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"Food Security in the Middle East and North Africa (MENA) and sub-Saharan Africa: A Comparative Analysis"

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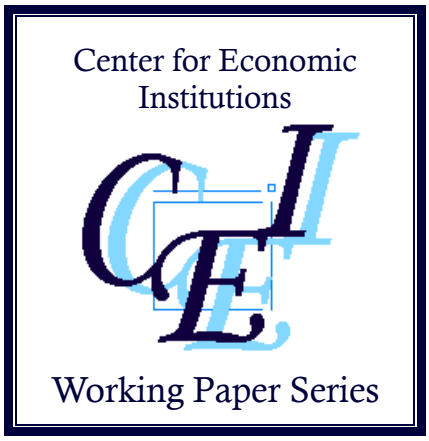

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Food Security in the Middle East and North Africa (MENA) and sub-Saharan Africa: A Comparative Analysis.

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SOAS

1. Introduction

This paper compares and contrasts the food security of two distinct geographical regions, namely the Middle East (sometimes referred to as Near Asia or West Asia) and North Africa (MENA) and sub-Saharan Africa. Since the global food price shock of 2007/08 and in light of predictions that global food prices are likely to remain both high and volatile for the foreseeable future (Oxfam 2011), national food security strategies are being reappraised by both national governments and international organisations. In particular, the extent to which food imports should be relied upon to achieve a nation's food security is being critically reappraised, particularly in many of the MENA countries that are highly import dependent. The desire to rely less on global food markets has led to debate on more innovative strategies, including land acquisition overseas by MENA countries and the potential for a green revolution in sub-Saharan Africa. The aim of this paper is to review the food security status and challenges for the two regions and to present a comparative analysis of potential strategies to improve food security in both regions.

The next section provides a working definition of food security and sketches a taxonomy of strategies and policies that can be used to ensure food security. Section 3 presents data on the food security status of countries in the two regions and looks at the extent to which they have relied on trade and domestic production as routes to food security. Section 4 discusses the food price shock of 2007/08, its impact on the two regions and the way in which it has caused a reappraisal of strategy, particularly in MENA. Section 5 looks at alternative policies to ensure future food security in MENA and sub-Saharan Africa and argues that viable future policies differ considerably between the two regions. Section 6 concludes.

[1] Thanks to Helen Tilley for research assistance with data collection on food security in sub-Saharan Africa.

2. Definitions and Strategies

2.a. Definitions

Food security can be achieved at two levels – national aggregate food security and individual food security. The former exists when a nation has adequate food supplies to feed its population, either via domestic production, food imports, food aid or some combination of these. Individual food security exists when all individuals in a country have access to adequate food. National food security is necessary but not sufficient for individual food security in that a nation may have adequate national food supplies but they may not be accessible to all individuals – if for example they are tied up in centrally located national grain silos or if individuals cannot afford to buy food. In the past domestic policy makers in developing countries have sometimes focused excessively on national food security with strategies such as strategic grain reserves but have failed to achieve individual food security in their countries (for an example see Harrigan 2003 on Malawi). The focus on individual food security was strengthen by Amaytra Sen's famous analysis of famines (Sen 1981) in which he used the demand-side concept of "entitlements" to food. Sen argued that individuals need entitlements to food and this will depend, amongst other things, on their income and assets. Hence, there can be individual hunger and famine even when food supplies are adequate. Sen's analysis showed that it is not just the supply side of food that is important but also demand side factors in ensuring individual food security. Another way of expressing the importance of both supply side and demand side factors is the "three As" – Availability of food, Accessibility of food and Affordability of food. Related to this is the definition of food security adopted by the World Food Summit in Rome in 1995 and now generally accepted by most international organisations as a working definition:

"Food security exits when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life."[2]

2.b. Strategies

Traditionally there have been three basic ways that a country can achieve food security at the national level – via domestic production, commercial food imports, or food aid. A strategy

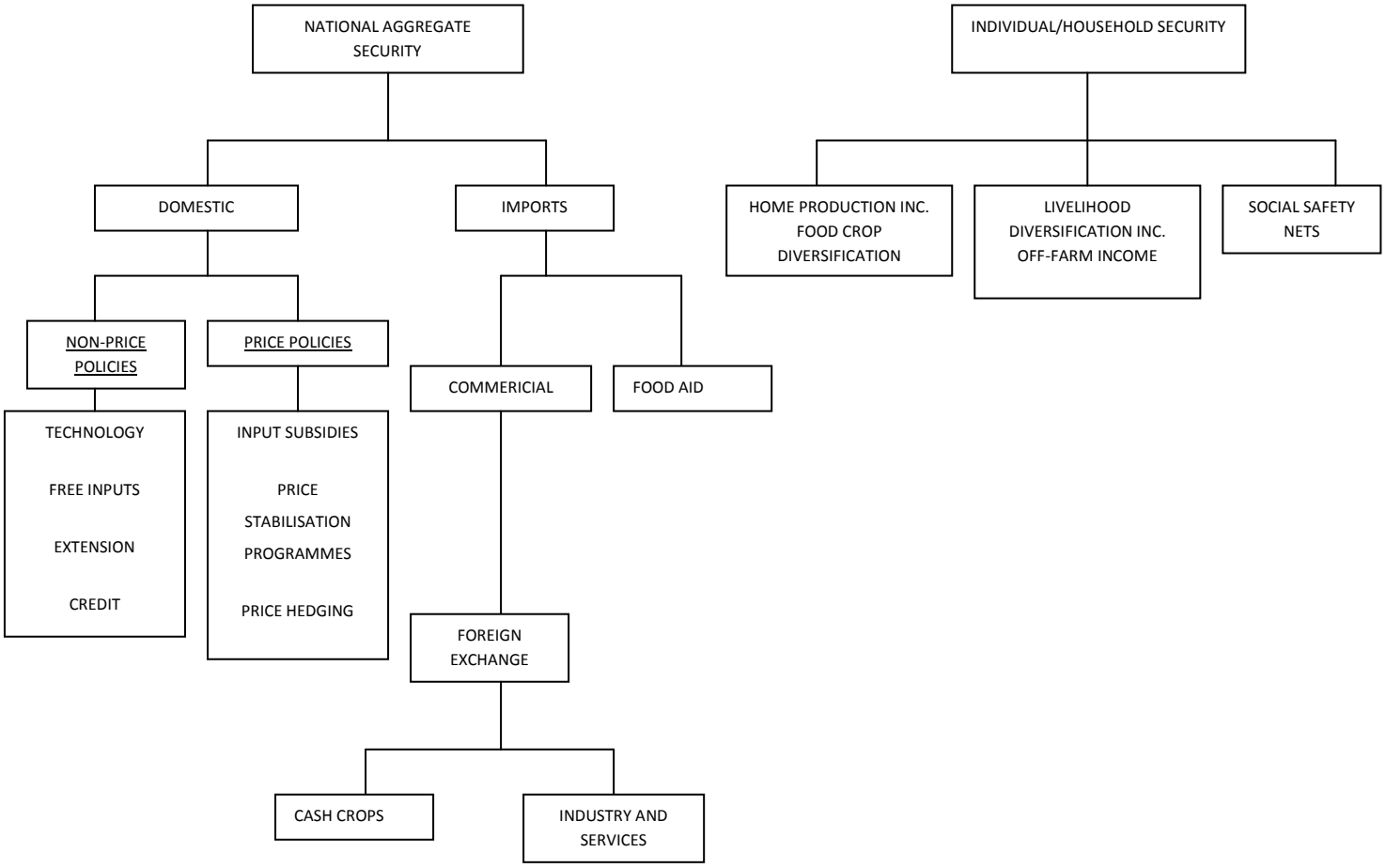
[2] See www.fao.org/wfs/index_en.htm

relying purely on the first option is synonymous with national food self-sufficiency and again, in the past, policy makers have sometimes wrongly confused food self-sufficiency with food security (Harrigan 2003, 2005). But food self-sufficiency is only one route to food security and in reality most countries are forced to rely on a combination of domestic production and imports, sometimes supplemented by food aid.

Figure 1 provides a taxonomy of strategies, and polices under each strategy, that can combine to make up a nation's approach to food security. To the extent that a strategy of domestic production is adopted, a variety of both price and non-price polices can be used to promote domestic food production. If a trade-based strategy of food imports is used this can be supported by policies which promote the production of agricultural export crops to earn the foreign exchange necessary for food imports and/or polices which develop other foreign exchange earning sectors such as manufacturing and services. Both strategies can be supplemented by food aid. At the individual level, households likewise have a choice between own food production or livelihood diversification into other activities with income used to purchase food in domestic markets. This needs to be supplemented by adequate social safety net programmes for households and individuals who would otherwise remain food insecure. Such programmes include food for work, school feeding programmes, targeted food subsidies, direct cash transfers etc.

As will be shown in the discussion in Section 5, there is considerable diversity in the extent to which MENA and sub-Saharan Africa rely on the different food security strategies outlined above. In addition, the MENA response to the 2007/08 global food price shock has produced a fourth innovative strategy not represented in Figure 1, namely the practice of acquiring land overseas to directly source food requirements.

Figure 1: Food Security Strategies and Policies



Source: Harrigan 2005

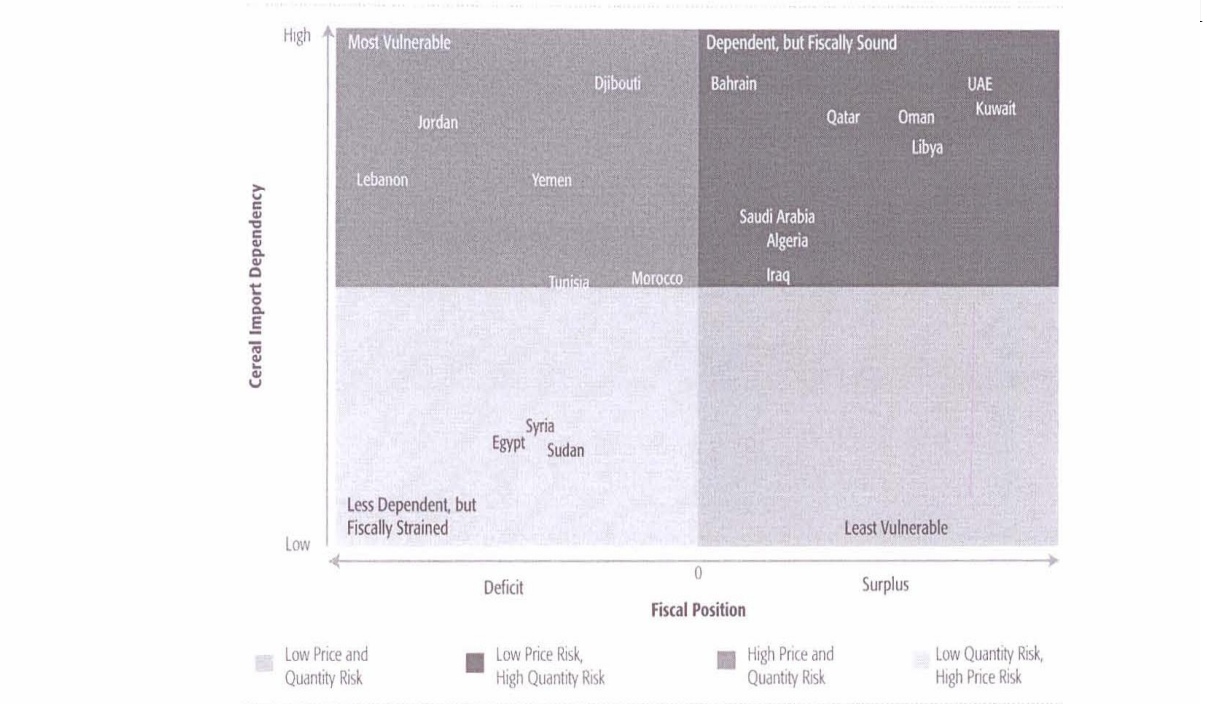
3. The Food Security Status of the Two Regions

