



Food Security in the Gulf Cooperation Council (GCC) Economies Working Paper

Andy Spiess

GCC Network for Drylands Research and Development (NDRD) & University of Hamburg, Germany
e-mail: spiess [at] ndrd (dot) org

Citation: Spiess, A., 2011. Food Security in the Gulf Cooperation Council (GCC) Economies [Working Paper]. Hamburg: NDRD
Online: <http://www.ndrd.org/Spiess - Working Paper on Food Security in the GCC.pdf>

Thematic Rationale

The changing political situation in the 21st century Gulf and the scale of socio-economic problems are presenting new challenges to the modern oil monarchies. The performance of traditional patron-client networks and wealth redistribution is increasingly vulnerable not only to the inherent uncertainty implied by dependence on oil revenues, but also to population dynamics enhanced by structural deficiencies, environmental degradation and future climate uncertainties. Projections indicate that Middle Eastern localities will be exceedingly vulnerable to aggregate impacts and risk of large scale discontinuities, which will exacerbate the current situation of the already progressively degraded land and is likely to intensify the already severe water stress (Met Office, 2009; Evans, 2009; Ayhan & Al-Othman, 2009; Williams et al., 2007; Burke et al., 2006). Consequently, the region is facing a number of converging trends that threaten the future wellbeing of Gulf nationals and will have a disproportionate impact on the low-income social strata¹. Coupled with a probability of increasing shocks resulting from natural disasters, this or the complex dynamics of international and domestic factors will cause a significant reduction in domestic agricultural production as well as the ability to import sufficient foodstuffs, which, in turn, may put local or regional respective food security under

¹ It should be noted that the comprehensive definition of food security elaborated in section 2 of this chapter includes 'all residents' and therefore it can be determined with certainty that large segments of those currently living in the Gulf, especially lower income expatriates, are severely food insecure. However, the plight of these millions of foreign workers has been sufficiently covered in the academic literature as well as in other works by the author and hence will not be part of this analysis.

threat with the potential to amplify destabilization, engender violence and even accelerate state failure processes in an already geopolitically charged region (Brown & Crawford, 2009; Maas & Tänzler, 2009; Schubert et al., 2008)². If these novel security challenges will be disregarded or inadequately addressed, they have the potential to disrupt the social contract and redistributive mechanisms which currently define state-society relations, and leave a legacy of fractured polities with greater susceptibility to future externalities.

The first noticeable reaction of Gulf monarchies to a changing security landscape, in other words their increasing vulnerability to transnational threats, came with the sudden spike in food prices in 2008. While the abrupt rise in world market prices was widely acknowledged to be an outcome of the untimely convergence of multiple structural and cyclical factors, sustained high prices, and increased volatility created concerns about food security among the Gulf Cooperation Council (GCC) member states³. However according to an upgraded version of the Food Price Index⁴ published by the Food and Agriculture Organization of the United Nations (FAO) global food prices reached another record

² In this context, food price inflation has also been among the root causes for the political uprisings in several Arab states beginning of 2011.

³ The Gulf Cooperation Council (GCC) is a "loose" political and economic alliance formed in 1981 with the main objective to confront their security challenges collectively and strengthen cooperation. Its members include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

⁴ The Food Price Index is a commodity basket that regularly tracks monthly changes in global food prices.

high in January 2011 (FAO, 2011). Evaluating the figures and in concurrence with other independent experts, chief economist and grains expert Abbassian came to the conclusion that the upward pressure on world food prices as a consequence of the 'unpredictability of weather activity' associated with progressive climate change were likely to persist in their trend and warned about the severe security implications (O'Grady, 2011). Research conducted by Nomura economists further identified growing shortages of water as a critical factor restraining any growth in agricultural productivity and in a recent publication that was not approved for distribution in Saudi Arabia revealed that in accordance with their Nomura's Food Vulnerability Index (NFVI)⁵ the Kingdom to be the 27th most vulnerable country to rising food prices on a global scale (Subbaraman et al., 2010, p. 26). Likewise, NCB Capital, the investment arm of Saudi Arabia's National Commercial Bank, warned that "*food inflation ... represents a potentially considerable social-economic risk which the authorities are poorly equipped to deal with*" (UPI, 2010).

Thus with the current GCC food import dependency exceeding according to the World Trade Organization 90 percent (Roy, 2010), neither the current quick fixes nor the piecemeal policy approaches will suffice to ensure human security in the region. The projected increase and profound dependence on external markets makes the GCC vulnerable not only to price variations and high food commodity prices but also to the increasingly changing food policies of the exporting countries such as a blanket ban on the exports of certain food commodities. The situation will be further amplified by modifications in dietary preferences towards meat consumption in the region, which is projected to nearly double from 2000 to 2030 (The World Bank et al., 2009, p.19). Nevertheless current policy approaches in the Gulf economies treat the symptoms of growing food insecurity, not the causes. Hence there is the urgent need for a paradigm shift that focuses not only on imports and agricultural policy, but on a structure that integrates the latter with energy, population control, and water policies, each of which directly affects food security. Concomitantly, Ulrichsen warns that the future will be framed by the need to find a balance between "*competing visions of the national and regional security architecture, between incremental reforms to political and economic structures and the deeper systemic problems which undermine long-term solutions, and between rising demands for, and falling supplies of, natural resources*" (Ulrichsen, 2009, p.30).

⁵ The NFVI is based on data compiled from the World Bank, FAO, USDA, CEIC as well as Nomura Global Economics estimates and is calculated as $100 - (0.25 * \text{GDP per capita} + 0.5 * \text{net food exports} - 0.25 * \text{share of food in expenditure})$. All the values have been normalized by subtracting them from the mean and dividing by standard deviation to allow a better comparison between countries.

Food Security: A Misunderstood Concept in the GCC

Food security is a holistic concept that involves economic, social, cultural, environmental and political aspects. Nevertheless while the multi-dimensional phenomenon of food security has evolved in the past decades to reflect the wider recognition of the complexities of the technical and policy issues involved⁶, it is by and large a completely misunderstood operational concept in public policy in the GCC which makes coherent discussion more difficult. The contemporary discourse is still characterized by a broad emphasis on the supply-side, reflecting the global perception from the 1970's when the notion was defined in terms of a food supply that could ensure the availability and price stability of basic foodstuffs at the national and global level. Once the limitations of the approach became clear to researchers and development practitioners in the mid 80ties, there was a radical paradigm shift toward a novel emphasis on the demand side, consumption and the issues of access by vulnerable members of society to food. The novel concept closely identified with Sen's (1981) seminal theory on food entitlements as well as the introduction of socio-economic and nutritional variables. A further dimension was adopted in the 1994 Human Development Report, which drew global attention to the construct of human security and argued that the scope of security should be expanded to include threats in seven areas of which food security was one integral component. The emerging paradigm was closely related to a rights based perspective to development that has, in turn, greatly influenced the ethical and human rights dimension in contemporary food security discourse⁷. In 1996 the World Food Summit definition reinforced the multidimensional nature of food security by including food accessibility, availability, utilization and stability by enabling policy responses focused on the promotion of livelihood options as well as including the concepts of vulnerability, adaptation and risk management. The concept was again refined in 'The State of Food Insecurity in the World' progress reports by stating that food security is realized "*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*" (FAO, 2009, p.8) and thus represents the emergence to assess food security as a social, cultural and political construct.

⁶ For a comprehensive review of this evolution see Clay (2002).

⁷ Please note that in principal the 'right to food' is not a novel concept and was first recognized in the United Nations Declaration of Human Rights in 1948.

Ultimately, in recognition that the complexity of climate change as a threat, environmental stressor and risk domain will have impacts with dramatic environmental and human consequences, food security could and should however be also seen as the outcome of complex interactions among natural resource management and human responsibility toward sustainable development.

Nevertheless, when putting 'food security' into the direct context with authoritarian ideologies and political realities in the Gulf monarchies we will be reminded of Sen's succinct quote that there is "*...no such thing as an apolitical food problem*" (Sen, 1982, p. 459). Counterintuitively, the contemporary threat of 'food insecurity' in the Gulf economies is not necessarily caused by the inability to supply food, but should rather be considered the result of long-term systemic failures. Ergo, identity politics with nationalistic tendencies conveying the message of power and control have often determined unsustainable ideologies rather than being a reflection of either economic or environmental rationale.

