FOODSECURE
FOR POLICIES THAT MATTER

Perspectives on relevant concepts related to food and nutrition security

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Working paper 2012-01

INTERDISCIPLINARY RESEARCH PROJECT
TO EXPLORE THE FUTURE OF GLOBAL
FOOD AND NUTRITION SECURITY

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Acknowledgement

The research leading to these results has received funding from the European Union's Seventh Framework Programme FP7/2007-2011 under Grant Agreement n° 290693 FOODSECURE.

Review

This paper has been reviewed by Lindsay Shutes (LEI Wageningen UR).

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1. Introduction

The food price spikes of 2007/08 have revived global awareness of the persistent problem of hunger and food insecurity in regions all over the world, and turned the spotlight back onto the critical importance of food and nutritional security for economic development and political stability. The observed domestic food price fluctuations in many countries (and in particular net-importing countries) during the food price crisis have also shown the influential role national and international policies play in mitigating and/or exacerbating local and global food security and hunger.

A first strong international commitment towards improving global food security was reflected by the first out of a list of eight Millennium Development Goals (UN Millenium Project 2005). In particular, the 'Hunger' target of the Millennium Development Goals strives to halving the proportion of people who suffer from hunger between 1990 and 2015. As a result of the recently observed price spikes, progress towards the 'Hunger' target of the Millennium Development Goals has slowed down (IBDR/World Bank 2012). The rising food prices in combination with the increasing demand of food crops for fuel production reversed the declining rate of undernutrition despite the increasing agricultural production; and only a few countries will succeed in achieving the 'Hunger' target by 2015 (IBDR/World Bank 2012).

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As a result, the fight against hunger is once again a hot topic on the political and research agenda. In light of the food price spikes of 2007/08, the G8 countries (UK, France, Germany, Italy, Japan, the US, Canada, and Russia) expressed their concerns about the global food security at their 2009 Summit in L'Aquila, which was called together with the main purpose of taking decisive action to achieve global food security.

At the 2012 G8 Summit in Camp David, this commitment was strengthened even more as the G8 countries agreed to intensify their efforts and to set up the New Alliance for Food Security and Nutrition in partnership with the African Union and the New Partnership for Africa's Development (NEPAD). This commitment will entail financial support of at least 1.2 billion USD (Department Of State. The Office of Electronic Information 2012).

In addition, the EU set up a 1 billion € Food Facility Program which operated from 2009-2011 and funded developing countries to take measures to address the high food prices. Other initiatives by the EU included "The World in 2025", a research effort directed at assessing the major future trends, especially at the level of international trade, scarcity of resources, economic development, and poverty. The FOODSECURE project, within the framework of which this report is written, is yet another showcase of the renewed interest of EU policymakers in global food security issues.

Also at the level of individual EU member states, substantial resources have been committed to the global fight against hunger. For example, DFID launched a 5-year program with a view to assessing the impact of climate change and economic development on future livelihoods in developing countries, including their food security. In 2011, Sustainable Crop Production Research for International Development (SCPRID), a research program worth £20 million, was set up by the UK Biotechnology and Biological Sciences Research Council (BBSRC), the Bill & Melinda Gates foundation and the governments of the UK and India, in order to support research on improving food security.

Each of these examples show the great interest major donors, policymakers and research organizations have shown in food security issues lately – and the important volume of funds which has been committed to the fight against food insecurity and hunger attest to the urgency attached to the matter.

Irrespective of the major attention which has gone as yet to support global food security, it is however not entirely clear yet what 'food security' actually encompasses and how it can be measured or quantified. While it is widely agreed that there are a wide range of different factors which contribute to exacerbating food insecurity problems, the exact definition of 'food security' has always remained somewhat vague and subject to interpretation. Such vagueness may complicate policy design and monitoring of policy impacts. To monitor progress at the level of global food security, a clear definition of the concept is required. In addition, one needs a set of clearly defined and measurable indicators of food security, which are generally accepted and can be monitored at a global scale.

In this report we will provide a brief account of the different concepts which have been used to describe food security – and to what extent the term 'food security' might have different meanings across different disciplines (ranging from biology and medicine over law to social sciences such as economics and sociology), different ideologies (ranging from governments with firm confidence in global food markets to advocacy groups lobbying for a focus on local food procurement), or different timeframes.

With this end in view, this report starts by investigating the different definitions which have been proposed for the concept of 'food security' and exploring their legacy. In addition, the concepts of food and nutrition security will be related to other standard concepts. Section 3 presents a set of operational indicators to measure 'food security'. Next, Section 4 discusses the integration of 'food security' in international law and the implementation in domestic policies (such as food self-reliance, food self-sufficiency, and food sovereignty), as well as in international policies (with a focus on the World Trade Organization). Finally, Section 5 concludes.

2. The evolution of the concept of 'food security'

Throughout the years, the definition of food security has experienced a substantial evolution, moving from a supply-focused concept, mostly related to food availability, to a multidimensional notion that takes also into account food accessibility, food utilization and food stability.

