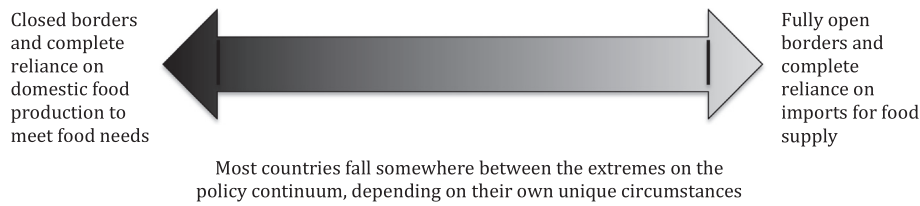


Fig. 3. Food self-sufficiency policy continuum. Source: adapted from Clapp, 2015a.

prices on world markets rise quickly and sharply, people's ability to access it can be seriously curtailed, especially in countries that are dependent on food imports and that have weak transportation infrastructure. Over 23% of the population in sub-Saharan African countries, for example, is chronically undernourished, and in some countries, such as Zambia and the Central African Republic, that figure is closer to 48% (FAO, 2015c: 45). In many developing countries, poor people spend a majority of their income on food, making their health and nutrition especially sensitive to food price trends (FAO, 2011). Even short-term periods of inadequate nutrition can have long-term negative effects for people's health, education, and long-term productivity, as well as for the economy as a whole (Chang, 2009: 6–7). As Chang (2009: 6) notes, "...[agricultural] specialization makes sense in the long run only when countries achieve a certain level of economic development... a fall in food consumption below a minimum level even for a year or two may have serious irreversible consequences." When a large proportion of a country's population is at risk of hunger in instances of sudden food shortages due to the vagaries of world markets, it is prudent to carefully consider ways to improve domestic food production.

Countries with volatile export earnings may also see benefits in reducing reliance on global food markets. Countries that are experiencing declining terms of trade for their exports, or which are reliant on just one or two commodity exports for the bulk of their foreign exchange, are more vulnerable to sudden drops in income than countries with more diversified export sectors. Developing countries tend to be more reliant on commodity exports, the prices of which are more volatile than for industrial exports. According to UNCTAD (2014), 39 of the Least Developed Countries (LDCs) (85% of this country grouping) are dependent on commodity exports, meaning that more than 60% of their export revenues are from commodity exports. Developing countries' terms of trade have also deteriorated since the 1980s (UNDP, 2011: 64). Many African countries, for example, rely on a narrow range of commodity exports for the bulk of their foreign exchange (for example, one or two export crops, a single mineral, or timber) that reflect their past colonial trade relationships. These countries often compete with a large field of exporters of those same products (UNDP, 2011). In Venezuela, reliance on oil export revenue resulted in severe food shortages when oil prices dropped dramatically in recent years, resulting in lower food imports in 2015–16 (Shipaini, 2016). In cases such as these, a country may want to diversify its economy by focusing on improving domestic food supply and providing more stable livelihoods in rural communities.

Countries that have the potential to be food self-sufficient in terms of their natural resource base, but which are currently net food importers, can benefit from increasing domestic food production. As noted above, over 60 countries at present do not have the resource capacity to produce the food they consume, but by the same token the majority of the world's countries do have the resource capacity to produce the food that they consume (Fader et al., 2013). Of those countries that have the resource capacity to be food self-sufficient, a number of them are net food importers. Many sub-Saharan African countries, for example, were net agricultural exporters in the 1960s–70s, but became net importers of food after the 1980s

(Rakotoarisoa et al., 2011). Some of those countries that have become reliant on imported food since the 1980s still have the capacity to produce sufficient foodstuffs domestically, including Guinea, Mali, Sudan, and the Democratic Republic of the Congo (see Fader et al., 2013: 4). Other net-food importing countries, such as Colombia and Venezuela in South America, also have the capacity to be self-sufficient in food (Fader et al., 2013), yet rely on global markets for a significant proportion of their food consumption (UNCTAD, 2014). Countries in these situations could reduce the risks associated with volatile export earnings and volatile food prices by increasing domestic food production.

Countries whose main dietary staples are controlled by a small handful of suppliers may also see benefits in pursuing greater food self-sufficiency. Rice, for example, is a thinly traded crop, meaning that there are relatively few suppliers and only a small percentage of global production is traded. Disruptions in supply can result in price spikes for thinly traded crops, as was the case with rice in the 2007–08 food crisis. Although critics of food self-sufficiency argue that there should be deeper trading in all crops to avoid such problems, for some staple crops, including rice, there are few countries that can supply it to global markets in large quantities. The share of the top five exporting countries in export markets for key staple crops illustrates the concentration among suppliers: five countries supply 85% of the world's milled rice exports; five countries supply 84% of the world's maize exports; and five countries supply 63% of the world's wheat exports (IFPRI, 2011: 19).<sup>7</sup> In these cases, excessive reliance on imports can introduce the risk of higher food prices should there be disruptions in any of the main supplier countries of these key crops. According to Puma et al. (2015), there were close connections between certain exporting countries and LDC importers in 2009. For example, Haiti and Senegal relied on France for over 96% of their wheat imports that year, and seven African countries relied on Thailand for over 96% of their rice imports.<sup>8</sup> Greater domestic production can reduce price and supply risks for countries that rely on a single source for nearly all of their key staple crops.