Paradoxically, a recent study analyzed the food security situation in the GCC by applying an apolitical myopic macro level definition, which can be summarized as a country's ability to finance its 'food imports' out of total export revenues and concludes that all of the Gulf economies are "food-secure" (Breisinger et al., 2010, p.3)⁸. Ergo the tendency to either misuse the concept, a reality that manifests itself by the frequent terminology application as either the incongruous notion of 'self-sufficiency' or representing the demand side perspective as 'food availability', or to apply inconsistent definitions is misleading. Therefore a comprehensive food security strategy in the GCC must first address the issue of demand growth as well as the underlying systemic challenges.

Setting the Frame: Status Quo and the Evolution of Irresponsible Policies

Some GCC countries have achieved noteworthy absolute progress in improving their Global Hunger Index (GHI) with the proportionate reduction of the undernourished population being the most significant driving factor

⁸ The authors reason that the ratio of total exports to food imports is more relevant for food security analysis than the net food trade position, which only reflects the fact that a country is a net food importer or exporter, but not the relative cost of access to food in each individual country. Hence it cannot reflect how vulnerable the county may be to changes in food prices and international food availability. 'Food imports' are defined as a measure of adequate acquisition of food crops in world markets to attain food security by individual countries.

among the best performers. For instance, between 1990 and 2009, Kuwait and Saudi Arabia saw some of the largest improvements on a global scale, by decreasing their GHI by -76.8 and -53.4 percent respectively (Von Grebmer et al., 2009, p.12). Nonetheless the current situation has the potential to reverse some of the achieved development progress and depleting oil reserves will also substantially reduce the extent to which the Gulf economies are shielded from the negative fiscal impacts of high food prices. According to the Economist Intelligence Unit, GCC spending on food imports is projected to more than double from US\$24.1 billion in 2009 to US\$53.1 billion by 2020 (EIU, 2010, p.16). By contrast, the International Trade Statistics 2009 published by the WTO show that the UAE alone imported food (SITC sections 0, 1, 4 and division 22) worth US\$15.28 billion in 2008, representing an annual percentage increase of 47 percent to 2007, while Saudi Arabia imported food worth US\$15.25 billion in 2008, representing an annual increase of 29 percent (WTO, 2009, p.54). Moreover, climate change will affect a number of physical, chemical and biological processes that drive the productivity of agricultural, forestry and fisheries systems and hence are likely to contribute to adverse impacts on global and domestic crop production levels (Fedoroff et al., 2010; Nelson et al., 2009; Hadid, 2009; FAO, 2008; Rosenzweig et al., 2007; Cline, 2007; Al-Kolibi, 2002). For instance, it is expected to reduce frequencies of winter low temperatures which affect production of certain traditional fruits trees in ancient cropping systems, mostly in the high-mountain region in Oman (Luedeling et al., 2009). At the same time, the regions questionable economic and demographic development, rapid unplanned urbanization, resource-intensive industrialization and the expansion of irrigated agriculture have placed a considerable burden and have heavily depleted natural resources, a situation that is set to worsen with climate uncertainties. In Bahrain for instance an estimated population of 1.2 million people (CIA, 2011) is causing the archipelago to be one of the most densely populated states of the world, inflicting an immense stress on its diminishing water resources and limited agricultural lands. The situation is further exacerbated by an ever increasing number of foreign nationals, illegal immigrants and an additional 5.8 million tourist arrivals in 2011 (WTTC, 2011, p. 7). The remaining 2.8 percent of its landmass considered arable land are under constant threat of dysfunctional planning, which has contributed to a massive encroachment on fertile land. Next to high rises, gulf clubs and motorsport circuits, land reclamation activities are reducing the stock of coastal wetlands⁹ by about 1.5 km² per year (Al-Jeneid et al., 2008, p. 96), while excessive groundwater withdrawals are resulting in a severe decline of the groundwater table through saltwater intrusion (Al-Zubari, 2003). Nevertheless to

⁹ Mangroves, saltmarshes, and intertidal areas

avoid even further misguided investments and policies, quantifying the impact of local interventions within the broader hydrology of the whole system would be increasingly imperative (The World Bank, 2007). With progressive salinization and desertification processes in the entire GCC region, the amount of arable land is projected to decrease even further and there should be little doubt that the challenge of food security will remain to stay.

A recent assessment placed Bahrain, Qatar, Kuwait, Saudi Arabia and UAE as the world's most water stressed countries and hence at 'extreme risk'. The analysis cautions that the dual drivers of climate change and population growth will combine to put further stress on scarce water resources and affect the food security of governments, regardless of how water secure they may be today. The vulnerability to having an insufficient quantity and quality of water to enable normal socio-economic functioning in these nations could constrain development and trigger social unrest if dwindling resources result in higher prices and limited access for their populations (Maplecroft, 2011). Accordingly, Brown¹⁰ (2011a) observes that: "*Long after the political uprisings in the Middle East have subsided, many underlying challenges that are not now in the news will remain. Prominent among these are rapid population growth, spreading water shortages, and growing food insecurity*".

However the substantial state-organized welfare polity has expanded the expectation of citizens on consumption, hence governments are finding themselves in a vicious spiral driven by the necessity to reduce public spending to avoid budget deficits and the immense social pressure to provide public services, notably inexpensive food, in order not to trigger a potential challenge to their regime legitimacy. Therefore as an immediate response to offset the impact of elevated food prices, several Gulf States introduced price controls, including further food subsidies and caps on rent increases, as well as public sector pay rises. The UAE for instance issued a policy to ban all food outlets, dealers, and importers selling food stuffs at elevated prices (Hartley, 2009) as well as announced a mammoth 70 percent public-sector wage increase (Al-Qassemi, 2010). Following this trend, Oman and Bahrain raised the salary of public sector employees by 43 percent (Pradhan, 2008) and 15 percent (OBG, 2008) respectively.¹¹ Finally Saudi Arabia introduced an entire

¹⁰ Lester Brown is the founder of the Worldwatch Institute as well as Earth Policy Institute

¹¹ Bahrain included other important products in its subsidy program as well as granting families around US\$ 120 in monthly assistance to curb especially the pressure of escalating rice prices, since the price for Basmati rice has doubled in 2007/2008.

list of sophisticated new measures including inter alia the lowering of custom duties on key staples (Jones et al., 2009). and a prudent incremental increase of public sector salaries for employees and retirees in form of a so called 'cost of living allowance', which will effectively have risen nearly 16 percent by 2010 (Sfakianakis, 2008, p. 5)¹². Following the unrests in the Arab world, including Oman and Bahrain, the region observed additional government spending to defuse social tensions. For instance government spending on social measures is expected to rise by 11 percent in Oman, despite the 10 billion US\$ contribution given to the Sultanate by wealthier GCC members (Reuters, 2011b). Moreover increasing food prices will threaten macroeconomic stability primarily through inflation and in this respect the annual percent change in food inflation in several MENA countries outpaced the change in overall inflation. In this respect Sfakianakis noted that food inflation in Saudi is forecasted to remain in the high single digits (The Saudi Gazette, 2011)¹³. However these short-term responses as well as long-term subsidies have proven to be inefficient on a global scale and provide fiscal distortions as well as governance imbalances. Especially subsidies in the food, water and power sector, once in place, are difficult to remove as disposable incomes adjust to different spending patterns and consumer perceptions.

Saudi Arabia is commonly cited as an extreme example for its perverse subsidies and past practices to use its oil revenues to pump irrigation water from nonrenewable fossil aquifers to grow water-intensive wheat and alfalfa in one of the most water-stressed environments. With production costs estimated at four to six times the world price and almost a third of its arable land devoted to irrigated wheat production, the Kingdom not only attained self-sufficiency but became an exporter of this staple crop. Concomitantly, the country uses about 3000 cubic meters of water for each ton of produced wheat, which accounts to three times the global norm (UNDP, 2006, p. 145)¹⁴. While in 2004 an alleged new water

¹² It is noteworthy to mention that Sfakianakis clearly pointed out that prudent fiscal management does not support pay increases above the rate of inflation, in particular not during periods of rising inflation as it was the case in the Kingdom when the analysis was made. Moreover while public-sector pay increases should in theory come along with or be result of increases in productivity, continual public-sector salary increases run the risk of enticing too many GCC nationals to seek government employment and hence provide disincentives to nationalization policies.

¹³ In this context, food costs in Saudi Arabia account according to Jadwa Investment for the largest weight of 30.4 percent in the consumer basket. Moreover political unrests in Syria, Egypt and Yemen added to lowering supplies and in turn causing further price increases.