The first definition of food security dates back to the World Food Conference of 1974, as the 1973 world oil crisis and the subsequent increase in world food prices raised awareness in the

international community towards their responsibility to fight hunger and malnutrition (Maxwell 1996). The proposed definition reflected a focus on the supply side and more specifically on the assurance of food availability and price stability of basic crops at both national and global level:

> *'Availability at all times of adequate world food supplies of basic foodstuffs […] to sustain a steady expansion of food consumption. […] and to offset fluctuations in production and prices' (United Nations 1975).*

In 1981, a study by Sen (1981) addressed the importance of individuals' and households' entitlement to food , thus introducing a new dimension to the national and global level of the former food security concept. The author stressed that some people could still be food insecure although there is enough food available in the aggregate. Sen (1981) further showed that food security is a combination of ownership, exchange possibilities and food availability, rather than of food availability as such. On the basis of these observations, in 1983 the FAO elaborated a new definition of food security, built on three pillars: availability, stability and access.

> *'The ultimate objective of world food security should be to ensure that all people at all times have both physical and economic access to the basic food they need' (FAO 1983).*

The World Bank likewise stressed the importance of individual access to sufficient food in its 1986 policy report. The main contribution of this report was the clear distinction between the short-term and long-term aspect of food security (Clay 2002). The former is defined as "transitory food insecurity" and describes the temporal inability to access sufficient food. The latter is defined as "chronic food insecurity" and is instead associated with a continuously deficient diet (World Bank 1986):

> *'Food security is defined as access by all people at all times to enough food for an active, healthy life' (World Bank 1986).*

In the 1990s the nutritional aspect of food security gained increasing importance. It was realized that an adequate intake of food does not automatically imply that micronutrient needs – in particular the daily requirements of iron, iodine and vitamin A – are met (DeRose et al. 1998). The recognition that the quality of the diet is as important as the quantity marked the shift in focus from energy deficiency to micronutrients deficiency. Moreover, it was acknowledged that

proper access to food has to be combined with nonfood resources such as adequate sanitation, proper health care and access to clean water in order to ensure a healthy and active life (Quisumbing et al. 1995).

These considerations converged in what is considered today the most complete and widely accepted definition of food security, which was elaborated at the World Food Summit in 1996 (Mechlem 2004). The new definition takes into account both the individual and the global level of food security and recognizes the importance of the nutritional value of the diet. It moreover reaffirms that food security is a multidimensional issue that goes beyond the simple availability of food and requires access to sufficient, safe and nutritious food. Finally, the new definition captures the social and cultural acceptance of food, by switching the emphasis from 'enough food' to 'preferred food' (Pinstrup-Andersen 2009).

> *'Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life' (FAO 1998).*

Thus, this definition consists of four key dimensions – availability, access, utilization and stability - which need to be satisfied simultaneously in order to achieve food security. *Food availability* is achieved when sufficient quantities of food are provided through production, stock levels, net trade and food aid (FAO 2006b). *Food access* is achieved when individuals have the adequate resources to obtain appropriate food for a safe and nutritious diet (FAO 2006b). Inequality both at the national level, and at the level of intrahousehold distribution, might prevent individuals from accessing adequate food even though food availability is achieved at the national or household level. For example, female bargaining power within the household not only determines her own nutritional status, but also significantly affects the nutritional status of children in the household (Smith et al. 2003). *Food utilization* reflects the ability to use food efficiently such that all physiological needs are met and is achieved through a nutritious and safe diet, the availability of clean water, adequate sanitation and proper health care. For instance, an individual might have access to obtain appropriate food, but due to bad health, he or she will not be able to absorb the micronutrients (FAO 2006b). Finally, *food stability* links back to all three above mentioned determinants and it refers to their temporal dimension. In this respect, a key

distinction is between shocks (transitory) and cyclical events (chronic), both affecting food security (FAO 2006b).

In the 2000s, the 1996 definition of food security was further extended with the concept of 'social access' – which reflects the potential importance of exclusion based on social norms, rather than on economic grounds (e.g. if women do not have sufficient bargaining power in the household to ensure satisfaction of their needs, or if some groups are excluded from the use of certain resources based on caste or ethnicity). At the 2009 World Summit on Food Security in Rome the 1996 definition of food security was reaffirmed. The four dimensions of food security were once more recognized and the embodiment of nutritional security in the concept of food security was further emphasized.

'Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, access, utilization and stability. The nutritional dimension is integral to the concept of food security' (FAO 2009).

Beyond the FAO definition, we will emphasize the importance of two concepts: dietary diversity and vulnerability. The rationale for highlighting *dietary diversity* results from the recognition of the importance of micronutrient needs. When people attain higher incomes, their preferences for food tend to change in favour of higher-value products such as fish, meat, dairy products, fruits and vegetables. As a result, with growing incomes, individuals not only tend to increase their consumption but also to adopt more diverse diets (Ruel 2002). A higher diet diversity is associated with increasing availability of energy and essential micronutrients in human diets (Gillespie 1997). A higher diet diversity could therefor also be considered as a reflection of a more expanded consumption set – and hence a higher level of food security.