It is often argued that MENA is potentially one of the most food insecure regions in the world. This characterisation is based on the region's heavy reliance on food imports (IFPRI 2010a, Wilson and Bruins 2005, World Bank 2009). Using imports as an indicator of food insecurity, MENA does appear highly insecure in that it has the largest food deficit of any region in the world in terms of cereal imports as a proportion of domestic consumption. Most Arab countries import at least 50 percent of food calories they consume (with a heavy consumption and import reliance on wheat). As a result MENA countries are the world's largest net importer of cereal. In 2007 their net import of cereal was 58 million metric tonnes (MT). On

this criterion sub-Saharan Africa appears far more food secure with net imports of only 27 million MT (World Bank 2009 Figure 1.1). This is reinforced when we consider that in 2002 Israel, Kuwait, Lebanon, Saudi Arabia and the United Arab Emirates (UAE) all featured in the world's top 20 per capita cereal importers, whilst Syria is the only MENA country to have produced a fairly regular cereal surplus over the past 40 years (World Bank 2009).

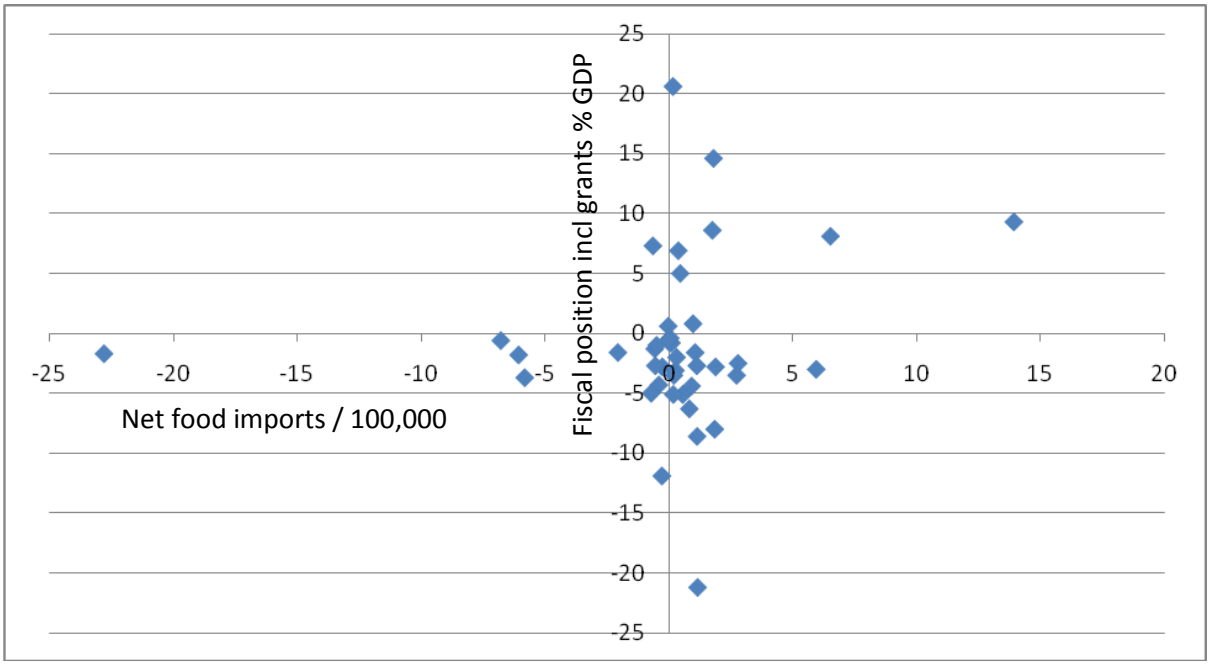
However, food imports are only one dimension of food security and relate to the macro level of national food security from a supply side perspective. Other variables that help determine a region's food security status include wealth levels, income distribution, and fiscal position. These variables differ not only between regions but also between nations. The joint World Bank/IFAD/FAO report on improving food security in Arab countries (World Bank 2009) argues that food security is partly determined by resource endowments which affect the level of food import requirements and also by fiscal balance which influences a country's ability to afford food imports. Using these variables the report produces a scatter diagramme with cereal import dependency on the vertical axis and fiscal position on the horizontal axis. This is reproduced as Figure 2. As can be seen from Figure 2 there is considerable variability between different MENA countries. No country falls in the least vulnerable quadrant whilst most of the GCC countries along with Oman, Libya and Iraq have a high cereal import dependency but are fiscally sound. This means that they are not particularly vulnerable to global food price shocks as due to their natural resource base, predominantly oil, they have a sound fiscal position and can afford food imports. This is reinforced by the fact that traditionally global food prices and oil prices move together (World Bank 2009). Their high import dependence however makes them vulnerable to quantity shocks such as trade embargoes or export bans by food exporting countries. Egypt, Sudan and Syria are less dependent on cereal imports as they have a strong food production base, but they are fiscally strained making them vulnerable to global price shocks. The most vulnerable group are those countries that are both highly import dependent and fiscally strained, namely, Jordan, Lebanon, Yemen, Tunisia, Morocco and Djibouti.

Figure 2: Arab Countries Cereal Import Dependency and Fiscal Position (2007 fiscal balance and 2005 cereal imports/total cereal consumption)



Source: World Bank 2009 Figure 2.4

Figure 3: Net Food Imports and Fiscal Balance by sub-Saharan Country, 2005



Source: FAO, IMF 2009: 80

Figure 3 shows a similar scatter diagramme for sub-Saharan countries (with the axes reversed). Compared to the MENA countries, many of the sub-Saharan countries are clustered around the centre of the diagramme, indicating that there are fewer extremes in sub-Saharan Africa particularly in terms of reliance on food imports.

Wilson and Bruins (2005) create a macro level Food Security Index (FSI) for nine Middle Eastern countries based on three variables: 1) food aid as a percentage of domestic consumption, 2) imports as a percentage of domestic consumption, 3) country income levels. Each variable is given a score of between 50 and -40 with 50 being the most food insecure. The variables are then combined to produce a single FSI which is used as a basis to classify each country. The data are reproduced in Table 1. Again, the data in Table 1 shows considerable variation in the food security status of the nine countries, with the GCC countries the most food secure - despite the fact that they have a heavy reliance on food imports they have high levels of wealth and do not need food aid. Jordan and Palestine are the two most food insecure countries in the sample – both have low income levels and are food aid and import dependent. From their analysis Wilson and Bruins conclude that food security in the Middle East seems to depend more on wealth levels than on climate. But as Lofgren and Richards (2003) point out, high income countries in the MENA region only account for about 10 percent of the region's population with low and middle income countries accounting for around 90 percent[3].

[3] Other authors have produced different taxonomies of MENA countries using different food security indicators. For example Diaz-Bonilla et al (2000) produce country rankings by combining food production per capita, the ratio between total export earnings and food imports, calories and protein per capita and the non-agricultural population share. Their taxonomy only classifies Sudan and Yemen as food insecure and they conclude that trade stress i.e. a high ratio of food imports to export earnings tends to contribute more to food insecurity in the MENA region than in other regions. IFPRI (2010a) produces a taxonomy using the ratio of total exports to food imports, food production per capita, wealth levels and the Global Hunger Index. According to this 13 MENA countries are classified as food security challenged whilst the GCC countries along with Iran are classified as food secure.

Table 1: Food Security Index Scores for 9 Middle Eastern Countries

Nation	Food aid score	Imports/consumption score	Income score	Total FSI score	Food security level
Iran	5	6	-10	1	High
Israel	5	18	-20	3	High
Jordan	30	19	-5	44	Very low
Kuwait	0	20	-20	'	Very high
Lebanon	10	18	-6	22	Low
Palestinian Territories	25	18	0	43	Very low
Saudi Arabia	0	13	-20	-7	Very high
Syria	5	2	-3	4	High
UAE	0	20	-20	0	Very high
Yemen	10	15	0	25	low

Source: Wilson and Bruins 2005 Table 7.

The above measures of food security have focused on macro level variables. However, although macro variables are important determinants of national aggregate food security, as argued in section 2, individual or household food security is a more meaningful concept. One internationally accepted measure that captures the individual dimensions of food security is the Global Hunger Index (GHI). This is a multidimensional approach to measuring hunger combining three equally weighted indicators 1) the proportion of undernourished as a percentage of population, 2) the prevalence of underweight children younger than five, 3) the mortality rate of children younger than five[4].

Table 2 provides GHI data for MENA, sub-Saharan Africa and the world. As can be seen, according to the GHI sub-Saharan Africa is far more food insecure than MENA with a GHI of 22.1 in 2009 (values between 22.0-29.9 are classified as alarming) as compared to 5.2 for MENA (values between 5.0-9.9 are classified as moderate hunger).

[4] This index ranges from 0 to 100, with 100 being the worst score.