¹⁴ This is an often misquoted figure, since many authors seem to assume that producing wheat in a hot arid country is equivalent

conservation strategy was launched, it took until 2008 to finally phase out some water-intensive food crops by 2016. However, this policy shift was unfortunately neither based on the appreciation of the “*unsustainability of this strategy*” (El Houry, 2011) or “*the government’s increasing emphasis on water security*” (OBG, 2011), but on the fact that the Kingdom already used at least two-thirds of its non-renewable water and with a constantly deteriorating quality it simply became technically unviable.¹⁵ In effect, the government has been subsidizing the depletion of its most precious natural resource, transferring the costs to the environment and eventually to future generations. Similar policies that implicitly subsidize or even endorse an environmentally irresponsible and destructive use of resources still pervade all over the Gulf economies¹⁶, while any sustainable progress that goes beyond purposeless rhetoric faces formidable political, socio-cultural, and institutional constraints (ESCWA, 2006).

The political reality described above elucidates the motives for some of the nonconformist and environmentally devastating policies in the region, which are profoundly entangled with supporting different sections of society. Water allocation and pricing policies are often based on supporting special interest groups, and have in reality very little to do with achieving food security. Hence the scaling down of Saudi Arabia’s wheat production does neither translate into the notion that the Kingdom will reexamine those dysfunctional development pathways, nor indicates the end of the highly industrialized domestic agricultural sector (OBG, 2011). Thus while phasing out one water-intensive staple the country is seeking to expand its equally disastrous dairy industry, which is considered another egregious example of a perverse agricultural policy with an all too obvious agenda. Considered the largest integrated dairy farm in the world, the company has according to their website a herd of 37000 Holstein Friesian cows¹⁷, each requiring an estimated 113.6 liters (30 US gallons) of water daily for drinking and the cooling system. The approximately 4.2 million liters of freshwater are again extracted from fossil

to the production in temperate climates which requires on average 1000 m³ per produced metric ton of wheat.

¹⁵ For a comprehensive analysis of Saudi Arabia’s agricultural development and its motives see a dissertation entitled ‘Experiments in Achieving Water and Food Self-Sufficiency in the Middle East: The Consequences of Contrasting Endowments, Ideologies, and Investment Policies in Saudi Arabia and Syria’ (2006) by Elie Elhadj.

¹⁶ Likewise, the notion to use solar desalination to promote domestic food production in Qatar is yet another worst case example that deliberately ignores the impact of desalination on the Gulf.

¹⁷ A cattle breed endemic to the cold climates of Northern Germany and Holland.

aquifers 1.83 km (6000 feet) underground (Russell, 2009). In the absence of considering the energy costs or that it would be much more economical to purchase dairy products from elsewhere, the company received another concession to pump even deeper and exploit a new aquifer when their first option was depleted. Simultaneously, imports of milk and dairy products still accounted for 77 percent of consumption (UPI, 2010). These paradoxical policies are substantiated by Saudi Arabia’s budget, which allocated US\$ 12.3 billion to the water, agriculture, and infrastructure sector in 2010, which represented a 31 percent increase over 2009. In 2011 the sector saw another increase of 10.4 percent and now receives a total expenditure of US \$13.55 billion (SR50.8 billion).

Thus current policies have a tendency to meet personal interests, rather than serving the public good. For instance in June 2011, King Saud University and the Ministry of Agriculture signed an agreement, which will allocate app. US\$ 50 million for the establishment of new ‘Center for Research and Development of Sustainable Agriculture’ to apparently promote sustainable agricultural production. Accordingly, a special research focus will be dedicated to developing new methods of conserving water in agriculture, while maintaining communication with relevant international organizations. However, while state of the art research in this field is already available in abundance, notably for instance by ICARDA¹⁸, such international initiatives thus far received very little attention from the Kingdom, neither have any of those water consuming technologies been applied. Consequently, the initiative sounds like another excuse to service a certain lobby, foreshadowed by its emphasis to develop the industry even further with the use of “modern technology” (KSU, 2011). Unsurprisingly, the establishment will be partially financed by Al-Bayroni Al-Jubail Fertilizer, an affiliate of Saudi Arabian Basic Industries Corporation (SABIC). To conclude the anticipated usage of “foreign expertise” will serve the purpose as in hiring “business” consultants who will

¹⁸ The International Center for Agricultural Research in the Dry Areas (ICARDA) is a member of the Consultative Group on International Agricultural Research (CGIR) group based in Washington and has a special program for the Arabian Peninsula based in Dubai. Recognizing that no single research institution could possibly address the critically important issues of global climate change, agriculture and food security, the CGIAR will address the increasing challenge of global warming and declining food security on agricultural practices, policies and measures through a strategic collaboration between 15 globally distributed Research Centers and the Earth System Science Partnership (ESSP). Another established organization that should be mentioned in respect to improving the productivity, social equity and environmental sustainability of water use in water-scarce nations is the International Center for Biosaline Agriculture (ICBA).

promote those ongoing unsustainable pathways that have been observed in the past.

Recognizing the unreliability of imports and in order to be less susceptible to price fluctuations, Gulf economies are now considering investing in strategic reserves to ensure supplies for domestic consumption. While the accumulation of stocks is a more efficient strategy than the pursuit of an alleged self-sufficiency, Wright and Cafiero (2011) indicate that heavy subsidies on grain consumption for the entire strata of society reduce the stabilizing response of consumption to price, and increase reserves will be needed to ensure food security. Following a call by the Shoura Council, Saudi Arabia intends to double its reserves of basic commodities from previously six month to one year's consumption by 2014 (Laessing, 2011). Accordingly, the country purchased 660000 metric tons of hard wheat in August 2011 to supplement its current strategic wheat reserve of 1.4 million tons¹⁹ (Carey, 2011). The Kingdom currently has a storage capacity of 2.52 million tons and plans to add 550000 tons of facilities in four cities within the next three years (Bloomberg, 2011). Yet food storage involves many potential risks, particularly due to post-harvest insect pests and grain pathogens, and hence will pose the challenge of sufficiently training highly qualified national specialists that come along with these newly-constructed depots²⁰. Ensuring safe grain storage requires technologies that leave no residues on the stored grain that may harm the consumer and demand environmental conditions such as low temperature and low oxygen, which will make it energy intensive in the climates of the Gulf economies. Such challenges cause concern about the ability of GCC governments to guarantee the necessary quality and safety. Al-Kandari and Jukes (2009) analyzed the food control systems in the GCC and came to the conclusion that whilst these nations have all improved over the past decade, they still can be described due to mainly institutional overlap as inefficient in providing the necessary protection to the consumer. The establishment of the SFDA in the Kingdom has according to the authors *"provided a major opportunity to establish a truly effective food control system ..."*. Nevertheless they do

¹⁹ The purchased the wheat from the US, Europe, Australia and Canada at US\$ 346 per ton. Since wheat is usually measured in "metric ton" and the price for this commodity being quoted in USD per metric ton (to sufficiently confuse everyone alternatively in USD per bushel), it is assumed here that all references to ton (tonne) and its symbol t are "metric tons" and hence the equivalent to 1000 kg (1 t = 10³ kg) – not to be confused with the imperial ton (or long ton) which is 2,240 lb and hence very close to a metric ton (tonne), compared to the short ton of 2,000 lb (907.185 kg).

²⁰ They should preferably be equipped with the willingness to physically work in this field. The chances that the Gulf economies will have to rely on foreigners for yet another critical infrastructure, just like in the desalination sector, is quite strong.

not fail to mention that the creation of yet another authority does not instantaneously solve all the issues and time will be needed to fully implement its policies and procedures. Another research by Abdel-Mawgood et al. (2010) found that compliance with Saudi legislation in respect to the import of genetically modified grain and plant/vegetable based processed foodstuffs was effective.

'Over-consumption' and 'Hidden Hunger': The Potential Role of Fisheries

Consumption trends and inflation have given rise to a phenomenon called 'hidden hunger' throughout the region, a situation whereby there is sufficient food consumption but it is lacking in essential vitamins and minerals. Sight and Life²¹ revealed in their process of mapping global hidden hunger that Saudi Arabia and the United Arab Emirates were severely affected, while Kuwait, Bahrain, Qatar and Oman are moderately affected²² (Ahmed, 2009). Nevertheless, while problems of micronutrient deficiencies still pose severe challenges to the public health nutrition agendas, simultaneously, chronic nutrition-related non-communicable diseases (NCDs) are showing trends of rapidly ascending prevalence (Galal, 2003). Changes in dietary patterns toward over-consumption and energy-dense foods²³ in addition to physically inactive lifestyles are often the result of socio-economic and cultural changes associated with rapid and unplanned development and lack of supportive policies in sectors such as health, agriculture, transport, urbanization, environment, food processing,

²¹ Sight and Life is a non-profit humanitarian initiative based in Switzerland that has been championing the global advocacy against micronutrient deficiencies.