Secondly, we would like to highlight the concept of *vulnerability*. Vulnerability can be defined as the probability of becoming food insecure. It depends both on 'exposure to negative shocks' and on 'defencelessness against negative shocks' (Kamanou and Morduch 2002). Food security, therefore, is an ex-ante status rather than an ex-post outcome (Barrett 2002). Another, but very much related dimension of vulnerability, is resilience, which can be defined as the ability of a system (or a household) to recover from a negative shock (e.g. a temporary food shock).

Unfortunately, each of these three dimensions are fairly hard to measure and/or operationalize in wider household-level or national assessments of food security. This is a problem which has been recognized earlier by research scholars – not only in the domain of food insecurity (e.g. Scaramozzino 2006), but also in the more general field of poverty analysis (see e.g. Kamanou and Morduch (2002) for an insightful review of the literature).

Vulnerability does not only affect a household's welfare outcome once a negative shock sets in. On the contrary, vulnerability may have a strong effect on household welfare ex ante, as households might try to reduce vulnerability through different strategies which might directly affect their welfare.

Possible household strategies include risk prevention, risk mitigation and risk coping. *Risk prevention* implies that a household takes action *ex ante* in order to reduce the probability of unexpected events. Some examples include orientation towards less risky farming practices, migration, proper feeding and the prevention of diseases (Holzmann and Jorgensen 2000). *Risk mitigation* includes livelihood strategies that are undertaken before the shock has been realized with as main purpose the reduction of the negative welfare impact of potential negative shocks. Three different categories of risk mitigation strategies can be applied by the household: portfolio diversification, insurance, and hedging (Holzmann and Jorgensen 2000). *Risk coping* is an ex-post strategy that is carried out by households to ease the impact of the realized welfare losses (Heitzmann, et al. 2002). Examples include the sales of assets, temporary employment, migration, and keeping children from school (Holzmann and Jorgensen 2000).

There are also a set of other concepts which have often been related or even equated with 'food security', in particular concepts such as 'malnutrition', 'hunger' and 'poverty'. We provide a brief discussion of each of these concepts below:

2.1. Malnutrition

Malnutrition is a condition that occurs when an individual does not consume enough micro- and/or macronutrients, and it is the result of a poor diet, problems with digestion or absorption or health problems (Medline Plus Medical Encyclopedia 2011). Three types of malnutrition can be defined: protein-energy malnutrition (i.e. deficiency of proteins), micronutrient malnutrition (i.e. lack of vitamins and minerals) and obesity (i.e. excess of calories). Both malnutrition and food

(in)security are therefore related not only to the intake of sufficient food, but also to the quality of food. Moreover, both concepts emphasize the importance of health status resulting from good sanitation, clean water, proper health care (FAO 2008).

2.2. Hunger

Hunger is defined in the dictionary as *'a feeling of discomfort or weakness caused by a lack of food, coupled with the desire to eat*' (Oxford Dictionary 2012), but it is commonly referred to as food deprivation (FAO 2008). Each individual that suffers (involuntarily) from hunger is considered food insecure, but the reverse is not necessarily true: an individual may have enough to eat, but can still be food insecure due to a poor nutritional diet, also known as hidden hunger (FAO 2008).

2.3. Poverty

The OECD (2002) states that '*Poverty encompasses different dimensions of deprivation that relate to human capabilities including consumption and food security, health, education, rights, voice, security, dignity and decent work'*. Poverty not only causes food insecurity, but it is also a consequence of food insecurity. The lack of sufficient, safe, nutritious food leads to lower cognitive and physical development (Grantham-McGregor et al. 2007). As a result of the lower developed skills and capabilities the probability to fall into poverty increases (FAO 2008).

3. Translating food security concepts into measurable indicators

Several food security indicators are used to assess the extent of hunger and malnutrition. Even if our list below may not be exhaustive, we list the major food security indicators used in the existing literature, each assessing different dimensions of food insecurity.

3.1. Country-level indicator of undernourishment

FAO's measure of food deprivation reflects the proportion of the population with a per capita dietary energy consumption below the standard minimum energy requirement – in other words: the proportion of the population considered as 'undernourished'. This proportion is estimated by comparing the hypothesized distribution of per capita energy consumption (in calories, mostly

based on country-level aggregate data on dietary energy supply (DES) per capita – but occasionally this can be based on household-level survey data as well); with the minimum per capita requirement cut-off point (Naiken 2003). The DES measure focuses on the food availability dimension of food security at the country level.

3.2. Household-level of energy intake

Smith et al. (2006) propose an indicator to measure the average daily energy intake of an individual in the household. The daily food energy availability per capita is calculated by converting household food expenditures into calories and averaging out the household-level figure over the number of adult equivalent household members.

3.3. Household diet diversity

Smith and Subandoro (2007) propose two indicators of food insecurity which measure the diet diversity, in particular:

(i) *diet diversity*, constructed by classifying food into 7 categories (resp. cereals, roots and tubers; pulses and legumes; dairy products; meats, fish, seafood and eggs; oils and fats; fruits; vegetables) and by summing up the number of different food categories that is consumed by the household during the reference period.