Table 2: Global Hunger Indices

Region	% undernourished 1990-92	% undernourished 2003-05	Underweight children 1988-92	Underweight children 2002-07	Under 5 mortality 1990	Under 5 mortality 2007	GHI 1990	GHI 2009
Sub-Saharan Africa	31.0	28.5	27.4	23.4	17.7	14.3	25.4	22.1
MENA	3.8	4.6	12.2	7.9	7.0	3.0	7.7	5.2
World	19.7	16.1	30.4	22.7	9.8	6.8	20.0	15.2

Source: von Grebmer et al 2009 (in IFPRI 2010b)

The most up to date figures for levels of undernourishment also show a sharp contrast between the two regions. In sub-Saharan Africa 239 million were undernourished in 2010, compared to 37 million in the MENA region, 19 million in developed countries and 578 million in Asia and the Pacific (FAO 2010). [5] In sub-Saharan Africa this was 28.5 percent of the population in 2003-05, the highest regional proportion (although there is a high degree of variability across countries) compared to only 4.6 percent of the population in MENA (Table 2). However, although MENA fares much better than sub-Saharan Africa in terms of the absolute number and percentage of the population undernourished, one alarming feature that emerges from regional comparisons of components of the GHI is that MENA is the only region for which the indicator has worsened over the past two decades – between 1990/92-2003/05 the proportion of undernourished increased in MENA from 3.8 percent to 4.6 percent. By contrast in sub-Saharan Africa there was a trend decline from 31 percent in 1990-92 to 28.5 percent in 2008. More recently, for both regions the impact of the 2007/08 global rise in food prices has resulted in an increase in the number of undernourished people – rising to 32 percent in 2009 in sub-Saharan Africa and adding an extra 4 million to the undernourished in Arab countries (World Bank 2009).

[5] Sub-Saharan Africa (SSA) refers to 45 countries (http://www.uis.unesco.org/profiles/EN/EDU/countries40350.html)

Tables 3 and 4 provide a combination of macro and individual level data relevant to food security for countries in the MENA region (Table 3) and the sub-Saharan region (Table 4).

Table 3: Macro and Individual Food Security Indicators for MENA Countries

	Total exports/ food imports	Food production per capita	Global Hunger Index	GNI per capita
Food security challenge countries				
Mineral resource rich				
Algeria	8.7	111	<5	2,720
Iraq	n/a	n/a	n/a	*800
Libya	11.1	133	<5	5,860
Sudan	5.5	148	19.6	640
Syria	8.9	237	5.2	1,430
Yemen	4.9	44	27	650
Mineral resource poor				
Djibouti	2.1	54	22.9	1,000
Egypt	6.9	199	<5	1,270
Jordan	4.7	120	<5	2,490
Lebanon	2.4	258	<5	5,520
Morocco	8.1	163	5.8	1,990
Tunisia	11.2	220	<5	2,880
West Bank and Gaza	1.1	135	n/a	1,230
Food secure countries				
Mineral resource rich				
Iran	15.9	246	<5	2,580
Bahrain	n/a	n/a	n/a	*24,733
Kuwait	25.4	55	<5	30,630
Saudi Arabia	19.2	104	<5	12,540
United Arab Emirates	17.2	114	n/a	22,583
Qatar	n/a	n/a	n/a	*76,000
Oman	n/a	n/a	n/a	*24,674
MENA average	**9.6**	**146**	**5.2**	**6,001**
MENA - Food security challenge	**6.3**	**152**	**n/a**	**2,307**
MENA - Food secure	**19.4**	**130**	**n/a**	**17,083**
World average	**11.3**	**233**	**15.2**	

Source: IFPRI 2010a, Table 2.

Table 4: Food Security Status and Food Trade Patterns by sub-Saharan Africa Country

Country*	Food security status 2003-2008		Net food imports USD 1,000 2004		Land locked	IMF income status
	GHI (IFPRI 2010b)	% undernourished (FAO 2010)	Total (FAO 2005)	Per capita (UNFPA 2005)		
DRC	41	69	271678	4725		F
Burundi	38.3	62	16173	2156	y	F
Eritrea	35.7	64	114271	25971		F
Chad	30.9	37	3930	405	y	oil
Ethiopia	29.8	41	90190	1165	y	L
Sierra Leone	28.9	35	111131	20206		F
Madagascar	27.5	25	-42225	-2270		L
Central African Republic	27.4	40	8504	2126	y	F
Angola	27.2	41	650666	40922		oil
Niger	25.9	20	29477	2106	y	L
Zambia	24.9	43	-56157	-4800	y	L
Liberia	24.3	33	95947	29075		F
Mozambique	23.7	38	187031	9446		L
Rwanda	23.1	34	-4388	-488	y	L
Guinea-Bissau	22.6		-29819	-18637		F
Togo	22.4	30	18312	3002		F
Burkina Faso	21.1	9	54229	4108	y	L
Zimbabwe	20.9	30	183125	14087	y	F
Tanzania	20.7	34	-28516	-745		L
Kenya	19.8	31	-608195	-17732		L
Mali	19.1	12	24619	1824	y	L
Gambia	18.5	19	112174	74783		F
Malawi	18.2	28	-58661	-4547	y	L
Nigeria	17.8	6	1391167	10579		oil
Cameroon	17.6	21	-65987	-4048		oil
Benin	17.1	12	277586	33046		L
Guinea	17.1	17	104527	11120		F
Senegal	16.8	17	593053	50688		L
Congo	15.2	15	178522	44631		oil
Uganda	15	21	-1384	-48	y	L

Côte d'Ivoire	14	14	-2281747	-125371		F
Namibia	13.6	19	-51149	-25575		M
Mauritania	13.1	7	219316	70747		-
Botswana	12.5	25	36697	20387	y	M
Lesotho	12.2	14	44251	24584	y	M
Swaziland	10.8	18	-207381	-207381	y	M
Ghana	10	5	-583773	-26415		L
South Africa	7.3		-680005	-14346		M
Mauritius	6.7	5	-72895	-60746		M
Gabon	6.4		173686	124061		oil

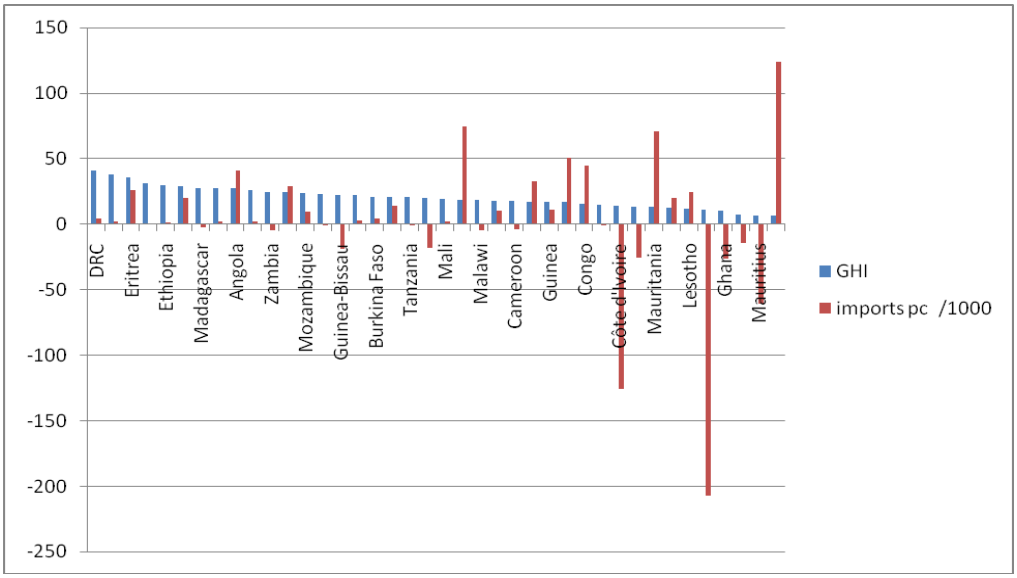
* The countries shown are those for whom there was data for at least one food security index and trade data. ** Oil = oil exporting countries; M = middle income countries; L = low income countries; F = fragile countries.
Sources: FAO 2005, 2010; UNFPA 2005; IFPRI 2010b.

Analysis of Tables 3 and 4 reveals some interesting facts of relevance to the discussion on viable food security strategies in section 5 which follows. In sub-Saharan Africa when countries are ranked according to their GHI there is no clear relationship between food security status and net food imports per capita. This is clearly illustrated in Figure 4. What is apparent is that as the GHI rating declines (i.e. a country becomes more food secure) there is a greater degree of variance in the food trade balance with both large surpluses (Mauritius, South Africa, Ghana) and deficits (Gabon, Mauritania) arising. This can be expected as a greater degree of food security is associated with a larger economy and therefore greater levels of trade. For the MENA countries the most food secure countries in terms of the GHI and other indicators tend to be the GCC countries which are heavily reliant on trade in the form of food imports. Hence, trade seems to be a critical factor in influencing food security[6].

Another factor that seems to have a bearing on food security is national income levels. Table 4 shows that for the sub-Saharan countries the IMF categorisation in terms of income status is related to food security status. The fragile economies and low income countries are the most food insecure, whereas the middle income countries tend to be the least food insecure. Likewise, Table 3 shows that those countries classified as food secure in MENA (with the exception of Iran) have the highest levels of GNI per capita.

[6] This conclusion contrasts with the view that MENA should be classified as food insecure due to its heavy dependence on food imports (World Bank 2009, Wilson and Bruins 2005, IFPRI 2010a).

Figure 4: Sub-Saharan Countries Global Hunger Index (2010) and Net Food Imports per Capita (2005)



Source: UNFPA 2005; FAO 2005; IFPRI 2010b.

Resource endowment does not seem to be correlated with food security in either region. There is no clustering of oil economies by food security status in sub-Saharan Africa whilst for MENA although all the food secure countries are classified as mineral resource rich, there are almost as many countries (six) that are also mineral resource rich but food security challenged (Table 3)[7].

The above economic analysis suggests that two factors may be critical in influencing a country's food security – the ability to generate sustained economic growth in order to raise income levels and the ability to increase the economy's level of trade[8]. In terms of the taxonomy of food security strategies presented in Section 2, it would seem that the trade-based approach can be as successful if not more successful than an emphasis on domestic production and self-sufficiency. However, the data on which this analysis is based is largely taken from the period before the 2007/08 global hike in food prices and also takes a

[7] Also noteworthy is the fact that Table 4 does not show any clustering of landlocked countries in sub-Saharan Africa by food security status.

[8] This growth and increased globalisation via trade must also be of a pro-poor nature if individual as well as national food security is to be enhanced.

predominantly economic approach to the issue of food security. As the next section will argue, the recent increase in global food prices has had a significant impact on countries in both regions, and particularly in the MENA region has led to a reappraisal of food security strategies, not just from an economic, but also from a political perspective.

4. The Food Price Shock of 2007/08 and Beyond

2007 and first half of 2008 witnessed a sharp rise in global food prices (See Figure 5) and other agricultural commodity prices which triggered concerns about food security, malnutrition and poverty in the MENA and sub-Saharan regions, as well as elsewhere.