²² Based on data retrieved from both UNICEF State of the World's Children 2009 and the WHO Global database on vitamin A deficiency and anemia, iodine deficiency, 'severity of hidden hunger' was determined based on the proportion of under-fives affected by anemia, vitamin A deficiency, stunting as an indicator of zinc deficiency and school-aged children affected by goiter. Please note that this definition based on children will exclude millions of malnourished expatriate workers residing in the GCC countries. For further detailed information see http://www.sightandlife.org/images/stories/pageimages/content/Topics/Hidden_hunger_world_map.pdf

²³ Energy-dense foods have more calories for the volume of food and generally fewer nutrients. There has been a sharp decline in the past three decades in the GCC in the intake of fruit, vegetables, legumes and whole grains, while there was an increase in the intake of unhealthy fast food and sugary drinks. Other unhealthy reported patterns include skipping breakfast, snacking (consumption of foods rich in calories and fat between meals) and a high percentage of people who consume foods outside the home, which often exposes them to more high-calorie unhealthy foods.

marketing, labor as well as education. These systemic deficiencies in the GCC resulted in yet unprecedented demographic and epidemiological transitions, with a high prevalence of overweight, obesity and further NCDs²⁴. Based on data from 2005 presented by the World Health Organization (WHO), the prevalence of overweight & obesity ($BMI \geq 25 \text{ kg/m}^2$) in Saudi society aged between 15-64 years is 71.4 percent for females and 66.2 percent for males respectively. The proportion of those being seriously obese ($BMI \geq 30 \text{ kg/m}^2$) in the Kingdom is 43 percent for females and 28.3 percent for males (WHO, 2011). A recent study showed that overweight plus obesity rates were even higher in Kuwait and Qatar, while the phenomenon is more prevalent among women and holds a non-linear association with age. In this respect 45.3 percent of women in Qatar and 47.9 percent in Kuwait were obese (Ng et al., 2011, p. 3), in other words suffering from a medical condition in which excess body fat has accumulated to the extent that it will have adverse effects on health and lead to a reduced life expectancy. This severe public health problem becomes even more pronounced among 30–60 year olds, where overweight and obesity rates among Gulf women ranged from 75–88 percent among women (Musaiger et al., 2011).²⁵ Among the chronic nutrition-related NCDs, hypertension and diabetes levels are extremely high in the GCC and tend to increase with age. The situation is creating a progressive health and economic burden on these countries' government welfare services. For instance the sustainability of Oman's health-care services became a serious concern following a 64 percent increase in expenditure from 1995 to 2005 (Al-Lawati et al., 2008, p. 4). Hence it can be argued that the high prevalence of obesity and the resulting health-determinant patterns has a substantial negative impact on human and social development in the Gulf (Alwan, 2011). Paradoxically, while the prevention of these concerns should be intrinsically linked with food security strategies, this is not yet the case. Gulf governments should ensure policies that protect and promote the public health of their societies and shift their consumption patterns away from

²⁴ These are for instance diabetes mellitus, hypertension, cardiovascular diseases, coronary heart disease, metabolic syndrome, nonalcoholic steatohepatitis, some types of cancers, etc.

²⁵ The body mass index (BMI) is a measurement which compares weight and height and thus defines people as overweight (pre-obese) if their BMI is between 25 and 30 kg/m^2 , and obese when it is greater than 30 kg/m^2 .

²⁶ In comparison based on the latest estimates obesity affects 10-30 percent of adults in EU countries.

According to the WHO, for instance those being serious obese in Germany are 12.3 percent females and 13.6 percent males (WHO, 2011). Moreover adolescent overweight and obesity are among the highest in the world, with Kuwait again having the worst estimates in the vicinity of 40 to 46 percent.

excessive caloric intake and to more physical active lifestyles²⁷. This urgency was also highlighted by Vellvé, the cofounder of GRAIN, by saying that the GCC region must move to change its consumption patterns, if it is serious about tackling food security (Davids, 2011).

As one possible response fisheries should play a vital role in food security strategies. Fish is highly nutritious, rich in essential micronutrients, vitamins, minerals, essential fatty acids and a source of affordable high-quality animal proteins, and hence represents an excellent supplement to diets based on either nutritionally deficient cereal-based or ready-to-eat convenience foods (i.e. containing 'empty calories'). Moreover, with a few exceptions, fish is usually low in saturated fats, carbohydrates and cholesterol (Garcia & Rosenberg, 2010). Despite the urgency, when it comes to the availability of fish, including capture, aquaculture and imports, as well as the per capita consumption in the GCC, the information is characterized by a general lack of data, and data which is often incomparable, inconsistent or not credible.²⁸ The annual average consumption of fish in Saudi Arabia is below world average, displays a high discrepancy between inland and coastal consumption (AL-Numair et al., 2005) and ranged between 8.15 to 13.43 kg per capita in the past decade (Al-Shuaibi, 2011, p. 35). Based on FAO (2010a, p.66) statistics, the country produces 88410 tons of fishery products in live weight, utilizes 231 tons for non-food uses, imports 199305 tons, re-exports 19531 tons and presents an annual per capita supply of 10.9 kg.²⁹ Likewise, Kuwait and Bahrain display with 12.4 kg

²⁷ This could be done by implementing a tax on so-called unhealthy foods and sugar-sweetened beverages (Gortmaker et al., 2011) or by putting an emphasis on public transport.

²⁸ In this context, the latest FAO fisheries statistics indicated that the UAE had a total fish food supply 121712 tons in live weight, which resulted in a per capita annual supply of 27.9 kg. In consideration of the fact that the world average reached an all-time high in the same year with an estimated apparent per capita supply of about 17 kg (live weight equivalent) and the mean European consumption is 22.2 kg (live weight equivalent) respectively (FAO, 2010b, p. 66), the figure for the UAE is contentious. Next to being calculated with a totally dated population figure, which is not exactly atypical for UN statistics, the estimate does not take into account the 10 million tourists that stayed in the UAE during the same year or that the data primarily shows the consumption patterns of the roughly 85 percent expatriate residents. Consequently, in respect to the national Emirati population and their deficient food consumption patterns the data becomes insignificant. The same observation can be made for the available information from Qatar and there have not been any studies concerned with these deficiencies.

²⁹ By contrast, the UAE produced 87570 tons in live weight, ascribed 74862 of these to non-food purposes (for instance fishmeal or fish oil); consequently imported another 148366 tons to actually re-export 41861 tons. While this may make sense to the business elite and economists, from a sustainability

and 15.2 kg per capita comparatively low annual fish consumption rates (ibid., p.65/66). Consequently the contribution of fish to animal protein supply based on data retrieved between 2005 and 2007 remained with 2 to 4 g per capita per day extremely low in Saudi Arabia, Kuwait and Bahrain.³⁰

Paradoxically despite being coastal countries, all the GCC economies except Oman have a high import dependency on fish. Notwithstanding the fact that the overexploited status of global fish stocks has not improved, the region is facing a number of additional challenges. While surrounding water bodies are characterized with medium productivity, they hold various forms of percomorphous fishes³¹ which are already fully or over-exploited and recently showed substantial declines. Moreover, due to their relative small size, high endemism, and limited oceanographic circulation, both the Red Sea and the Gulf are particularly vulnerable to toxic pollution, eutrophication, habitat degradation, loss of species, and reduction in ecosystem productivity. The key environmental threat is next to increased high volume and density of the marine transportation and oil pollution the ongoing uncontrolled and unsustainable development, in particular industrial expansion, infrastructure development, pollution discharges and the excesses of conventional tourism (in respect to the Arabian/Persian Gulf see for instance Sale et al., 2011; Sheppard et al., 2010 and for the Red Sea see for instance Heileman & Mistafa, 2009).

There is common consensus among scholars that the most significant threats to the sustainability of the Gulf ecosystems come from the massive extent of coastal habitat modification by dredging and converting shallow, productive marine areas into land for real estate, causeways, tourism resorts, recreation and industrial facilities (Abuzinada et al., 2008; Lattemann & Höpner, 2008; Khan, 2007; Jones et al. 2007) Against this background, there is still an absence of recognition among GCC policy makers when it comes to restoring degraded habitats and reducing coastal pollution. The potential to increase the average per capita consumption of fish and fishery products, reduce their dependence on imports as

and human security point of view it represents a challenge to common sense.