(ii) *the share of calories from staple foods* out of total calorie intake at the household-level and hence looks at diet diversity as an indicator of food security. The motivation behind this approach is that poor households will have a high marginal utility of calories, and hence choose a diet which achieves a much as possible calories within its budget constraint. As staple foods are usually the cheapest source of calories, poor households will have a higher share of calories provided by staple foods. As households expand their budgets, they will increasingly substitute towards foods which are relatively more expensive in providing calories, but have higher level of other preferred attributes, such as taste. Jensen and Miller (2008) apply this methodology to Chinese household survey data; but it has been used by other authors as well (see e.g. D'Souza and Jolliffe 2010).

3.4. Individual-level energy and nutrient intake

The food consumption and individual intake surveys (FIS) contain information of the nutritional intake at individual level. The information of the FIS on the food intake can be converted into energy intake and nutrient deficiency indicators (e.g. iron deficiency). The advantage of the recording data on individual intake of energy or nutrients is that one can control for intra-household access to food; as well as to divergent consumption patterns of special groups such as pregnant women (Ferro-Luzzi 2003).

3.5. Anthropometric indicators

While all of the previously listed indicators can be considered as 'input-oriented' food security indicators; anthropometric indicators focus on 'output', in other words on the consequences of malnutrition. Anthropometric indicators for children focus in particular on poor physical growth and low weight of children below the age of five.

First, *low weight-for-height*, also known as wasting, captures short-term substantial weight loss resulting from health problems or acute food shortage. Wasting is strongly associated with child mortality. The second indicator, *stunting*, reflects low height-for-age and is an indicator for chronic malnutrition. Stunted children fail to reach their potential cognitive and physical development. The third indicator, *underweight*, reflects low weight-for-age and results from the combination of short-term weight loss and long-term growth problems. All the indicators are calculated by comparing weight and height of a child with a reference population of well-nourished and healthy children (Shetty 2003).

The anthropometric indicators used to measure the consequences of malnutrition for adolescents are *stunting* and the *body mass index*. A low height-for-age can be the result of a chronic lack of food, infections and disease. In general, stunted adolescents have lower school achievement and work productivity. The body mass index is calculated by dividing individual weight by the square of individual height. Adolescents are classified as undernourished (overweight) if their body mass index is lower (higher) than the 5th (85th) percentile of the NCHS/WHO reference data (Shetty 2003).

In case of adults and elderly, the *body mass index* is used as an anthropometric indicator. If an adult or an elderly has a body mass index lower than cut-off point 18.5, he/she is considered to be undernourished. A body mass index higher than 25 indicates a risk of overweight for adults and elderly. For elderly, the body mass index is associated with the risk of mortality and morbidity (Shetty 2003).

3.6. Qualitative measures

In the US, qualitative measures of food insecurity are calculated based on data from the Current Population Surveys, which contain a food security module in which households subjectively report their food security status. In particular, the food security module consists of 18 questions (Kennedy 2003). Based on the responses to these questions, a Food Security Scale is compiled which measures the severity and the prevalence of food insecurity and ranges from 0 to 10. The index can be used to divide the population into 4 categories: the food secure (<2.32), the food insecure without hunger (<4.56), the food insecure with moderate hunger (<6.53) and the food insecure with severe hunger (Kennedy 2003).

3.7. Global Hunger Index

The Global Hunger Index is designed by the International Food Policy Research Institute (IFPRI) to capture the multidimensionality of food insecurity. The index is constructed by equally weighing 3 indicators: the proportion of the population who are food energy deficient (based on DES); the percentage of children under five that is underweight; and the under-five mortality rate of children (Wiesmann 2006).

3.8. Global Food Security Index

Recently, the Global Food Security Index was released. This novel index is compiled by the Economist Intelligence Unit, with the help of an expert panel from international organisations and academic institutions. The Global Food Security Index takes into account three core dimensions of Food Security: affordability, availability, and quality, across 105 countries. So far, the dataset only has one round of data; but it will be updated on a quarterly basis (The Economist Intelligence Unit 2012).

3.9. Overview

Dimension	Measure	Level
Food quantity	1. Indicator of undernourishment	Country level
	2. Average energy intake	Household level
	3. Qualitative measures	Household level
	4. Individual energy intake	Individual level
	5. Global Hunger Index	Country level
Food quality	1. Households diet diversity	Household level
	2. Share of staples in total calories	Household level
	3. Individual nutrient intake	Individual level
	4. Qualitative measures	Household level
Outcome	1. Anthropometric indicator	Individual level
	2. Global Hunger Index	Country level
Composite Index	1. Global Food Security Index	Country level

3.10. Problems

In the assessment of food and nutritional security some aspects of the 1996 FAO definition can be empirically operationalized, such as the physical and economic access to food. For other dimensions, however, operationalization is more challenging – for example food preferences. So far, these have not been accounted for in our review of measurable indicators.