Figure 5: FAO Food Price Index

Source: FAO website

Falling energy and commodity prices and a weakening global economy meant that food prices fell back in late 2008, but again peaked in early 2011. In the last ten years to 2010 food prices have risen overall by an average greater than 80 percent. Forecasts suggest that

underlying structural factors mean that prices are likely to remain volatile and are unlikely to fall back to their pre-crisis levels (Oxfam 2011). The World Bank has highlighted the risk of future food price shocks. In particular, due to the supply constraints discussed below, cereal price growth is projected to accelerate from 0.26 percent a year until 2030, to 0.82 percent a year between 2030 and 2050 (World Bank 2008, p.62).

Structural factors underpinning high and volatile food prices relate to both demand side and supply side factors in global food markets. On the demand side, high population and income growth in areas such as China, India and the Gulf States adds pressure to global markets. Changing food consumption patterns towards meat, particularly in emerging markets, means that 30 percent of world grain now goes to feed animals, even though an acre of arable land can produce 63 kilos of protein from grain but only 9 kilos of protein from beef. Added to this is biofuel demand for land and crops, particularly in the USA which accounts for 28 percent of world cereal exports (Fabiosa et al 2008). On the supply side, there has been a decline in the global productivity growth rate for major cereals. One factor contributing towards this has been climate change (Cline 2007) causing natural disasters in major producers of food, such as the 2010 floods in Australia. One result has been limited global stocks of food especially in OECD countries compared to high levels of 1980s and 1990s (Gardner and Sumner 2007). In times of shortage exporters are increasingly imposing export restrictions or bans. For example, during 2007/08 India and Egypt restricted their rice exports, and wheat export and other grain exports were banned by Russia, Ukraine, Argentina and Kazakhstan.

The thinness of global food markets i.e. the fact that only a small proportion of global production enters international markets via trade, means that demand and supply shocks are amplified in terms of their impact on prices in international markets. This has been worsened by high oil prices since oil is an important input to fertilisers, pesticides and fuel for tractors and machinery and also affects the transport costs of food. The impact on global food prices has been made worse by financial trading in agricultural commodities which has increased dramatically in recent years. In 2008 US$150 billion was invested in index and other funds for agricultural commodities compared to only US$15 billion in 2004 (Foresight 2011). This financial speculation can push prices up and also cause volatility.

The food price shock of 2007/08 had several adverse impacts on Arab countries. It is estimated that the shock led to an additional 4 million undernourished people in Arab countries (World Bank 2009). It also contributed to poverty, especially rural poverty. In the MENA region 5 percent of the population is classified as poor (below the lowest World Bank poverty line of US$1.25 per day), with 76 percent of them living in rural areas. The poor in the region spend between 35 percent – 65 percent of their income on food and were adversely affected by rising prices. In addition, there is a high concentration of people just above the poverty line in many MENA countries, which makes poverty very sensitive to even small increases in the cost of living, most notably in countries like in Egypt and Morocco (ESCWA 2010). The rural landless, marginal farmers and the urban poor were the most affected groups. ESCWA (2010 Table 8) has estimated that the food price shock of 2007/08 created 2.19 million new poor in six conflict affected MENA countries alone, namely, Egypt, Jordan, Palestine, Sudan, Syria and Yemen. The effects of rising food prices on living standards in MENA led to political instability. Food riots and demonstrations in 2007 and 2008 against rising food prices occurred in Bahrain, Jordan, Lebanon, Morocco, Saudi Arabia and Yemen and the wave of political unrest that swept the region in the first half of 2011 has been partly triggered by socioeconomic factors such as declining real wages, unemployment and rising food prices (Harrigan 2011).

The food price shock also led to macroeconomic problems in Arab countries. Inflation in the MENA region increased more than twice the speed of world inflation in 2007/8 (IMF 2008). Countries that relied heavily on food imports but did not gain from higher oil prices, such as Jordan, Lebanon, Morocco and Djibouti, saw deterioration in their trade balance due to the higher cost of food imports. Fiscal pressures also mounted due to the existence of food subsidies – as imported food prices rose it cost more to keep domestic consumer prices constant via subsidies. Countries like Egypt, Jordan, Syria and Yemen increased public sector wages, increased bread subsidies and increased direct cash transfers to try to cushion the impact. In addition to the food price shock, the current global financial crisis means that some MENA countries with limited financial resources are finding it difficult to get credit from international food companies and food exporting countries to finance their food import requirements.

The effects of the global food price increases in sub-Saharan Africa has been more varied by country due to the country specific variability in the extent to which reliance is made on food

imports. To understand the linkage between food prices, food security and poverty in sub-Saharan Africa also requires an assessment of income sources, the ratio of net food buyers to sellers, and the change in food prices relative to other expenditures. Anderson (2004, p.18) argues that food price rises (through trade liberalisation) have the potential to benefit the 65 percent of the rural Sub-Saharan Africa population who are farm households, although the extent to which they are net food sellers will influence this impact (IFPRI 2004; World Bank 2008). There is also potential for a wage rise for landless farm labourers as a result of rising food prices.

As will be shown in the next section, the current high levels of global food prices have caused many policy makers to reappraise the extent to which they rely on a trade-based food security strategy, and this reappraisal has been particularly pronounced in the MENA region. This reappraisal is occurring despite the fact, as argued in Section 3, that high levels of trade seem to be associated with food security.

5. Food Security Strategies in the Two Regions

5.a. Trade-based strategies

5.a.i. MENA

During the 1970s a large food gap emerged in the MENA region, with food demand rapidly outpacing domestic food production leading to increased reliance on food imports. This was due to rapid income and population growth during the oil boom years of the 1970s as well as a neglect of the domestic agricultural sector. Rapid population growth was particularly marked in the GCC states such as UAE, Kuwait and Saudi, with the former seeing the world's largest population growth - between 1961-2002 an increase of 2,897 percent. These countries, along with Jordan, were in the world's top ten countries for population growth. As a result over the past 40 years there has been a large increase in food imports to the MENA region.

The increased reliance on food imports to achieve food security in the region meant dependence on global food markets and this made countries in MENA vulnerable to global food price shocks and disruptions in global supply. Mindful of this fact, policy makers in the

region, especially in some of the oil rich states, embarked on programmes of domestic food production. Many countries began to support domestic production of cereals by subsidising inputs, protecting farmers against imports, building massive irrigation projects and buying crops at excessively high prices. Jordan, Morocco, Libya and Saudi Arabia launched such policies in the 1970s followed later by Kuwait and UAE. The cost, however, in both ecological and economic terms, was high. Domestic subsidies in the form of price support had to be offered to domestic farmers since their production costs far exceeded international prices. For example, at the end of the 1980s Moroccan cereal farmers were paid prices 180 percent above world prices, Syrian maize farmers in the mid-1980s received prices 100 percent above world prices and Saudi wheat farmers in the early 1980s received prices 600 – 1000 percent above world prices (Weinbaum 1984, Wilson and Bruins 2005).

The most notable country in terms of this drive towards increased domestic food production was Saudi Arabia. Massive irrigation projects were launched in the Saudi desert in the 1970s and 80s to support grain and dairy farmers. Loans to farmers rose from US$5 million in 1971 to US$1 billion in 1983 and the country spent US$2.12 billion on farm subsidies between 1978-1992. As a result wheat output in Saudi rose from 3,300 MT in 1978 to 3.9 million MT in 1992. Not only did Saudi achieve food self-sufficiency in cereals she temporarily became the world's sixth largest wheat exporter.

The collapse in oil prices in the 1980s meant that the drive towards domestic food production could not be sustained in the region and policy makers as well as international organisations accepted that food imports would continue to remain an important component of the region's food security strategy. It is predicted that for Arab countries (excluding Sudan) dependence on food imports will increase by 64 percent in the next 20 years. The IFRPI IMPACT model (IFPRI 2008) and the FOA Food Balance Model (FAO 2006a, 2008) both predict that demand for food in the Arab world will grow substantially to 2030 and their food production will not keep pace, leading to increased reliance on food imports. All countries except Sudan are predicted to remain net cereal importers through to 2030 and the only country predicted to decrease its cereal imports is Morocco (by 17 percent). The country that is expected to have the greatest increase in its cereal imports is Egypt. Meat and milk consumption are also predicted to rise in the region especially in the oil rich countries due to population increase and increasing incomes, leading to increased imports of these goods to GCC countries.

The predicted increased reliance on food imports is due on the demand side to strong population growth, income growth and urbanisation. On the supply side, low agricultural productivity growth is predicted for the region. This is largely due to factors relating to natural resource endowments – projections show that by 2050 renewable water will fall to an average of 500 cubic meters per capita[9] and arable land to 0.12 hectares per capita (World Bank 2009). Climate change is also predicted to reduce water availability in MENA via reduced rainfall which will adversely affect both crop area and yields (Cline 2007).

Most countries in the MENA region continue to protect their farming sector, with high levels of trade protection against certain imports to shield producers from cheaper competing imports (such as durum wheat farmers in most countries, milk and olive oil producers in Tunisia, sugar beet farmers in Syria and Lebanon). However, most international organisations, such as the World Bank, FAO, and IFPRI, as well as authors such as Lofgren and Richards (2003) and Richards and Waterbury (2006) are advocating agricultural liberalisation and a more trade-orientated approach to food security in the region. The joint report of the World Bank, FAO and IFPRI (World Bank 2009) states that the challenge facing the MENA region is "to find the best ways to improve food security, whilst recognising that there will be a continued and increasing dependence on imports." This is echoed in the 2008 World Development Report (World Bank 2008).

An increased reliance on a trade-based food security strategy has implications for future resource allocation in the MENA region. Within the agricultural sector, international organisations are advocating a shift away from domestic cereal, dairy and meat production towards production of tree crops, vegetables, fruit and semi-arid crops, which make more efficient use of water and which can be partly destined for export markets. This is based on the need to save scarce water and maximise the returns to water use[10]. Hence, within agriculture the policy advice is to shift away from water intensive food crops towards more water efficient agricultural exports, with the foreign exchange earned from such exports helping to fund a higher level of food imports. This type of approach is sometimes known as

[9] Jordan already has annual renewable water resources of less than 150 cubic meters per capita making it one of the most water scarce countries in the world.

[10] Vegetable production yields six times more value added per drop of water than wheat production, and ten times more than beef. Yet in the Maghreb 40 percent of irrigated land is devoted to cereal, 51 percent in the Mashreq and 73 percent in GCC.

Virtual Water Trade (Allan 1998) – whereby water scarce countries should import water intensive goods. However, due to distortions in water scarce countries such as trade protection, price supports, subsidized credit, energy and water subsidies which encourage excess water use for irrigation, water scarcity currently plays only a small role in determining global trade patterns.

One policy implication of the trade-based approach to food security in the region via international trade in agricultural products is the need to open up global markets and liberalise trade in agricultural commodities. MENA relies heavily on European Union markets for the export of its agricultural produce yet these markets remain highly protected. DeRosa (1995) argues that non-discriminatory agricultural trade liberalisation will improve food security in MENA and IFPRI (2010a) notes that trade liberalisation will result in lower production and more imports of wheat for MENA, but higher production and more exports of fruits and vegetables.