³⁰ The rest of the GCC states displayed with 4 to 10 g good to very good rates (FAO, 2010a, p. 65), however in the case of both the UAE and Qatar this is obviously a result based on distorted data resulting from the demographic imbalances with more healthy consumption patterns. Oman displays a positive trade balance and the contribution of fish to animal protein supply is above 20 percent.

³¹ Percomorphi are one of the largest orders of fishes including for instance the perches, mackerels, blennies, and numerous related kinds.

well as sustaining catches at near current levels, will rest critically on substantially improving the management and conservation of their marine ecosystems and to reconsider those underlying causes.

Poor Governance and Corruption: An Invitation to Outsource Food Insecurity

Instead of giving proactive adaptation measures some serious thought, the Gulf governments opted for a strategy that raised grave international concern: the purchase or long-term lease of agricultural land for offshore food production from highly volatile nations, predominantly by state-owned and private investors, is seen as a politically preferable option to secure the increasing local demand with inexpensive food (NIC, 2008). While it makes sense to import agricultural products from countries with adequate climatic conditions and technological advancement, there is a certain perverse logic and more than questionable agenda in the assumption that there is a so called "win-win" situation when doing so in poverty stressed fragile or even failed states. Regrettably, these claims are often promoted by supranational organizations which were already responsible for some of the world's most visible environmental disasters and the resulting human suffering.³² The enduring myth that there is an abundance of so called 'idle' or 'underutilized' arable land resources in Africa and that agricultural output could be considerably improved without compromising further environmental degradation has received extensive

³² Here especially in reference to the consequences of badly planned irrigation schemes to serve large scale agricultural projects, drying rivers and vanishing lakes have threatened the livelihoods of downstream communities dependent on fishing, grazing and flood recession farming. The Aral Sea and Lake Chad perfectly illustrate only two of such well known examples that affected millions of people in several nations and where human agency was a catalyst not for human progress but for a setback in regional human development (see for instance UNDP, 2006, p. 211ff). Another highly contested project, known as the National Project for the Development of Upper Egypt, has had devastating environmental effects including increased salinity and shrinking lakes in the Toshka depression (El-Shabrawy & Dumont, 2009; Bush, 2010; Sparavigna, 2011), has been directly related to Gulf agricultural offshore investments and will be mentioned later. Finally, the upstream damming of the Tigris and Euphrates rivers by Syria and Turkey will have severe basin wide consequences (USDA-FAS, 2009). Despite international opposition, Turkey is still proceeding with large scale dam building as part of its "south-eastern Anatolia project" (GAP) and the consequences of the upstream damming of Iraq's rivers as well as the subsequent reduction in river flows, when compounded with a general projected trend toward a decline in precipitation entering the two river basins, is having a severe impact on the Iraqi and GCC food security by affecting the water quality and marine habitats of the Gulf.

coverage in the literature in the past two decades. These descriptions do not take into account that these areas provide a vital basis for the livelihoods of vulnerable groups or for the natural ecosystem in general³³ as well as that especially in Africa the attachment to the land transcend economic and utilitarian considerations (Makunike, 2009). The 'Post-Conflict Environmental Assessment of Sudan' clearly describes how issues of conflict, displacement and environmental degradation and Sudan's mounting population are considered to be intrinsically linked. According to the report the contemporary situation can "only be described as an intense and unremitting competition amongst an impoverished population for scarce and diminishing natural resources" (UNEP 2007, p. 163). Deininger and Byerlee (2011) emphasize that the encroachment on traditional users' land rights to some extent initiated by financiers from the Gulf led to serious conflict. Moreover their findings show that yields in Sudan as a result of overexploitation have been stagnant or declining and comprise of only 0.5 t/ha relative to 4 t/ha in comparable agro-ecological environment in Australia (Ibid., p.8). Concurring, Elasha (2010) outlines a severe reduction in crop productivity consisting of up to 80 percent for sorghum and 50 percent for millet. Given that the Horn of Africa is currently facing what has been called the worst drought in six decades, resulting in an estimated 12.4 million people being food insecure, it is progressively more problematic that GCC governments are buying up farmland to export the produce³⁴. Despite these obvious concerns, the Gulf policy makers see this part of the world characterized by weak legal frameworks and institutions as the most suitable way to guarantee lower food import costs by avoiding international markets. There is further a noticeable preference for fragile states where illegal land appropriation cannot be easily pursued as a result of high

³³ Some of the current uses and functions include livestock grazing, cattle route or wildlife corridors, gathering of wild products for subsistence or revenue (e.g. food, firewood or building materials), maintenance of water quality, shifting agriculture, maintenance of soil fertility and biodiversity conservation. See for instance Dufey et al. (2007). Consequently, it is very difficult to appropriate a huge piece of land in any African country without sparking some sense of dispossession, resentment and displacement.

³⁴ Moreover, this phenomenon of food insecurity is not new and the World Food Programme as well as the international donor community has been trying to feed millions of refugees and drought-stricken impoverished populations in Sudan, Somalia, Ethiopia and other nations across the region. Affecting an estimated 109 million people, the Horn of Africa actually witnessed 42 droughts since 1980. The famine in Ethiopia which took place in 1984 resulted in a death toll that some estimates put as high as one million.

level corruption and poor governance, thereby compromising the food security of the host populations.³⁵

Especially the Emirates have displayed a keen interest and next to a Memorandum of Understanding between the Ministry of Agriculture and Sudan in the 'field of food security' in 2004, the war torn nation is considered based on a study commissioned by the Ministry of Foreign Trade "... one of the countries eligible for achieving Arab food security due to the abundance of vast natural resources which are represented in the fertile land" (Diab, 2010, p. 34). Despite being based on false assumptions, this has led to a surge of suspicious land deals being covered extensively in the media³⁶. When it comes to Southern Sudan the situation was analyzed by a Norwegian development initiative in form of a baseline survey of large-scale land-based investment. The report revealed that the single largest investment is a 2.3 million hectare lease was finalized by the UAE in 2008, which constitutes a land area larger than Kuwait or Qatar. In lieu of monetary payment for the 30 year lease, the company who signed the agreement has reportedly promised to provide education and health facilities for affected local communities. Nevertheless, despite being on the ground for more than two years, the Emirates have not yet provided any services and as a result of Southern Sudan's current development stage there are no monitoring mechanisms in place to ensure that the foreign companies fulfill their obligations in a timely manner (Deng, 2011; The Economist, 2009). The UAE have also been looking at opportunities in Kazakhstan, Cambodia and especially Pakistan (Kerr & Bokhari, 2008).³⁷ The Qatari Investment Authority established Hassad Foods with an endowment of US\$ 100 million to invest in or buy up food and agricultural companies around the world who are negotiating foreign land acquisitions. Apparently this indirect approach has a moral component and according to the company's chairman: "We don't want to be in a situation where the rich are taking away food and land of the poor" (Hart & Walton, 2009). Nevertheless, shortly after this statement the company

³⁵ To some extent these particular patterns of bilateral investment preferences may further be strengthened by direct family ties with Gulf elites.

³⁶ For instance Sudan already leased 400,000 ha of wheat fields to the UAE or Abu Dhabi acquired 30,000 ha of land in June 2008 through its development fund to grow primarily alfalfa, which is used as animal fodder (Rice, 2008).

³⁷ Another similar example comes from new Sudan. In July 2011 a senior researcher at the Sudan Economic Advisor's Office at the Sudanese Embassy in Abu Dhabi, urged the Abu Dhabi Fund for Development and other Emirati investors to make some progress in developing their farmland in Sudan, which has been given to them either free or at nominal rent costs. He reported that they had been given a total of 252000 ha of Sudanese farmland on condition they will invest in the land, but have not done anything until today (Bundhun, 2011).

signed a roughly 1 billion USD joint venture with Sudanese government (Bladd, 2009). Bahrain and Kuwait are negotiating a series of import agreements and potential long-term investment investments in South East Asia. Saudi Arabia has identified 27 countries which are currently under investigation for agricultural investment projects and is granting financing facilities to provide the necessary incentives to firms exploring agricultural investments abroad. In June 2011 the Minister of Agriculture specifically declared Kazakhstan, Russia and Ukraine as "*probable countries of investment*" (Benham, 2011). Regrettably the Kingdom further expressed interest in highly food insecure countries and has been looking at projects in Sudan³⁸, Southern Sudan, Ethiopia, Egypt and Tanzania. However, there have been recent indications in the media that Saudi Arabia is negotiating a bilateral agreement with Australia to secure future imports of basic commodities, which should certainly be considered a step in the right direction (Sambidge, 2011).