Another potential challenge which should be addressed when assessing food and nutritional insecurity is that the reviewed indicators describe the state of affairs at a certain point in time – and can therefore be considered as 'static'. Further research is needed to find an appropriate and effective way to capture the dynamic aspect of food security.

4. Food security in international and domestic policy making

In the second part of this report, we will focus on how different food security concepts have been integrated in international law (in particular, into the Universal Declaration of Human Rights), as well as how they have been implemented in practice in domestic and international policies.

4.1. Integration in international law: Right to food

After World War II, a rights-based approach to food security emerged with the aim of pushing governments into taking active actions to eradicate hunger and malnutrition. The right to food was first recognized in the Universal Declaration of the Human Rights in 1948. In 1966 States Parties recommitted to the right to food in the International Covenant on Economic, Social and Cultural Rights (Hospes 2010).

Also the definition of the right to food witnessed an evolution over time, moving from a focus on food access to a more articulated and multidimensional concept.

> *'The right to adequate food is realized when every man, woman and child, alone or in community with others, have physical and economic access at all times to adequate food or means for its procurement.'* (United Nations Committee on Economic, Social and Cultural Rights 1999)

The implied obligations for States are generally considered to be threefold: the obligation to respect, to protect and to fulfill (Eide 1999). The obligation to respect implies that the State cannot take any measure that would violate the right to food. The obligation to protect requires that governments take measures that prevent third parties to deprive individuals from their right to food. The obligation to fulfil integrates an obligation to facilitate and to provide: the State must proactively facilitate the opportunities by which the right to food can be exploited (Eide 1999; United Nations Committee on Economic, Social and Cultural Rights 1999). In other words, the right to food focuses on the obligation of states and on the allowance of individuals that are negatively affected by a food right violation to use remedial measures to get their rights implemented. These legal measures could be proceedings before courts or institutions that provide restitution, compensation, satisfaction or guarantees of non-repetition of the right to food violation (FAO 2006a).

A practical tool - the Voluntary Guidelines - was developed in 2004 to guide states in the implementation of the right to food. The Voluntary Guidelines include a series of actions that States can carry out to build an environment for people to exploit their right to food. It provides also guidelines for States to set up safety nets for the people that face a right to food violation (FAO 2005b).

4.2. Integration in domestic policymaking

The Rome Declaration on World Food Security and the World Food Summit Plan of Action of 1996 defines 8 commitments as guidelines or principles to pursue food security. It lays the foundations for diverse paths such that nations can progress towards this common objective. Each nation must adopt a policy strategy consistent with its resources and capacities (FAO 1998). Three food policies can be adopted: food self-reliance, food self-sufficiency and food sovereignty.

4.2.1. Food self-reliance

A policy of food self-reliance implies that the country's production focuses on agricultural export products with a comparative advantage to generate sufficient resources to pay for the imported agricultural products (Magnan et al. 2011, Deb et al. 2009).

4.2.2. Food self-sufficiency

A country that is self-sufficient is able to produce all the food it needs (Deb et al. 2009). The main distinction between food self-reliance and food self-sufficiency is that food self-reliance allows for imports as a supply of agricultural products whereas food self-sufficiency is aimed at removing the need to do so, by increasing domestic food production. Aiming for food self-sufficiency as a policy is economically efficient if the country has a comparative advantage in growing its own food. However, as a result of a growing scepticism towards international markets and trade, a number of countries continue to stress the shift towards food self-sufficiency as a policy priority even though they do not have a comparative advantage in growing basic food crops (The Economist 2009a, The Economist 2009b, Abbott 2009).

Food self-sufficiency used to be a very common policy objective around the world in earlier decades. For example, the 7th Five-year plan of India (spanning the period from 1985-1990) stated explicitly that

> *'continued fast agricultural growth and self-sufficiency in food must remain a top priority concern of planning in India. In planning for food self-sufficiency, adequate and balanced attention must be paid to cereals, oilseeds, pulses, fruits and vegetables and*

protective foods like milk, eggs, meat and fish.' (Government of India, Planning Commission 1985)

Also EU's Common Agricultural Policy focused heavily on moving the EU towards self-sufficiency, eventually leading to large surpluses which had to be destroyed or exported at low prices.

In the meanwhile, India and EU's policy towards food production has evolved a lot. EU's farm subsidies are no longer coupled to production, which reduces the incentive for surplus production; and also India's more recent 11th Five-year plan is much more nuanced in that respect. While continuing to emphasize the fact that *'Food Security considerations remain an immediate priority'*, and while the Central Government continues to invest heavily in schemes aimed at raising foodgrains production; no explicit mention of achieving food self-sufficiency as a major policy objective is made anymore (Government of India, Planning Commission 2008).

China, in contrast, continues to focus explicitly and publicly on food self-sufficiency. Vice Premier Hui Liangyu stated in 2011 that China will give primacy to a policy of food self-sufficiency to meet the demand of the Chinese population. To pursue food self-sufficiency the Chinese government has taken various measures to support the increase of domestic food production (China Daily 2011, Wong 2011).