In addition to changing the structure of agriculture towards export crops, another strategy is export diversification into industrial and manufactures for export in order to earn foreign currency to import food. This should form part of any sensible strategy since ecological constraints in the MENA region limit the potential of agriculture[11]. As a result of constraints to agricultural production, the agricultural sector in MENA contributes only 12 percent to the region's GDP yet uses over 80 percent of water as compared to 4 percent used by industry (IFPRI 2010a, Table 5). The extent to which countries will need to rely on sectors other than agriculture to help achieve food security varies, particularly according to their availability of water resources.

Reliance on non-agricultural exports as a route to food security via food imports requires both an expansion and diversification of exports from the region. IFPRI (2010a) argues that a commonly used measure of food security at the macro level is the ratio of total exports to food imports. This ratio is low for MENA. In addition, the fact that the region's exports are concentrated, with approximately 70 percent of the region's export earnings coming from oil, exposes the region to food security risks via fluctuations in oil prices. Over the past two

[11] 83 percent of land in the Arab MENA receives less than 4 inches of rain annually and among these countries all but Syria, Sudan and Tunisia have over 50 percent of their land classified as desert, waste or urban (Wilson and Bruins 2005).

decades manufacturing exports as percentage of total exports have been declining showing a lack of export diversification[12].

Lofgren and Richards (2003) argue that in a trade-based food security strategy, labour-intensive exports can play a crucial role, not only as a source of foreign exchange but also by boosting real wages of poor people. Since the scope for increasing wages and employment in agriculture is limited they advocate a focus on manufacturing and to a lesser extent services to promote pro-poor labour-intensive export-orientated growth[13].

5.a.ii Sub-Saharan Africa

Comparing sub-Saharan Africa to the MENA region, several features are evident in terms of the reliance on food imports to achieve food security. Firstly, the sub-Saharan region is less reliant than MENA on food imports in absolute terms - in 2007 MENA's net import of cereal was 58 million MT compared to only 27 million MT for sub-Saharan Africa (World Bank 2009, Figure 1.1). As a result domestic markets are a much more important source of food in sub-Saharan Africa with domestic markets (including the value of own consumption) for food staples worth US$49.7 billion in the region in 2000 (FAO 2003). However, there is still a heavy and increasing reliance on trade (particularly intra-regional trade) for achieving food security - only 20 percent of Sub-Saharan Africa's total calorie consumption was obtained from domestically produced rice, wheat, and maize in 2003 (i.e. produced within the country it is consumed in) (FAO 2006b).

Secondly there is far more country variation within the sub-Saharan region, with some countries being large food importers and others being large food exporters. By country, the

[12] In MENA manufacturing still only accounts for 13.4 percent of GDP whilst the service sector is dominated by domestic activities and public services rather than exports (IFPRI 2010a). Also, with the exception of Tunisia and Turkey, the share of manufactured goods in exports remains below the average for middle income countries (Lofgren and Richards 2003) and that this needs to be improved to help a trade-based food security strategy.

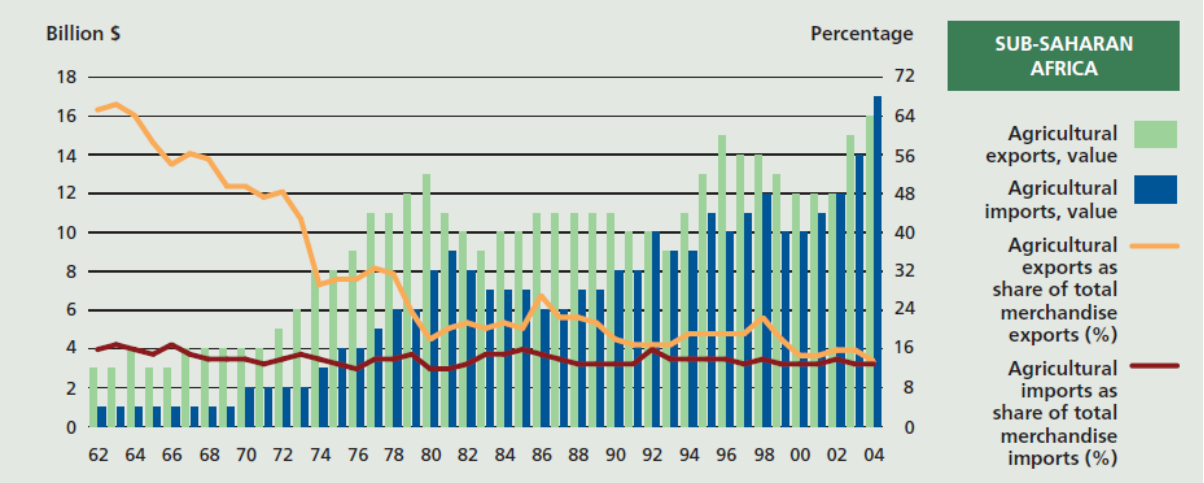
[13] Lofgren and Richards (2003) also argue that it is wrong to conflate national food security with food self-sufficiency in drought prone countries which characterise the MENA region since this wrongly assumes that domestic production is a less risky mode for satisfying domestic demand than is dependence on international trade. They argue that the empirical evidence shows that cuts in domestic grain supplies due to droughts in MENA are far more significant than cuts in import supplies due to embargoes.

largest net food importers in the region in 2004 were Nigeria (US$1,391m), Angola (US$651m), and Senegal (US$593m). Conversely, the largest net food exporters were Ivory Coast (US$2,282m), South Africa (US$680m), Kenya (US$608m), and Ghana (US$584m) (FAO 2006a, p.141). By country the proportion of total calorie consumption obtained from domestically produced rice, wheat and maize also varies greatly, from 63 percent in Zambia to 12 percent in DRC (FAO 2006b).

Thirdly, sub-Saharan Africa relies on intra-regional trade for much of its food security unlike MENA. For example, two thirds of the total regional demand for rice (19,580,000 MT in 2008) was met by regional production (although wheat is still mainly imported with 97 percent of total regional consumption of 12,192,000 MT in 2008 being imported). The trend for all developing countries has been for increased intra-regional and trade with other developing countries, and sub-Saharan Africa has experienced this trend in the agricultural sector.

Taking agricultural trade more generally (not just food crops) over the long term the sub-Saharan region has been a net agricultural exporter, although in 2004 the increase in the value of imports resulted in a trade deficit (see Figure 6). A characteristic of Sub-Saharan Africa is the trend increase in its agricultural imports to agricultural GDP ratio as shown in Table 5. This is consistent with the increasing role for agricultural trade and a reduction in agricultural and food self-sufficiency in sub-Saharan Africa.

Figure 6: Agricultural Imports and Exports of Sub-Saharan Africa



Source: FAO (2006a, p.102).

Table 5: Shares of Agricultural Trade in Agricultural GDP

Group/Region	Agric Exports/ Agric-GDP (%)			Agric Imports/ Agric-GDP (%)		
	1990-91	2000-01	2006-07	1990-91	2000-01	2006-07
Industrial Countries	95.0	145.5	177.1	70.8	116.5	156.7
Developing Countries	42.3	51.3	55.0	33.4	48.1	60.0
East Asia & Pacific	42.5	49.8	70.7	23.1	33.6	42.2
Europe & Central Asia	29.4	50.9	59.3	52.4	62.5	84.1
Latin America & Caribbean	81.4	85.2	84.4	42.8	60.6	74.7
Middle East & North Africa	15.9	26.2	26.5	76.9	95.0	104.5
South Asia	6.4	8.9	13.1	6.8	10.1	17.3
Sub-Saharan Africa	29.5	43.2	40.9	16.9	28.9	35.9
World	51.1	63.9	71.3	39.7	57.3	72.9

Notes: Trade ratios are computed as simple averages in the country groups.
Due to the cases of agricultural GDPs are very small (less than 1%), some small countries or Island economies are excluded, e.g. Luxembourg, Brunei, Hong Kong (China), Macau, Singapore, Palau, Bahrain, Djibouti, Kuwait, Trinidad & Tobago, Seychelles etc.
Sources: Based on mirror data from UN COMTRADE Statistics and World Bank WDI database.

Source: Aksoy and Ng (2010, p.14)

Although sub-Saharan Africa is much less reliant on food imports than MENA to achieve food security, like MENA the region has seen a growing food gap over the past four decades due to both demand side and supply side factors. Factors affecting the pattern of demand for food and the extent of food insecurity are greatly influenced by demographics including population growth trends and urbanisation as well as income growth within the region.

Between 1985 and 2003, the population of sub-Saharan Africa increased by 63 percent and between 1990 and 2003 the population growth rate for the region averaged more than 2.4 percent per year (Staatz and Dembele 2008, p.17). Of this increasing population, a larger proportion is living in urban areas. Between 1985 and 2004 the number of people living in urban areas in sub-Saharan Africa had increased by 2.5 times, from 24 percent to 35 percent of the population (ibid, p.17). Club du Sahel (2000) noted that more than half of the region's population will be in urban areas by 2035. This trend is particularly pronounced in West Africa, the sub-region currently with the lowest extent of food insecurity, where 60 percent of the population is projected to be urban by 2020.

Income growth and increased urbanisation have also resulted in changing consumption patterns which has directly affected the agricultural sector. Demand for more processed

products has increased which raises the scope for value addition. However sub-Saharan African producers have had variable success in taking advantage of this opportunity. In addition, there has been a shift towards wheat and rice (which are net imports) and this has the potential to reduce demand for traditional staples. This has an impact on food prices, particularly when transport costs are considered. On the supply side, low agricultural productivity in the region is a major constraint, as discussed in Section 5.c. below.

The above analysis has shown that the MENA region is much more reliant on a trade-based food security strategy than sub-Saharan Africa, as shown by the former region's much larger food imports. In addition, in sub-Saharan Africa there is greater country variability in terms of food imports, and a greater reliance on both domestic and regional markets for food supplies. However, within sub-Saharan Africa there has been a growing food gap and a resulting decline in food self-sufficiency and a corresponding greater reliance on agricultural trade.

To the extent that both the MENA and sub-Saharan regions will have to rely increasingly on food imports to achieve food security there are a number of initiatives that countries in both regions could take to improve the effectiveness of the trade-based component of food security. The World Bank/IFAD/FAO report (World Bank 2009) suggests a number of ways in which MENA countries could reduce their exposure to international market and price volatility for imported foods. This includes: improving supply-chain efficiency to reduce cost and improve food distribution; developing virtual stockpiles of food for example via financial reserves and forward options rather than relying on physical stockpiles; and investing in infrastructure to store and transport food.