Countries with a large population can also benefit from reducing their reliance on world markets for food supplies. If the amount of food commodities purchased on world markets by large countries fluctuates year-to-year, their purchases can influence global food prices in ways that might lead to higher food prices, and reduced access, not only in the country that is purchasing food on world markets, but also in other countries that import the same staple commodities. A self-sufficiency ratio close to 100% for such countries could contribute to more stable domestic as well as international food prices. Davis et al. (2014: 561) note that in fact food self-sufficiency is higher in countries with larger populations. India and China, for example, have been largely food self-sufficient in

<sup>7</sup> Milled rice: Thailand 36.4%; Vietnam 19.9%; Pakistan 10.9%; India 10.4%; United States 7.2%. Maize: US – 53%; Argentina 15.1%; Brazil 6.3%; France 6.0% and India 3.5%. Wheat: United States 22.9%; France 12.4%; Canada 12.0%; Russian Federation 8.9%; and Argentina 6.7%.

<sup>8</sup> Puma et al., 2015, p. 9–10. Benin, Mozambique, Mauritania, Angola, Laos, Guinea and Guinea-Bissau all rely on Thailand for over 96% of their rice imports.

food grains in recent decades. China recently relaxed some aspects of its food self-sufficiency policy, allowing imports of soy for animal feed, which had the effect of increasing world prices for soy (Mitchell, 2008: 5). If it relaxes its self-sufficiency target for maize, China's entry into world markets is likely to have an impact on international maize prices (Sharma, 2014: 23). When a country's imports of key crops is significant enough to drive price changes on global markets in this way, it is reasonable for that country to carefully consider the costs and benefits of relying on domestic vs. imported foodstuffs.

*Countries at risk of trade disruptions as a result of war or political tensions* may also benefit from greater levels of food self-sufficiency. In such cases, domestically grown food can provide governments with more certainty regarding their food supply. The United States, for example, takes this issue seriously, as exemplified by the comments of George W. Bush in a speech to the National Future Farmers of America Organization in 2001:

It's important for our Nation to be able to grow foodstuffs to feed our people. Can you imagine a country that was unable to grow enough food to feed the people? It would be a nation that would be subject to international pressure. It would be a nation at risk. And so when we're talking about American agriculture, we're really talking about a national security issue.

[(Bush, 2001)]

Most countries consider the ability to ensure food supplies in times of crisis to be a national security issue, and depending on the risk that imports will be cut off due to conflict or political tensions, countries may want to invest in their domestic agricultural capacity.

In the scenarios outlined above, countries may adopt policies that encourage greater food self-sufficiency not only because it can contribute to domestic food security and social stability, but also because it makes economic sense (FAO, 1999; Clapp, 2015a). An important question is thus whether those who oppose the idea of food self-sufficiency object to the principle of enhancing domestic food production, or whether their complaint is about the policy tools by which countries pursue that goal. Even if some economists might agree that increasing domestic production in order to reduce reliance on international markets can be beneficial in some of the cases outlined above, they would likely reject trade restrictive policy measures as a means by which to achieve it. Indeed, most of the critiques of food self-sufficiency outlined in the previous section make reference to the perils of trade restrictions. Conflating the means (trade policies) and the ends (greater food self-sufficiency), however, obscures the complexity of the issue and discourages objective analysis of countries' unique situations.

At the same time, it is important to recognize that many countries face financial resource constraints that limit their choice of policy tools. Increasing domestic food production with the use of targeted agricultural investment may be an option available to wealthy countries. But many poor countries do not have the option of implementing such programs, leading them in some instances to consider the use of trade measures as a means promote food self-sufficiency. In particular, in cases where more open trade policies heighten the risks outlined above, some countries may view trade restrictive policies as warranted considering the benefits and costs of the options available to them. In these types of scenarios, it is important to carefully evaluate the specific constraints facing individual countries, as well as the potential impacts of different policies on third parties, to determine a mix of policies that is appropriate to the circumstances.

It may also make sense for countries to pursue different policies regarding food self-sufficiency and agricultural specialization at different points along their development trajectories, again taking into account the resources available to them (Chang, 2009: 7). For

example, a country may seek to pursue short-to-medium term measures—such as temporarily imposing tariffs on imports of some food items, or offering guaranteed purchase prices for food crops—as a way to encourage a structural change in its agricultural sector that supports greater domestic production capacity. Once that structural shift has occurred, that country may wish to gradually adopt more open trade policies, such that its improved food self-sufficiency is more compatible with liberalized food trade. Many of the countries that today have high self-sufficiency ratios were historically able to benefit from these types of policies. Without flexibility to shape policies that are stylized to their unique conditions, countries that today find themselves in the scenarios outlined above may face an increased risk from an excessive reliance on international trade to meet their food needs. For this reason, Chang (2009: 7) stresses, “The issue of national food self-sufficiency should not be dismissed so easily.”

## 6. Conclusion

Opponents of food self-sufficiency often critique it on the grounds that it represents an extreme policy stance that rejects all food trade. As this paper shows, a closer look at the definitions of the concept, and the measurements utilized to capture it for policy purposes, reveals that food self-sufficiency is more about a country's domestic capacity for food production than it is about a rejection of food trade. Indeed, most countries engage in at least some food trade, even if they are actively promoting food self-sufficiency. The polarized nature of the debate is often fueled by rhetoric from its opponents that equates food self-sufficiency with autarky. The binary nature of the debate tends to obscure and downplay the real concerns that countries may have about the risks associated with excessive reliance on trade for their food supplies.

A more nuanced approach based on the real-world application of food self-sufficiency policies does not view the concept as an either/or proposition, but rather sees it in relative terms. Such an approach could potentially create room for a more productive policy dialogue on this issue at the international level. A detailed and objective assessment of individual countries' unique circumstances, for example, could help in efforts to carve out policy space within international trade rules at the WTO. Given the range of circumstances facing different countries, it is important for trade rules to incorporate sufficient flexibility to enable countries to utilize the policy tools that are available to them in ways that maximize the benefits of greater food self-sufficiency while minimizing the risks associated with both the restriction of trade and an excessive reliance on trade.

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