4.2.3. Other views: food sovereignty

The last decade has experienced an increased support for the concept of 'food sovereignty'. Much of this ideology was initiated by the *Vía Campesina* - a movement of farmers, peasants, farm and indigenous peoples' organizations from all the regions of the world - at the World Food Summit in 1996. The concept was developed as a response to the alleged '*globalization of poverty and destruction of local productive capacities and rural societies'* (Vía Campesina 1996):

> 'Food is a basic human right. This right can only be realized in a system where food sovereignty is guaranteed. Food sovereignty is the right of each nation to maintain and develop its own capacity to produce its basic foods respecting cultural and productive diversity. We have the right to produce our own food in our own territory. Food sovereignty is a precondition to genuine' (Vía Campesina 1996).

According to the Vía Campesina (1996) food sovereignty is based on 7 principles that form the critical foundations for achieving food security at individual, household, national, regional and global levels. The seven principles highlight key policies and reforms meant to enforce food security, including the enforcement of the right to food, an agrarian reform, protecting natural resources, reorganization of food trade, ending globalization of hunger, social peace and democratic control.

The 7 basic principles regarding food according to advocates of 'food sovereignty' are as follows. First, food is a basic human right: everyone must have access to safe, nutritious and culturally appropriate food. Each nation is expected to declare this as a constitutional right and to guarantee the access to food by the development of the primary sector. Second, indigenous people should have the ownership and the control over the land they work. In other words, the movement demands the right to access of food-producing resources. Third, sustainable management and use of the natural resources should grant the preservation of such resources. The right to manage these resources and the right to preserve the biodiversity is attributed to those who work on the land. This requires a shift away from cash-crop monocultures, chemical inputs, the industrialized production models and requires the ban of patenting and the commercialization of diverse genetic resources. Fourth, food trade should be reorganized: food is in the first place a source for nutrition and only in the second place a trade item. The priority of the national agricultural policies should focus on the production for domestic consumption and food self-sufficiency. The import of food should not displace local production nor depress the prices. Fifth, speculative capital should be carefully regulated, properly taxed and the Code of Conduct for multilateral institutions should be strictly enforced, in order to end the "globalization of hunger". Seventh and last, smallholder farmers must be able to give direct input into the formulation of agricultural policies at all levels and everyone must be allowed to participate in open and democratic decision-making process with honest and accurate information. The realization of this last key-principle calls - among other things - for the democratization of multilateral organizations such as the United Nations.

Since the introduction of the concept several policy statements, publications, declarations and interpretations on the concept of food sovereignty have been proposed. The international Planning Committee for Food Sovereignty (IPC) facilitated this collective process (FAO 2005a).

The IPC is a result of collaboration between non-governmental organizations (NGOs), civil society organizations (CSOs) and social movements that jointly organized the Forum for Food Sovereignty in parallel to the '2002 World Food Summit: five years later' (NGO/CSO Forum for Food Sovereignty 2002). According to the NGO/CSO Forum for Food Sovereignty (2002),

> *'Food Sovereignty is the right of peoples, communities, and countries to define their own agricultural, labor, fishing, food and land policies which are ecologically, socially, economically and culturally appropriate to their unique circumstances. It includes the true right to food and to produce food, which means that all people have the right to safe, nutritious and culturally appropriate food and to food-producing resources and the ability to sustain themselves and their societies'*

Food sovereignty thus goes beyond the concept of food security and of the 'right to food'. It demands the access to appropriate food as well as access to food-producing resources, while food security emphasizes only the access to adequate food and does not say anything about the origin of food nor the method of production (Rosset 2003). Furthermore, food sovereignty both includes the right to food and the right to produce. However, in contrast to 'the right to food', this approach has not been recognized as an enforceable right or an explicit policy objective by any international treaty (Thomas 2005).

4.3. International food market regulations: the WTO

Domestic policies regarding food policy cannot be designed in isolation from policies implemented by other countries. Once again, the food price spikes of 2007/08 have shown how food security in one country can be substantially impacted by food policies implemented in other countries. Hence, to ensure global food security, coordination between food policies at an international level is essential. The World Trade Organization (WTO) plays a major role in the global coordination of agricultural and food policies. Its main legacy is to ensure free trade by setting up trade rules between nations (WTO 2012a). The Agreement on Agriculture (AoA) specifies the trade rules for the liberalization of agricultural products in particular.