As MENA countries are the single largest group of cereal importers there is potential for economies of scale via multinational procurement and MENA countries could do more to monitor world and regional cereal demand and supply to foresee price shocks. Linked to this is the need for better monitoring of national food demand and supply in MENA. The League of Arab States has proposed a regional food security and early warning system to help predict quantity and location of any needed assistance and this could work with established institutions that already monitor food supplies such as the FAO.

Both MENA and sub-Saharan countries could make greater use of formal risk markets to insure transactions in global food markets and there is scope for countries to use financial

instruments to create virtual stockpiles of food i.e. by using futures contracts and option contracts. They could also improve logistics to get imported food to consumers at lower prices. Gulf countries score highly on the World Bank logistics performance index, but below other upper income countries, but countries like Algeria, Syria, Yemen, Lebanon, and Egypt score badly as do most sub-Saharan countries (World Bank 2007).

5.b. Food aid

In times of protracted crisis food aid may be required by a country in order to maintain individual food security for its population (FAO 2006a, p.32). Sub-Saharan Africa has been far more reliant on food aid than the MENA region. Wilson and Bruins (2005) look at nine Middle Eastern countries and find that between 1992-2002 six received food aid, namely, Jordan, Lebanon, Iran, Syria, Israel and Palestine. However, over this period all reduced their dependence on food aid. By contrast in 2006 24 of the 39 countries facing serious food shortages and in potential need of food aid were in Africa (FAO 2006a, p.85), with the main cause being civil strife and humanitarian displacement.

Food aid is usually expressed in its wheat equivalent but it consists of grain, processed grain products, pulses, micronutrients and fortified products, as well as contributions of cash for the purchase of qualifying products. Of sub-Saharan cereal consumption of 63m MT, approximately 9 percent (5.8m MT) in 2004/05 was provided through food aid.[14] The quantity of food aid shipment is following a downward trend. Table 6 shows the patterns of food aid provision as a share of total food consumption by sub-Saharan sub-region. The highest recipient of food aid was Eastern Africa, also where the GHI was highest, however Western Africa, the most food secure sub-region had a higher share of food aid than Central Africa, where some of the most food insecure countries are located. By individual country there is no clear trend between the Global Hunger Index rating and the provision of food aid[15],

[14] The consumption data is only available for 2005.

[15] Considering individual countries within sub-Saharan Africa: the Democratic Republic of Congo has the highest GHI rating for the region, yet its share of food aid of 1 percent of food consumption is comparable with that of Ghana's, one of the region's most food secure countries.

suggesting that it cannot be relied upon as strategy and that there are other complex factors underpinning its provision, possibly along with data anomalies.

Table 6: Food Aid as a Share of Total Food Consumption and Hunger Rating in sub-Saharan Africa

Sub region	Food aid % 2004-06	GHI 2003-08
Sub-Saharan Africa average	3.2	20.5
Central	1.1	23.1
East	6.7	25.7
Southern	2.4	17.1
West	3.7	19.2

Source: FAO 2010 http://www.fao.org/economic/ess/ess-data/ess-fs/ess-fadata/en/ IFPRI 2010

Analysis has shown that food aid, if not delivered appropriately, can damage local production and markets and in turn have a negative impact upon food security in the long term. In response to these findings CARE-USA adjusted their food aid policy to strengthen the management of local and regional purchases of food aid (FAO 2006a, p.23).

In summary, sub-Saharan Africa has been much more reliant on food aid than MENA, but the impact of food aid on long term food security is debatable.

5.c. Domestic food production in MENA and sub-Saharan Africa

Due to regional differences in natural resource endowments and farming methods, there is more scope for the sub-Saharan region compared to MENA to focus on increased domestic food production as a source of future food security. Table 7 shows that the available agricultural land per capita in sub-Saharan Africa at 1.74 ha/per capita in 2006 significantly exceeds that in MENA at 1.11 ha/per capita. In addition, sub-Saharan Africa has a substantially smaller irrigated area and lower fertiliser use than all other regions, including MENA. The Near East and North Africa region has almost eight times the proportion of irrigated area and more than a five times greater usage of fertiliser. These comparisons indicate that sub-Saharan Africa has far greater potential than MENA to increase food production both extensively (expanding the area cultivated) and intensively (via productivity gains from more intense use of inputs such as irrigation and fertiliser).

Table 7: Agricultural Area, Irrigation and Fertiliser use by Region

Region	Agricultural area per capita (ha/pc)	Irrigated area (% of arable and permanent crops area)	Fertiliser use (kg/ha of arable land)
Sub-Saharan Africa*	1.47	3.7	14.6
Asia and the Pacific	0.31	33.7	171.6
Latin America and the Caribbean	1.46	11.0	89.3
Near East and North Africa	1.11	28.7	73.1
Total world	0.80	18.0	100.8
Total developed countries	1.34	10.6	82.6
Total developing countries	0.66	23.0	114.3

Source: FAO 2005, p. 179 * Excludes South Africa

The fact that sub-Saharan Africa has the lowest global application of nutrients to the soil (Foresight 2011, p.133) is reflected in average cereal yields for the region, which are a third to a half of those of other regions as shown in Table 8. It is also reflected in value added per worker in agriculture. The value added per worker for the sub-Saharan region in 2003 was

US$327 with an annual growth rate of 1.4 percent between 1992 and 2003. This is less than one sixth of that of the MENA region where the value added per worker was US$ 2140, with a faster growth rate of 2.4 percent (FAO 2005, p.178).

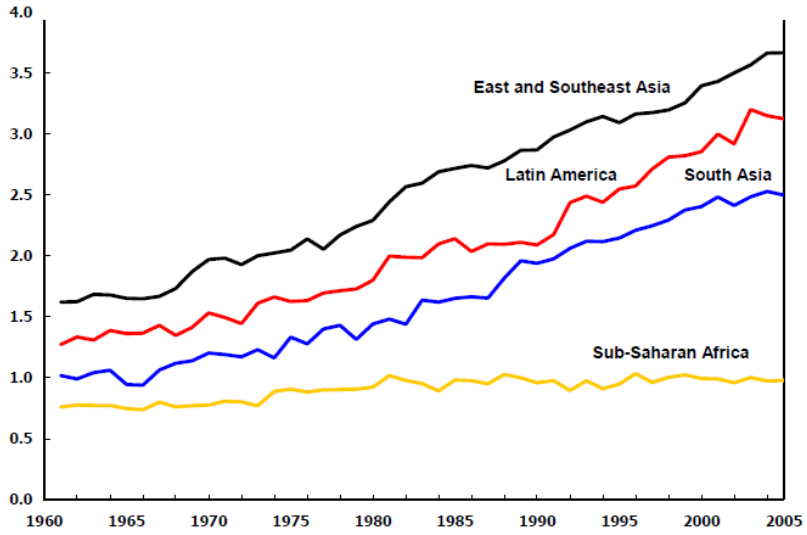
Table 8: Cereal yields by region

Region	Cereal yields kg/ha	
	1992-1994	2002-2004
Sub-Saharan Africa*	10054	10709
Asia and the Pacific	30889	34590
Latin America and the Caribbean	24563	30121
Near East and North Africa**	19647	23609
Total world	28002	31675
Total developed countries	32087	38038
Total developing countries	25518	28363

Source: FAO 2005, p.154
* Excludes South Africa
** Afghanistan, Algeria, Bahrain, Cyprus, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya Morocco, Palestinian Territory, Oman, Qatar, Saudi Arabia, Syria, Tunisia, Turkey, UAE, Yemen.

Scope for sub-Saharan Africa to increase food crop productivity is shown in Figure 7. Whilst there is a high degree of diversity across sub-Saharan countries, overall there has been slow productivity growth in the agricultural sector (Christiaensen and Demery 2007; Byerlee et al. 2005; Dercon et al 2006; Diao et al. 2006; Mwambu and Thorbecke 2004). The cereal yield growth for the region (Figure 7) shows an increase of just under 30 percent, whereas the increase for developing countries in Asia was 177 percent and Latin America 144 percent (Staatz and Dembele, 2008, p.8).

Figure 7: Cereal Yield Growth Rates by Region, 1960-2005



Source: FAOSTAT cited in Staatz and Dembele (2008, p.8)

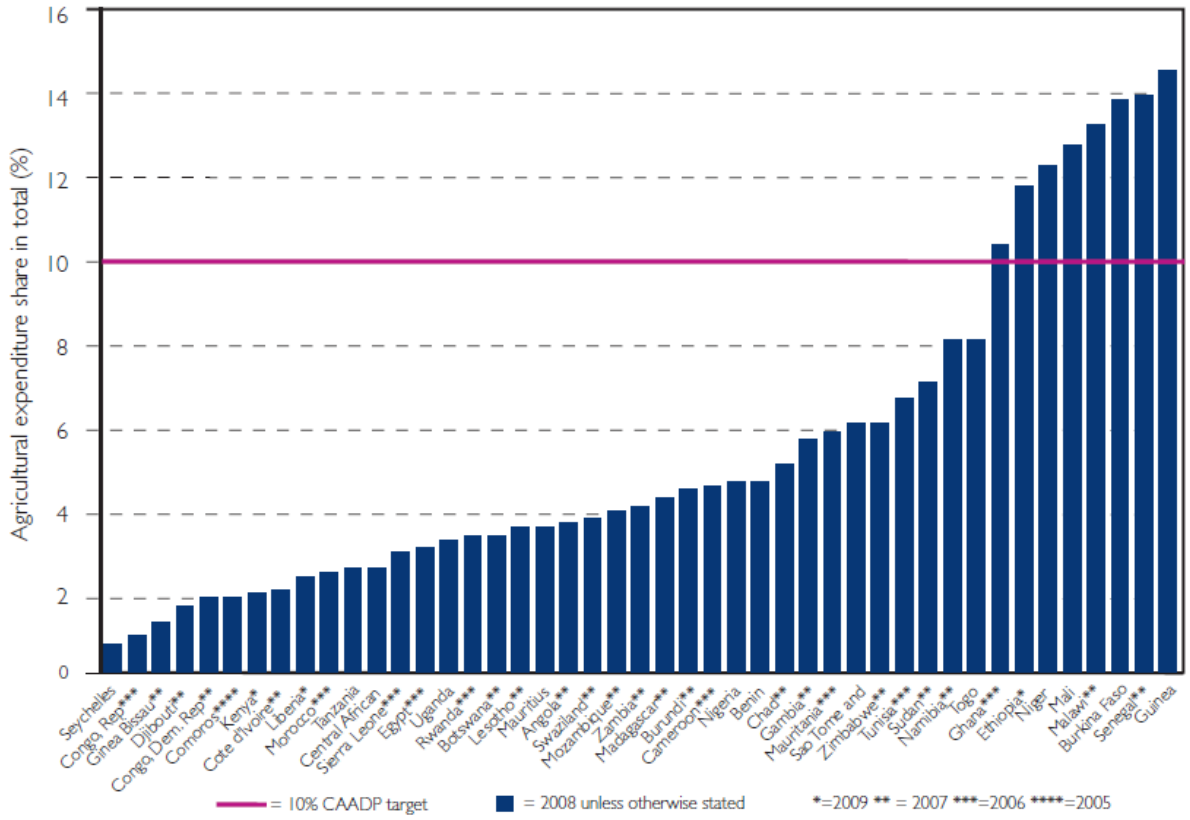
Sub-Saharan Africa's inability to take advantage of its potential for both extensive and intensive growth of domestic food crop production is explained by a number of factors, including supply inefficiencies which are due to inadequate investment in transport, irrigation and storage and supply infrastructure. More generally, there remains a high degree of variance in terms of access to resources (Jayne and Chapota 2006; Jayne et al. 2001; Weber et al. 1988; Zezza et al. 2006).