Unsurprisingly, there has been a vociferous reaction to these practices. The German NGO Welthungerhilfe (2009, p.4) points out the risks of high-level corruption and says: "*States that are dependent on food imports, in particular, are surrendering more and more land to foreign investors while failing to ensure that conditions improve income and food security for their own population. Agricultural investments are rarely made in such a way that they offer the local population a genuine share of the benefits*". Cotula et al. (2009) emphasized that these large-scale land acquisitions have the potential to directly dispossess and displace large numbers of rural people from land that they consider their long-standing heritage and who crucially depend on it for sustaining their livelihoods. Smaller and Mann (2009) take the discussion further by examining the uncertainties and impacts relating to the commodification of land and water in such deals, keeping in mind that the local tenure situation may involve customary rights. They conclude that if governments are determined that an investment should take place despite the opposition of a land or rights holder, expropriation of land rights or water use rights might be possible and that the fulfillment of compensation requirements will be unlikely in the event of diminishing water resources. In 2009 the Geneva Academy took an urgently-needed look at this emerging trend and the potential and actual consequences on the realization of human rights (Geneva Academy of International Humanitarian Law and Human Rights, 2009). Kaloustian & Newman (2009) point out that since the situation presents such a serious threat to food sovereignty, accountability mechanisms are needed in order safeguard the rights of impoverished and vulnerable

³⁸ Companies such as Saudi-based National Agricultural Development Co (Nadec) which is led by the wealthy Saudi Al-Rajhi family and is 20 percent owned by the finance ministry's Public Investment Fund (PIF) have invested in farmland in Northern Sudan.

communities in target nations. Finally, Zoomers (2010) warns that 'codes of conduct' as proposed by several quarters in the context of global land acquisitions are unlikely to work in favor of for poor people's livelihoods in the target nations. These worries as well as the fact that poorly designed incentives in combination with the lack of transparency in negotiations could "*foster corruption*" were recently confirmed by the World Bank (2010, p. 95).

Ali (2009) takes a look at the environmental repercussions of corporate farming and observes that countries which remain willing to capitalize on their natural resources are not facing up to their acute water scarcity problems. Likewise, Cochrane (2011) points out the need of national governments to recognize that short-term benefits do not out-weight the long-term environmental damage, and seek compensation to rectify violations. The chief executive of the East African Farmers Federation noted in this context that the available regulatory frameworks were not detailed enough to include water scarcity issues. Likewise, Brown (2011b) warned that these land acquisitions typically involve water rights, meaning that agricultural foreign direct investments potentially affect all downstream countries as well³⁹. Finally, when over one-hundred papers were presented at the International Conference on Global Land Grabbing in 2011, not one positive outcome could be found for local communities; such as, food security, employment and environmental sustainability. The symposium summarized that large-scale agricultural investments have nothing to do with enhancing food security (Food First, 2011).

However, many of these acquisitions are in their preliminary stages and deals announced in the media may never fall through or falling short of original requests because of public protest against the investment, insufficient funding and poor communication between investors and government negotiators (Hart & Walton, 2009). Likewise, Deininger et al. (2011, p.141) finds that as a result of rudimentary project proposals, lack of knowledge and technical know-how, overoptimistic revenue forecasts coupled with suspiciously opaque ways of processing and approving deals implied that many projects either did not start production at all or operated only on a small fraction of the land they had been allocated.

Dubious agricultural investments in food insecure countries can next to international attention and severe negative image repercussions have further drawbacks and hence serious doubts can be raised about the viability of this strategy. Given that several of the host countries are politically instable and may become even more so in

³⁹ For instance any water extracted from the upper Nile River basin to irrigate crops in Ethiopia or Sudan will not reach Egypt, upsetting the already delicate water politics of the Nile by adding new parties to the negotiation.

times of crisis, it is unlikely to assume that food can be exported from them. In this context, the BinLadin Group has been forced to discontinue a US\$4.3 billion project to grow rice in Indonesia after violent protests, while in Kenya Qatar has been facing social disturbances after the expatriation of indigenous farmers (IRIN, 2009). The situation may also become embarrassing once the corrupt structures these deals were based on are removed or replaced. One example has been the Alwaleed's Kingdom Agricultural Development Co (KADCO) land acquisition in Egypt in 1998, which was part of the already mentioned contested National Project for the Development of Upper Egypt (Bohannon, 2010). A recent investigation by Egypt's public prosecutors' office revealed that the original business transaction violated Egyptian law, because the area bought was twice the legal limit and because it improperly exempted KADCO from all taxes and fees (Reuters, 2011a).⁴⁰

There is still a notable severe lack of knowledge as well as widespread ignorance concerning these serious issues among GCC nationals⁴¹, reminiscent of the indifference displayed toward the exploitation of impoverished foreign nationals, notably women, working in the Gulf. This was once again sadly displayed in a paradoxical statement made by the president of the Saudi Consumer Protection Association in response to the recently observed price hikes in the Kingdom: *"... this behavior is unethical and goes against Islamic principles, as harming a person's livelihood is among the worst things a trader can do."* (Abdullah, 2011).

Conclusion

There is common consensus that food security will be a serious threat to future human wellbeing in the GCC member states, with the potential to threaten local economies, social fabrics and domestic politics. Despite political hazards and serious security concerns involved with the concept, especially when the current welfare systems will start to disintegrate as a result of population pressure, the contemporary policy responses in the GCC can be considered idiosyncratic for the approach to any acute development issue, which tends to be defined by

⁴⁰ Popularly known as the Toshka Desert Project, the investment was based on the strategy to pump irrigation water from Lake Nassar reservoir, behind Egypt's Aswan High Dam and deliver it via a series of canals to reclaimed agricultural areas in the vicinity of the Sudanese border. Alwaleed reportedly did not want to enter international arbitration over the ownership rights and surrendered his claim to the contested land.

⁴¹ For instance during the Jeddah Economic Forum 2010 panelists discussing agriculture and food security highlighted the 'prudent measures taken by the Kingdom by striking deals with overseas farmers and agriculturists'.

lack of far sighted planning, proactive adaptation measures and comprehensive science-based assessments. Thus despite voiced commitment, official approaches to and understandings of food security are inconsistent at best, supplemented by the lack of political will to rethink those unsustainable development models or to initiate economic and social reforms. This is particularly evident in the water sector or in respect to coastal development, where existing resources are constantly overused or destroyed without any decisive structural intervention.

Policy responses should thus be considered alongside major issues that confront contemporary GCC societies, notably population control, implementing rigid labor and immigration policies, building national capacity, educating people about health and nutrition, comprehensive obesity prevention, as well as action against environmental degradation and climate change, because they all these have strong links with food security, including common causes and solutions. Moreover effective, financially sustainable safety nets that assist households in greatest need alongside with creating more strategic reserves will be crucial. These strategies should be well defined and embedded into conventional policy with a paradigm shift toward sustainable development, while both mitigation and proactive adaptation approaches need to be audaciously pursued and emphasized in all policy sectors, including agriculture and economic diversification.

One major concern should be the question of how food security can be secured in the future in ways that do not undermine human rights in other countries. In this context, serious doubts can be raised about the viability of the prevalent strategy of the GCC member states to pursue foreign direct investment in agriculture with a bizarre preference for highly food insecure and politically instable countries. Next to the ethical implications that already triggered an international outcry from a wide range of experts along with negative image repercussions, there should evidently be concern that the acquisition or long-term lease of such foreign domains leaves food supplies especially in times of shortages exposed to sovereign risk and other supply chain problems beyond importers' control.

Consequently to be able to have an informed discussion about food security in the GCC, scholarly research should be specifically targeted toward delivering the indispensable knowledge to underpin policy formulation for improving the situation within the context of sustainable development and in the face of severe environmental challenges. Hence such decision support tools should not only include feasible long term options for reducing exposure to risk and increasing coping capacity, but also formulate a regional agenda that deals with the underlying structural deficiencies.