The AoA consists of three pillars: domestic support, market access and export subsidies. The first pillar aims at cutting back the subsidies that support domestic prizes or production. The

AoA classifies policies into three categories or boxes. The amber box contains all the policies that have a direct impact on production. These domestic support policies give rise to overproduction, which in turn leads to dumping, export subsidies and drives out imports. The blue box consists of indirect production policies that still distort trade. For example, government programs that support farmers by direct payments under the condition that farmers limit their production. The green box includes all the domestic support policies that have a minimal impact on trade. For instance, it includes government investment in infrastructure and domestic support programs that make direct payments to farmers that do not stimulate the production. WTO members agreed that from 1995 the developed countries reduce their domestic support by 20% over six years, developing countries by 13 % over ten years and least developed countries had no obligations. (WTO 2012b)

The second pillar, market access, stands for the reduction of various trade restrictions that have an effect on the imports. Developed countries agreed to cut their tariff and non-tariff barriers to trade by 36% on average over six years and developing countries by 24% on average over ten years. Least-developed countries were discarded from tariff reductions regulations, but they had to convert their quota's and other non-tariff barriers to tariffs, also known as tariffication (WTO 2012b).

The final pillar of the Agreement concerns export subsidies and other measures installed by governments to make the export market artificially competitive. Subsidizing exports is prohibited by the Agreement, except for those measures that are included in a member's list of commitments. The Agreement requires that for those measures, developed and developing countries were obliged to cut back the value of the export subsidies by 36% over six years and by 24 % over ten years. The quantities of the subsidized exports had to be reduced by 21% over six years for developed countries and by 14 % over ten years for developing countries (WTO 2012b).

4.4. Domestic food policies in relation to WTO objectives

From a global efficiency point of view, food self-reliance is the best strategy a country can pursue to achieve food security when markets are free and perfect: each country produces the

food in which it has a comparative advantage. Advocates of food sovereignty and food self-sufficiency, however, tend to question the hypothesis that markets are free and perfect, and therefore consider it overly risky to fully rely on global markets for the fulfilment of basic needs.

It is important to understand the impact of openness to trade against the backdrop of recently experienced price volatilities of basic food and oil crops. Events such as weather shocks, pests and natural disasters can result in high price volatility and food crises when markets lack the capacity to absorb these shocks (FAO et al. 2011). Low-income countries are especially concerned by the macro-economic impacts of agricultural price volatility, since for them, agricultural commodities usually make up a higher share of trade compared with developed countries (IBDR/World Bank 2012).

The consequences of changes in food prices are clearly different for net-importing and net-exporting countries. An increase in the global price of food products implies an improvement of the balance of payment of net-exporting countries and deterioration for the net-importing countries. A price shock can put additional pressure on the exchange rate and may cause a shortage of foreign reserves for net-importing countries. Furthermore, fiscal measures to mitigate the effects of the crisis can entail increased budgetary costs that will have to be met by increased government borrowing or budgetary discipline. For net-exporting countries, uncertainty about the price for agricultural products may cut back investment and decrease the utilization of the production capacity (FAO et al. 2011).

Also at the micro-level, the effects of fluctuations in food prices differ between net-consuming and net-producing households of food products. Poor households in developing countries are often net-consumers who spend a significant part of their income on basic food. A food crisis may evoke important behavioural changes at the level of household expenditures. First, households tend to reduce the quality and the diversity of the food consumed. If this is not enough to cope with the food crisis, households start cutting back also the quantity of the food eaten (Compton et al. 2010, IBDR/World Bank 2012). In particular women reduce their consumption to leave more food for the other household members, thereby acting as the shock absorbers of household's food insecurity (Quisumbing et al. 2008). Finally, spending on basic needs such as education or health may be reduced.

The changing food behaviour of households in response to food crises and the reduction in spending on social services can have severe and long-lasting effects. Children that experience poor health and nutrition (a lack of macro- and micro-nutrients) in their early childhood years fail to reach their potential cognitive and physical development (Grantham-McGregor et al. 2007). The conditions in the first 2 years of life are thus crucial for the development of the adult human capital in terms of skills and capabilities (Friedman and Sturdy 2011) and may lead to irreversible damage including lower height, lower school attendance, reduced income and decreased birth weight (Victora et al. 2008). Micronutrients deficiencies during pregnancy increase the possibility of maternal mortality (Black et al. 2008) and affect fetal growth and future outcomes of the child (Victora et al. 2010). Nutritional deficiencies are also associated with lower physical activity and productivity of adults. On the other hand, the net-producing households that are confronted with higher prices for their agricultural products experience an increase in their revenues. Higher agricultural prices increase the incentives for farmers to invest to increase their production capacity.

Policy makers try to mitigate the negative effects of food crises by including a series of short-term measures in their trade policy. Trade-oriented policy measures undertaken by governments respond to the risk of losses for significant groups by isolating the domestic market from the international price surge. Exporting countries try to protect their domestic markets by restricting or banning their exports, by imposing increasing export taxes or by reducing export subsidies. Importing countries, on the other hand, will try to reduce the increase in domestic prices by a temporarily reduction of tariffs, custom fees or other import restrictions or by the introduction or a raise of import subsidies (Martin and Anderson 2012). The isolation of domestic markets by the restriction or ban of exports or the temporarily reduction of tariffs and custom fees on imports may create a collective action problem. If many countries simultaneously protect their domestic markets by taking restrictive trade measures it may result in higher volatility for global food prices and it will not deliver food security (Martin and Anderson 2012, Rutten et al. 2011).