Agricultural productivity in sub-Saharan Africa has been constrained by both underinvestment and investment that has been inappropriately targeted, apparent from the high and variable rates of return.[16] Particularly notable is inappropriate investment related to poor project design and inadequate monitoring and evaluation (African Development Bank et al. 2006; World Bank Independent Evaluation Group 2006; both cited in Staatz and Dembele 2008). Weaknesses in the maintenance of existing infrastructure and expenditure upon import subsidies rather than productive investment have also been two notable characteristics (Staatz 2008, p.9). Structural adjustment policies have resulted in decades of insufficient investment in infrastructure from agricultural parastatals, networks of extension agents, and national agricultural research (Jayne et al. 2010). By country there are large variances in public sector

[16] Economic rates of return were found to range from an average rate of 18 percent for foreign financed irrigation projects for twenty years since 1985 to a median rate of 34.3 percent for agricultural research projects (AfB et al. 2006, Alston et al. 2000 cited in Staatz and Dembele 2008: 9).

expenditure on agriculture as shown in Figure 8, which has persisted despite the African Union (AU) pledge to direct 10 percent of public expenditure to agricultural development.[17]

Figure 8: Agricultural Expenditure as a Share of Total Spending by Country



Source: Fan et al. 2009.

Although sub-Saharan Africa has much greater potential for a food security strategy to rely on domestic food crop production compared to MENA, this does not mean that the agricultural sector in MENA should be ignored. International organisations (World Bank 2009) have advocated increased agricultural productivity as one part of a three pronged strategy to improving food security in MENA (along with strengthening domestic safety nets, family planning and education and reducing vulnerability to international food market volatility in the ways suggested in section 5.a.ii above).

[17] Through the Comprehensive Africa Agricultural Development Programme (CAADP).

In both MENA and sub-Saharan Africa improving agricultural productivity (not just in food crop production) will contribute to food security in three ways: it will increase the purchasing power of the rural poor via higher incomes from increased productivity enabling them to buy food; it will increase foreign exchange earnings via increased agricultural exports of crops in which the regions have comparative advantage so providing foreign exchange to purchase food imports; and it will increase domestic production of food and hence reduce need for imports. An increase in the purchasing power of the rural poor is particularly needed in sub-Saharan Africa where it is estimated that 42.3 percent of the population will remain in poverty by 2015 (IFPRI 2004). The agricultural sector is an important factor in overall economic growth and poverty reduction and therefore productivity growth in the sector plays a key role (Christiaensen and Demery 2007, Byerlee et al. 2005, Dercon et al 2006, Diao et al. 2006, Mwambu and Thorbecke 2004). The relationship between the agricultural sector and food security, through the poverty reduction transmission, is more direct than for other sectors. It has been estimated that a 10 percent increase in agricultural yields in Africa, is associated with a 7 percent reduction in poverty (World Bank 2008 cited in Foresight 2011, p.127). Therefore exploring the potential for a green revolution in Africa is crucial to both food security and poverty reduction.

In MENA there is little scope to increase agricultural production extensively i.e. via increased use of resources like land and water that are already scare. Hence the region will need to rely on intensive increases i.e. productivity increases in terms of yields per unit of land and water. In the mid-1980s agricultural productivity in MENA started catching up with other net food importing developing regions, largely due to adoption of improved wheat and rice varieties in countries like Syria, Iran and Egypt. But more recently productivity growth is again lagging most other regions, except for in the production of fruits. As shown in Table 8, although cereal yields in MENA exceed those of sub-Saharan Africa , they are still well below the global average and this gap is widening. Between 1990-2007 cereal yields in the Arab world increased by 14.5 percent compared to global average of 21.5 percent. However, the scope for MENA to increase its food crop productivity is limited by ecological factors.

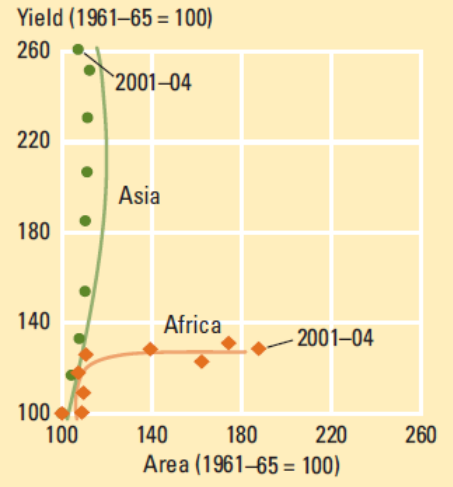
5.d. A green revolution in sub-Saharan Africa?

As argued above, in contrast to MENA, there is much more scope for a green revolution in food crop production, as well as agriculture more generally, in sub-Saharan Africa, and this could do much to improve food security. Staatz and Dembele (2008) argue that there is scope for faster growth in agriculture in sub-Saharan Africa and in turn for an increase in domestic food production through a type of green revolution based on: i) changes in the global and regional socio-economic and political contexts; ii) increased willingness to support the sector as a basis for poverty reduction; and iii) lessons from some success stories in Africa. These opportunities must be balanced against the challenges faced by the current and future impacts of HIV/AIDS, population growth and climate change upon the sector. These present challenges for the rural labour supply and at the same time place pressure on food, energy and water (Foresight 2011, p.127).

The characteristics requiring consideration in an evaluation of both the absence of and scope for a green revolution in sub-Saharan Africa include population density, infrastructure, geography and ecology, fertilizer use and the soil quality, and agricultural sector policies. These will be discussed in turn and comparisons made to the situation in Asia at the time of its green revolution.

On average the population density of sub-Saharan Africa is one tenth of that of South Asia, however the high extent of diversity in the region has resulted in some areas where a high density of population has prevented further expansion of agricultural output through increased land area (e.g. Rwanda). Once adjustments are made for land quality, the population density in Kenya is found to be higher than that of Bangladesh (World Bank, 2008, p. 55). Figure 9 shows how increasing land area has been the dominant strategy of sub-Saharan Africa, in comparison to yield increases dominating the Asian strategy. Future expected trends in population growth in sub-Saharan Africa however increase the urgent need to address agricultural productivity.

Figure 9: Cereal Production Expansion Strategies



Source: FAO 2006a, cited in World Bank 2008, p. 55.

The resource endowment of sub-Saharan Africa's agriculture is very different from Asia at the start of its green revolution. The main characteristic of sub-Saharan Africa's agriculture is that it is diverse in the range of staple crops that are produced with characteristic differences by sub-region. Asia was able to focus on improved varieties of rice and wheat and their irrigation, however in sub-Saharan Africa a variety of improved varieties are needed along with Africa-specific technologies. This presents an immediately greater challenge.[18]

Whilst some estimates show that applying existing technology could still have benefits, increasing average yields by as much as three times in many parts of Africa (Foresight 2011, p.80), sub-Saharan African agriculture has distinct characteristics requiring specific technologies. These include: i) the diversity of staples; ii) a greater need for increased nutrients; iii) increased transport costs making ii more challenging; iv) a majority dependence on rain fed agriculture due to a low proportion of irrigated area (Table 7); v) low population density which raises the per person infrastructure cost; vi) a higher proportion of the population residing in landlocked countries with higher transport costs (Collier 2006, World Bank 2007); and vii) higher research costs due to lower economies of scale to R&D

[18] The third Asian green revolution crop was maize, in Africa this is only dominant in the South (Staatz and Dembele 2008, p.30).

compared to other regions as a result of the region's geography (Staatz and Dembele 2008, p.30).

In particular the geography of the region and its impact upon transport costs, highlights the importance of domestic food production as a strategy. Faster growth is dependent upon greatly increased levels of investment in infrastructure, which are more efficient and targeted to areas where the growth payoffs are higher. Sub-Saharan Africa has experienced decades of insufficient investment in infrastructure which have resulted in greatly increased production costs and higher risk. Particularly notable is the low investment in roads, related to the lower population density and also in irrigation. These infrastructure shortfalls have a large potential to impact upon production costs, such that in landlocked countries transport costs can be as high as 77 percent of the value of their exports (Foresight, 2011, p.85). Furthermore, deficiencies in storage and supply infrastructure can have a large impact on the food supply chain. Post-harvest losses for maize in parts of Africa, can be as high at 30 percent, and not unusually 10 to 20 percent (Foresight, 2011, p.93).

Table 7 shows that fertiliser use in sub-Saharan Africa is significantly lower than in all other regions, including MENA. The World Bank (2008) citing Morris et al 2007, note that on average farmers in Sub-Saharan Africa have to sell double the amount of grain to purchase one kilogram of fertiliser compared to Asian and Latin American farmers. The soil quality in sub-Saharan Africa has deteriorated over decades due to this lack of fertiliser use along with the expansion of production into less fertile land areas as population pressures have increased. It has been estimated that this has affected three quarters of the region's farmland (World Bank 2008, p.55). An example of where policy around land rights has encouraged improvements in the soil quality is in Ethiopia. The strengthening of users rights resulted in increased investment in building terraces (Foresight 2011, p.84).

The sub-Saharan region has a history of interventionist agricultural sector policies, however, there are numerous examples of misdirected policies and inefficiencies. In addition to this, the sector has historically been heavily taxed. When these factors are combined with the more frequent occurrence of macroeconomic shocks, lower public investment and higher marketing costs and weak supply chains the cumulative challenges for a green revolution in Sub-Saharan Africa are notably higher than they were in Asia.