References

- Abdel-Mawgood, A. L., Gassem, M. A., Al-Sadon, A. A., Al-Ghamdi, S. S., Al-Doss, A. A., 2010. Monitoring of genetically modified food in Saudi Arabia. *African Journal of Food Science*. Vol. 4, Issue 8, pp. 536 – 540.
- Abdullah, S., 2011. Unholy price rise before holy month bites consumers hard. *Arab News*, July 10th. Online: <http://arabnews.com/saudiArabia/article469782.ece?service=print> [Accessed: 25/08/2011]
- Abuzinada, A. H., Barth, H.-J., Krupp F., Boer B., Al Abdessalaam, T. Z., 2008. Protecting the Gulf's marine ecosystems from pollution. Basel, Boston, Berlin: Birkhäuser Verlag
- Ahmed, S., 2009. *Global Hidden Hunger Map*. Basel: Sight and Life. Online: http://www.sightandlife.org/images/stories/pageimages/content/Topics/Hidden_hunger_world_map.pdf [Accessed: 5/08/2011]
- Ali, S. M., 2009. The dangers of corporate farming – Pakistan's bid to open its agricultural sector to foreign corporations may accentuate rural poverty and inequity. *OpenDemocracy*, 11th May. Online: <http://www.opendemocracy.net/print/47903> [Accessed: 21/08/2010]
- Al-Jeneid, S., Bahnassy, M., Nasr, S., El Raey, M., 2008. Vulnerability assessment and adaptation to the impacts of sea level rise on the Kingdom of Bahrain. *Mitigation and Adaptation Strategies for Global Change*, Vol. 13. No. 1. pp. 87–104.
- Al-Kandari, D., Jukes, D. J., 2009. A situation analysis of the food control systems in Arab Gulf Cooperation Council (GCC) countries. *Food Control*. Vol. 20, pp. 1112–1118.
- Al-Kolibi, F. M., 2002. Possible effects of global warming on agriculture and water resources in Saudi Arabia — impacts & responses. *Climatic Change*, Vol. 54, pp. 225–245.
- Al-Lawati J. A., Mabry, R., Mohammed, A. J., 2008. Addressing the treatment of chronic diseases in Oman. *Preventing Chronic Disease*, Vol. 5, No. 3, pp. 1-7. Online: http://www.cdc.gov/pccd/issues/2008/jul/pdf/07_0086.pdf [Accessed:20/08/2011]
- AL-Numair, K., Lewis, N. M., Evans, S., 2005. Omega-3 Fatty Acid Consumption and Food Sources Differ among Elderly Men Living in Coastal and Internal Regions of Saudi Arabia. *Pakistan Journal of Nutrition*. Vol. 4, No. 2, pp. 106-111.
- Al-Qassemi, S. S., 2010. A 70 Percent Pay Rise - That's a 100 Percent Bad Idea. January 3. Dubai: Dubai School of Government. Online: http://www.dsg.ae/NEWSANDEVENTS/DSGNews.aspx?udt_755_param_detail=1862 [Accessed: 21/08/2011]
- Al-Shuaibi, A. M., 2011. An Economic Study of the Demand for Red Meat in the Kingdom of Saudi Arabia using Almost Ideal Demand System. *Trends in Agricultural Economics*, Vol. 4, No. 1, pp. 30 -40.
- Alwan, A. (ed.), 2011. *Global status report on noncommunicable diseases 2010 - Description of the global burden of NCDs, their risk factors and determinants*. Geneva: World Health Organization
- Al-Zubari, W. K., 2003. Alternative water policies for the Gulf Cooperation Council countries. Al-Sharhan, A. S., Wood, W. W. (eds.). *Water Resources Perspectives: Evaluation, Management and Policy*. Elsevier Science.
- Ayhan, M. E., Al-Othman, A., 2009. Sea level rise within the west of Arabian Gulf using tide gauge and continuous GPS measurements. *2009 Geophysical Research Abstracts*, Vol. 11. [Presented at the European Geosciences Union General Assembly, Vienna, Austria, 19 – 24 April, 2009]
- Benham, Jason, 2011. Kingdom to double wheat reserves. *Arab News*, Riyadh, June 15.
- Bladd, J., 2009. Call for GCC 'land grab' policy to stop – experts. *ArabianBusiness*, 7 September. Online: <http://www.arabianbusiness.com/call-for-gcc-land-grab-policy-stop-experts-13103.html> [Accessed: 20/08/2011].
- Bloomberg, 2011. Saudi Arabia needs more facilities to store food as prices rise. *ArabianBusiness*. January 9th. Online: <http://www.arabianbusiness.com/saudi-arabia-needs-more-facilities-store-food-as-prices-rise--372320.html> [Accessed: 29/08/2011]
- Bohannon, J., 2010. The Nile Delta's Sinking Future - Climate change and damming the Nile are threatening Egypt's agricultural oasis. *Science*, Vol. 327, No. 5972, pp. 1444 – 1447.
- Breisinger, C., van Rheenen, T., Ringler, C., Pratt, A. N., Minot, N., Aragon, C., Yu, B., Ecker, O., Zhu, T., 2010. *Food Security and Economic Development in the Middle East and North Africa - Current State and Future Perspectives*. IFPRI Discussion Paper 00985. Washington, D.C.: International Food Policy Research Institute (IFPRI)
- Brown, L. R., 2011a. This will be the Arab world's next battle - Population growth and water supply are on a collision course. *Guardian*. April 22nd . Online: <http://www.guardian.co.uk/commentisfree/2011/apr/22/water-the-next-arab-battle> [Accessed: 24/08/2011]
- Brown, L. R., 2011b. The New Geopolitics of Food. *Foreign Policy*, May/June. Online: http://www.foreignpolicy.com/articles/2011/04/25/the_new_geopolitics_of_food [Accessed: 25/08/2011]
- Brown, O., Crawford, A., 2009. Rising Temperatures, Rising Tensions - Climate change and the risk of violent conflict in the Middle East. Winnipeg: International Institute for Sustainable Development (IISD)
- Bundhun, R., 2011. UAE investors urged to start developing farmland in Sudan. *The National*, Jul 27.
- Burke, E. J., Brown, S. J., Christidis, N., 2006. Modeling the recent evolution of global drought and projections for the twenty-first century with the Hadley Centre Climate Model. *Journal of Hydrometeorology*. Vol. 7, No. 5, pp. 1113–1125.