In summary, relying on global markets which are not perfect and can be affected by ad-hoc domestic policies from major exporters (such as export bans) may be seen as overly risky by some countries. Especially very large countries such as China may therefor decide to reduce

these risks, even if at the expense of lower economic efficiency, and to strive for food self-sufficiency instead.

The food sovereignty movement also tends to criticize the WTO agreements on food and agricultural policies, and in particular the AoA (Sharma 2011). In their view, the AoA has a direct impact on the ability of developing countries to achieve food security. In particular, they claim that the AoA allows WTO members to switch from trade-distorting subsidies in the amber box towards direct payments and indirect support in the green and blue boxes that are discharged from large reductions – which, again in their view, continues to allow for overproduction and dumping of agricultural products (Glipo 2003). Second, the food sovereignty movement is concerned that the market access pillar of the AoA has increased developed countries' access to markets of developing countries – eventually leading to reduced agricultural prices and the exclusion of local producers from their access to the local markets (NGO/CSO Forum for Food Sovereignty 2002).

With this in mind, the People's Food Sovereignty Network (SD) proposes an alternative trade policy, in which international trade has to ensure adequate prices for all farmers and fishers and countries may exercise the right to protect its domestic markets from dumping practices and artificially low prices. The food sovereignty movement also advocates the removal of direct and indirect agricultural export support policies and the abolition of subsidies that stimulate unsustainable agriculture.

It is clear that the focus of food sovereignty lies on the production for domestic consumption and food self-sufficiency (Vía Campesina 1996). Under the food sovereignty framework communities are allowed to take protective measures to arrive at food self-sufficiency at local and national level (People's Food Sovereignty Network SD). The decrease in competition in the local markets results in higher prices and increases production.

This view is criticized by Kerr (2011) on the ground that protection-based self-sufficiency cannot realize food security. This statement is supported by the following arguments. First, the poor in developing countries are often net-consumers, who spent a significant part of their income on food. An increase in the prices of food resulting from protectionist trade measures can thus move households from being food secure to food insecure. Second, many regions in the world are

nowadays not self-sufficient, because demand is higher than supply for food production. If self-sufficiency becomes the norm, then these regions must increase their production. The increase in production can have severe consequences: it can lead to increasing stress on land; it may jeopardize biodiversity and the environment; it does not lead to sustainable ecological production. Finally, local food system failures, such as famines, monopolies, and so on, can raise prices, which negatively affect the food secure status of net-consumers in developing countries.

5. Conclusion

In the first part of our report, we have defined food and nutrition security according to the FAO (1998) definition:

> *'Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.'*

In addition, a series of other food-security concepts have been defined; and a set of quantifiable indicators of food security (as used in the existing literature) have been proposed.

The second part of our report has shown how the concept of food and nutrition security is embedded in international law to push governments to take actions to eradicate hunger and malnutrition. Both food security and the right to food do not impose a specific policy that must be followed to achieve food security.

As discussed above, there are several reasons and motivations, which might explain the choice of domestic policymakers to follow a policy of food self-sufficiency or food sovereignty instead of a policy of food self-reliance. Under the condition of free and perfect markets, it is economically optimal to pursue a policy of food self-reliance. Advocates of food self-sufficiency and food sovereignty question this hypothesis and propose an alternative policy. The first alternative is a policy of food self-sufficiency, which aims to produce all food demanded by the national population domestically.

A second alternative is food sovereignty. The movement of food sovereignty emphasizes the ‘right to food’ as well as ‘the right to produce’. In this view, the right to produce is undermined by low food prices resulting from overproduction and dumping practices by developed countries. Hence, the food sovereignty movement proposes that adequate food prices should be ensured by protection-based food self-sufficiency as long as the condition of free and perfect food markets is not fulfilled.

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FOODSECURE
FOR POLICIES THAT MATTER

The FOODSECURE project in a nutshell

Title	FOODSECURE – Exploring the future of global food and nutrition security
Funding scheme	7th framework program, theme Socioeconomic sciences and the humanities
Type of project	Large-scale collaborative research project
Project Coordinator	Hans van Meijl (LEI Wageningen UR)
Scientific Coordinator	Joachim von Braun (ZEF, Center for Development Research, University of Bonn)
Duration	2012 - 2017 (60 months)

Short description

In the future, excessively high food prices may frequently reoccur, with severe impact on the poor and vulnerable. Given the long lead time of the social and technological solutions for a more stable food system, a long-term policy framework on global food and nutrition security is urgently needed.

The general objective of the FOODSECURE project is to design effective and sustainable strategies for assessing and addressing the challenges of food and nutrition security.

FOODSECURE provides a set of analytical instruments to experiment, analyse, and coordinate the effects of short and long term policies related to achieving food security.

FOODSECURE impact lies in the knowledge base to support EU policy makers and other stakeholders in the design of consistent, coherent, long-term policy strategies for improving food and nutrition security.

EU Contribution	€ 8 million
Research team	19 partners from 13 countries

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This project is funded by the European Union under the 7th Research Framework Programme (theme SSH) Grant agreement no. 290693