Despite the difficulties facing Africa in successfully implanting a green revolution, recent evidence of localised successes in staple food production in sub-Saharan Africa based on increased fertiliser use and technology advances, particularly in maize in Malawi, Kenya, Zambia and Zimbabwe (World Bank 2008, p.55) suggest that there is scope for increased food production to be a viable strategy. However, due to the region's diversity there is no one type of green revolution that will address the region's food production inefficiencies and countries will have to find novel ways to boost crop and livestock production to avoid increasing reliance upon imports and food aid (Foresight 2011, p.127). Nevertheless, the organisational challenges of a green revolution in sub-Saharan Africa are large, such that the risk of pursuing a domestic production strategy in isolation is great. A recommended approach would be to pursue a domestic production strategy as a primary focus, supported by a trade-based strategy.

In conclusion, both MENA and sub-Saharan Africa have the potential to increase agricultural and food crop productivity. For both regions key policies to improve agricultural productivity include: more R&D in agriculture; improving availability of rural assets like land, physical capital, education and health; investing in rural infrastructure; improving product markets; improving access to financial services and strengthening producer organisations. Rural poverty is at the heart of food security problems in both regions and hence there is a particular need to target smallholder farmers in the process of trying to raise agricultural productivity. However, the scope for both extensive and intensive growth in agriculture and food crop production is far greater in sub-Saharan Africa than in MENA, such that boosting domestic food crop production via a green revolution is likely to play a much greater role in sub-Saharan Africa's future food security strategy than it will in MENA. The potential for greater food crop production in sub-Saharan Africa is closely linked to a fourth food security strategy currently in vogue in the MENA region, namely, land acquisition in third party countries. This is discussed below.

5.e MENA's land acquisition overseas

We have argued above that both MENA and sub-Saharan Africa will have to rely on a combination of trade and domestic production to achieve future food security, with MENA being particularly dependent on trade. However, much of the work carried out on food

security in MENA was conducted before the global food price hike of 2007/08. Lofgren and Richards (2003) for example state that "reliance on imports of grain is made increasingly attractive by a long-run downward trend in world prices that is expected to continue in the future." (p. 12). We now know that this prediction was wrong.

Following the food price hike of 2007/08 most MENA countries are beginning to reappraise their food security strategies. They are uncomfortable at relying on trade in international food markets as this makes them vulnerable to price volatility as well as to trade embargoes and export bans and the geo-political influences of big suppliers like USA. The fact that five exporters – Argentina, Australia, Canada, EU and USA - supply 73 percent of the world's traded cereals (FAO 2008) makes MENA's access to food highly vulnerable to events in these five exporters plus their relationships with these countries. For example, countries like Iran, Syria with poor relations with the West may fear trade embargoes. In addition, rising global food prices have contributed to the wave of political unrest currently sweeping the MENA region via their impact on domestic food prices (Harrigan 2011).

As a result of the above factors, the issue of food security is taking on political dimensions in MENA. A strong concept that is emerging in the region is that of "food sovereignty" – the idea that nation states can have full political and economic control over their access to food. This is leading countries to want to reduce their reliance on food imports. We have already argued above that due to resource endowments the scope for MENA countries to increase their domestic food production in order to reduce reliance on imports is limited. In response to this constraint, a new innovative approach which is emerging in the region is a policy of acquiring land in third party countries on which to grow food for delivery to the home MENA country. This controversial strategy is being adopted by more and more food scarce MENA countries, with Arab investors buying or leasing land in poor but land and labour abundant countries to secure their food supply. Many of the host countries are in sub-Saharan Africa. Between 2006-2010 15-20 million hectares of farmland in developing countries has been subject to transactions involving foreign investors, many from the MENA region (World Bank 2009).

Advocates of this strategy claim it is a win-win approach: The investing MENA country gets guaranteed access to food and a high financial return on its investment. The poor recipient country gets an injection of capital into its agricultural sector promoting development and

increasing agricultural output so that there is more for everyone. The advantages of such practices for sub-Saharan Africa include the potential for investment in agricultural infrastructure leading to job creation, as well as health and education investment, agricultural technology spill overs and in the longer term the potential for improved international food price stability (Braun and Meinzen-Dick 2009).

Saudi Arabia and UAE are at the forefront of this MENA initiative. They hold 2.8 million hectares of land mainly in Indonesia, Pakistan, Sudan and Tanzania. The Saudi's now plan to acquire a chain of 100,000 hectares of land abroad as part of their "King Abdullah initiative for Saudi agricultural investment abroad" and are targeting Brazil, Indonesia and Sudan. Other agreements in place or being negotiated include: Egypt in Uganda and Sudan; Bahrain in Philippines; Kuwait in Cambodia, Laos and Myanmar; Libya in Ukraine and Zimbabwe; Qatar in Cambodia, Vietnam, Kenya and Sudan. For example in December 2008 Qatar took 40,000 hectares of land in Kenya in exchange for a US$2.5 billion loan to build a deep water port. Pakistan is actively courting Arab investors to buy up Pakistani land in return for oil and finance and Sudan, the largest country in Africa with abundant water for irrigation from the Blue and White Nile, is also a potential target[19].

The MENA investments in overseas land are carried out in a variety of ways. The UAE has used government investment but multi-national financial institutions such as the Arab Authority for Agricultural Investment and Development (AAAID) have also been involved, whilst in Saudi some of the investment has been carried out by private companies such as Al-Qudra and the Bin Laden Company - the Saudi government often gives credit facilities or finance to private investors who want to buy foreign land.

This land acquisition in third party countries to grow food for the Arab population is the changing face of food security in the MENA region. But it is a highly controversial strategy. The terms of the arrangements are often not transparent and often favour the investor with, for example, tax exemptions in the host country. There is potential for labour abuses and it can threaten food security in the host countries in years of poor harvest if the investing country has priority claim on food production. For example, Saudi is now receiving rice, wheat and barley from land they lease in Ethiopia whilst the World Food Programme spent

[19] China, Japan and South Korea have also engaged in extensive land acquisitions overseas to produce food for domestic consumption.

US$116 million providing 230,000 MT of food aid between 2007 and 2011 to 4.6 million Ethiopians threatened by hunger and malnutrition (South Asia Partnership 2011). The Sudanese are planning to set aside one fifth of their cultivatable land for Arab governments despite the fact that it is the recipient of the largest food aid operation in the world.

MENA's land acquisition strategy also has the potential to export political unrest to the host country as local populations loose access to land –farmers in Kenya and Pakistan have voiced opposition to proposed deals with Gulf countries, with Qatar for example facing an uprising from local farmers in Kenya who claim that the land the Qataris want to buy is theirs. There is also the possibility of negative externalities in the host country in that the foreign investors may not care about the long term environmental consequences of their actions. All these problems are exacerbated by the fact that many of the sub-Saharan host countries have weak institutions which often mean they cannot protect the rights of local people or the environment. In light of these issues, the Head of the FAO, Jacques Diouf has referred to some of these projects as 'neo-colonialist'.

An interesting new literature is beginning to emerge on this novel land acquisition approach to food security in MENA (Cotula et al 2009, IFPRI 2010a, Braun and Meinzen-Dick 2009) and it is an area that deserves further research. Clearly, there are strong implications for sub-Saharan Africa as a host region and food security issues in MENA and sub-Saharan Africa have become linked as a result of the former's land acquisitions in the later.

In light of the above problems, an alternative approach to purchasing land in third party countries has been recommended by the World Bank (2009). The Bank has suggested that instead of buying land in third party countries, MENA states should just invest in the local infrastructure and technology needed to produce, transport and store the food and should secure food through contract farming and investment in rural infrastructure in the host country. The FAO is likewise pushing foreign investors to support joint ventures with local farmers rather than leasing land or buying it outright. Qatar is looking into this with its Hassad Food Company owned by Qatar's sovereign wealth fund.

6. Conclusions

This paper has shown that in terms of national aggregate food security, the MENA region is often portrayed as being very food insecure due to its heavy reliance on food imports. However, in terms of more meaningful indicators of food security at the level of the individual, sub-Saharan Africa is much more food insecure than MENA as shown by indicators such as the Global Hunger Index and percentage of the population undernourished.

Analysis of both regions shows that trade seems to be a critical factor in influencing food security, as is country income level. On the other hand, resource endowment does not seem to be correlated with food security in either region. This suggests that two factors are critical in influencing a country's food security – the ability to generate sustained (pro-poor) economic growth in order to raise income levels and the ability to increase the economy's level of trade.

Reliance on foreign trade and food imports, however, is only one of several possible strategies for achieving food security. Other strategies include recourse to food aid, domestic food production and land acquisition overseas. In terms of food imports, MENA is much more reliant on this strategy than sub-Saharan Africa due to MENA's ecological constraints on food production, although predictions suggest that both regions will become increasingly dependent on food imports in the future unless domestic production is increased significantly. Although less dependent on commercial food imports, sub-Saharan Africa has been much more reliant on food aid than MENA and is more reliant on intra-regional trade.

In terms of domestic production, sub-Saharan Africa has much more potential than MENA to increase food production through both extensive and intensive production increases. In particular, there is potential for a significant green revolution in sub-Saharan Africa, although the difficulties of implementing such a revolution should not be underestimated.

Both regions have been adversely affected by the global food price increases of 2007/08 and of the first half of 2011. The upshot, particularly in MENA, has been a reappraisal of trade-based food security strategies and a reluctance to rely on volatile international food markets. Whilst sub-Saharan Africa can reduce reliance on international food markets via a green revolution, this option is limited in MENA. Hence MENA is turning to a new approach to food security via land acquisition overseas. This controversial strategy means that food

security in the two regions is likely to become more closely interlinked since much of MENA's land acquisition is occurring in sub-Saharan Africa.

Whatever combination of strategies individual countries in MENA and sub-Saharan Africa adopt to obtain food security, there will always be a need for appropriate social safety nets to ensure that the poor and vulnerable have access to food. One of the three approaches to food security in MENA recommended by the World Bank, IFPRI and FAO (World Bank 2009) was to strengthen safety nets along with family planning and education, including education on family size and nutrition. Policies under this heading include for example, more targeted and flexible safety nets and food subsidies so that food price shocks are not allowed to reduce investment in human capital, for example by pulling children out of school.

Lofgren and Richards (2003) likewise argue that income poverty is a primary issue for household food security in MENA and that Government safety nets and poverty alleviation strategies are essential, for example, targeted food subsidies, public works programmes, pensions and cash transfers. They point out that between 1985 and 2000 poverty rose in most of the MENA region's middle and lower income countries.

In sub-Saharan Africa the need for adequate social safety nets is also crucial due to the high incidence of poverty in the region and high levels of undernourishment. In addition, the prevalence of HIV/AIDS also impacts negatively on food security particularly in Eastern and Southern parts of the region[20] (Staatz and Dembele 2008, p.13). A full discussion of safety net policies is beyond the scope of this paper.

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[20] Whilst HIV/AIDs appears to have a greater prevalence amongst higher income groups, the lower income capacity of the poor to cope with the disease results in the impact upon poorer groups being greater.

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