- Bush, R., 2010. Food Riots: Poverty, Power and Protest. *Journal of Agrarian Change*, Vol. 10 No. 1, January 2010, pp. 119–129.
- Carey, G., 2011. Saudi Arabia Buys 660,000 Tons of U.S., European Hard Wheat. *Bloomberg*. Aug 14th.
Online: <http://www.bloomberg.com/news/2011-08-14/saudi-arabia-buys-660-000-tons-of-u-s-european-hard-wheat-1.html> [Accessed: 25/08/2011]
- Central Intelligence Agency (CIA), 2011. *The World Factbook 2011*, Washington, DC: Central Intelligence Agency.
- Clay, E., 2002. Food security: Concepts and Measurement. Paper for FAO Expert Consultation on Trade and Food Security: Conceptualizing the Linkages, Rome, 11-12 July.
- Cline, W. R. 2007. *Global Warming and Agriculture: Impact Estimates by Country*. Washington D.C.: The Peterson Institute.
- Cotula, L., Vermeulen, S., Leonard, R., Keeley, J., 2009. Land grab or development opportunity? Agricultural investment and international land deals in Africa, Rome & London: FAO, IIED and IFAD. Online: <http://www.iied.org/pubs/pdfs/12561IIED.pdf> [Accessed: 23/08/2011]
- Cochrane, L., 2011. Food Security or Food Sovereignty: The Case of Land Grabs. *The Journal of Humanitarian Assistance*, July 5th. Online: <http://sites.tufts.edu/jha/archives/1241> [Accessed 21/08/2011]
- Davids, G., 2011. Gulf needs new plan for food security as prices soar. *ArabianBusiness*. January, 11th.
Online: <http://www.arabianbusiness.com/gulf-needs-new-plan-for-food-security-as-prices-soar-372940.html> [Accessed: 21/08/2011]
- Deininger, K., Byerlee, D., 2011. *The Rise of Large Farms in Land Abundant Countries: Do they have a future?* Policy Research Working Paper 5588. Washington, DC: The World Bank Development Research Group - Agriculture and Rural Development Team
- Deininger, K., Byerlee, D., Lindsay, J., Norton, A., Selod, H., Stickler, M., 2011. *Rising Global Interest in Farmland - Can It Yield Sustainable and Equitable Benefits?* Washington, D.C.: The International Bank for Reconstruction and Development/The World Bank
- Deng, D. K., 2011. *The New Frontier - A baseline survey of large-scale land-based investment in Southern Sudan*. Oslo: Norwegian People's Aid.
- Diab, Y., 2010. *Analytic study of foreign trade between the United Arab Emirates and the Republic of Sudan*. Abu Dhabi: United Arab Emirates Ministry of Foreign Trade – Trade Analysis and Information Department.
- Dufey, A., Vermeulen, S., Vorley, W., 2007. *Biofuels: strategic choices for commodity dependent developing countries*. Amsterdam: Common Fund for Commodities.
- Economist Intelligence Unit (EIU), 2010. *The GCC in 2020 – Resources for the future*. White paper from the Economist Intelligence Unit – Sponsored by the Qatar Financial Centre Authority. Geneva: The Economist Intelligence Unit
- Elasha, B. O., 2010. *Mapping of Climate Change Threats and Human Development Impacts in the Arab Region*. Arab Human Development Report Research Paper Series. United Nations Development Programme - Regional Bureau for Arab States.
- Elhadj, E., 2006. *Experiments in Achieving Water and Food Self-Sufficiency in the Middle East: The Consequences of Contrasting Endowments, Ideologies, and Investment Policies in Saudi Arabia and Syria*. Boca Raton: Dissertation.com
- El Houry, R., 2011. *The Gulf Countries' Water Crisis*. Muftah, May 9th. Online: <http://muftah.org/?p=1057> [Accessed: 20/08/2011]
- El-Shabrawy, G. M., Dumont, H. J., 2009. *The Toshka Lakes*. Dumont, H. J. (ed.), 2009. *The Nile - Origin, Environments, Limnology and Human Use*. Springer, pp. 157-162.
- Evans, J. P., 2009. 21st century climate change in the Middle East. *Climatic Change*, No. 92, pp. 417–432.
- Fedoroff, N. V., Battisti, D. S., Beachy, R. N., Cooper, P. J. M., Fischhoff, D. A., Hodges, C. N., Knauf, V. C., Lobell, D., Mazur, B. J., Molden, D., Reynolds, M. P., Ronald, P. C., Rosegrant, M. W., Sanchez, P. A., Vonshak, A., Zhu, J.-K., 2010. Radically Rethinking Agriculture for the 21st Century. *Science*, No. 327, pp. 833-834.
- Food and Agricultural Organization (FAO), 2008. *Climate Change: Implications for Agriculture in the Near East [NERC/08/INF/5]* Synopsis of the Twenty-Ninth FAO Regional Conference for the Near East held in Cairo, Egypt, 1-5 March 2008. Rome: FAO
- Food and Agricultural Organization (FAO), 2009. *The State of Food Insecurity in the World 2009. Economic crises – impacts and lessons learned*. Rome: FAO
- Food and Agriculture Organization of the United Nations (FAO), 2010a. *Fishery and Aquaculture Statistics 2008*. Rome: FAO
- Food and Agriculture Organization of the United Nations (FAO), 2010b. *The State of World Fisheries and Aquaculture 2010*. Rome: FAO
- Food and Agriculture Organization of the United Nations (FAO), 2011. *World food prices reach new historic peak*. 3 February 2011. Rome: FAO
Online: <http://www.fao.org/news/story/en/item/50519/icode/> [Accessed: 23/08/2011]
- Food First, 2011. *Landmark Conference on Land Grabbing*. Institute of Development Studies (IDS), University of Sussex, 6-8 April. Online: <http://www.foodfirst.org/en/Land+grabbing> [Accessed: 20/08/2011].
- Galal, O., 2003. Nutrition-related health patterns in the Middle East. *Asia Pacific J Clin Nutr*, Vol. 12, No. 3, pp. 337-343.
- Garcia, S. M., Rosenberg, A. A., 2010. Food security and marine capture fisheries: characteristics, trends, drivers and future perspectives. *Phil. Trans. R. Soc. B*, Vol. 365, pp. 2869–2880.

- Geneva Academy of International Humanitarian Law and Human Rights (ADH-Genève), 2009: The Global Land Grab: A Human Rights Approach. Conference at the Graduate Institute of International and Development Studies, 16 May 2009, Geneva. Online: http://www.3dthree.org/pdf_3D/globalandgrab_seminar2009_programme.pdf [Accessed: 25/08/2011]
- Gortmaker, S. L., Swinburn, B. A., Levy, D., Carter, R., Mabry, P. L., Finegood, D. T., Huang, T., Marsh, T., Moodie, M. L., 2011. Changing the future of obesity: science, policy, and action. *The Lancet*, Volume 378, Issue 9793, pp. 838 – 847.
- Hadid, A. F. A., 2009. Impact of Climate Change: Vulnerability and Adaptation - Food Production. Tolba, M. K., Saab, N. W. (eds.), 2009. Arab Environment: Climate Change – Impact of Climate Change on Arab Countries. Report of the Arab Forum for Environment and Development (AFED). Beirut: Technical Publications and Environment & Development Magazine, pp. 63-74.
- Hart, A., Walton, B., 2009. Water Scarcity, Food Security Concerns Prompt Global Land Grab. Circle of Blue, 17 November. Online: <http://www.circleofblue.org/waternews/2009/world/water-scarcity-food-security-concerns-prompt-global-land-grab/> [Accessed: 22/08/2011]
- Hartley, Joanna, 2009. Food prices to halve as part of UAE gov't plan. *ArabianBusiness*, 4 February. Online: <http://www.arabianbusiness.com/food-prices-halve-as-part-of-uae-gov-t-plan-80378.html> [Accessed: 23/08/2011].
- Heileman, S., Mistafa, N., 2009. Red Sea LME. Sherman, K., Hempel, G. (Eds.), 2009. The UNEP Large Marine Ecosystem Report: A perspective on changing conditions in LMEs of the world's Regional Seas. UNEP Regional Seas Report and Studies No. 182. United Nations Environment Programme. Nairobi: Kenya, pp. 175-186.
- IRIN, 2009. Africa: Tractored out by "land grabs"? New York: UN Office for the Coordination of Humanitarian Affairs.
- Jones, D. A., Ealey, T., Baca, B., Livesey, S., Al-Jamali, F., 2007. Gulf desert developments encompassing a marine environment, a compensatory solution to the loss of coastal habitats by infill and reclamation: The case of the Pearl City Al-Khiran, Kuwait. *Aquatic Ecosystem Health and Management*, Vol. 10, No. 3, pp. 268-276.
- Jones, N., Harper, C., Pantuliano, S., Pavanello, S., Kyunghoon, K., Mitra, S., Chalcraft, K., 2009. Impact of the economic crisis and food and fuel price volatility on children and women in the MENA region [Working paper 310]. London: Overseas Development Institute.
- Kaloustian, J. L., Newman, Frank C., 2009. Land Grabbing for Food & Fuel Outsourcing: A Rising Threat to the Right to Food. (HRA Submissions to the United Nations Human Rights Council 10th Session) Berkeley, CA: Human Rights Advocates (HRA) Online: <http://www.humanrightsadvocates.org/advocacy-at-the-un/> [Accessed: 25/08/2011]
- Kerr, S., Bokhari, F., 2008. UAE investors buy Pakistan farmland. *Financial Times*, 11th May. Online: <http://www.ft.com/cms/s/0/c6536028-1f9b-11dd-9216-000077b07658.html#axzz1W2AFo1Cx> [Accessed: 23/08/2011]
- Khan, N.Y., 2007. Multiple stressors and ecosystem-based management in the Gulf. *Aquatic Ecosystem Health and Management*, Vol. 10, No. 3, pp. 259-267.
- King Saud University (KSU), 2011. Saudi Ministry of Agriculture, KSU sign agreement for ambitious sustainable agriculture R&D center – News Portal, 12 Jun, 2011. <http://enews.ksu.edu.sa/2011/06/12/center-research-development-sustainable-agriculture/> [Accessed: 22/08/2011]
- Laessing, U., 2011. Leaders in Kingdom to discuss plans for food reserves. *Arab News*, January 15th. Online: <http://arabnews.com/economy/article235820.ece> [Accessed: 21/08/2011]
- Lattemann, S., Hopner, T., 2008. Environmental impact and impact assessment of seawater desalination. *Desalination*, Vol. 220, Issues 1-3, pp. 1-15.
- Luedeling, E., Gebauer, J., Buerkert, A., 2009. Climate change effects on winter chill for tree crops with chilling requirements on the Arabian Peninsula. *Climatic Change*, Vol. 96, Nos. 1-2, pp. 219-237.
- Maas, A., Tänzler, D., 2009. Regional Security Implications of Climate Change - A Synopsis. Adelphi Report January 2009. Berlin: Adelphi Consult.
- Makunike, C., 2009. Large-Scale Agricultural Investment in Africa: Points to Ponder. Kugelman, M., Levenstein, S. L. (eds.). *Land Grab? The Race for the World's Farmland*. Washington, D.C.: Woodrow Wilson International Center for Scholars, p. 85-93.
- Maplecroft, 2011. Maplecroft index identifies Bahrain, Qatar, Kuwait and Saudi Arabia as world's most water stressed countries - Key emerging economies and oil rich nations export water issues to ensure food security through African 'land grab'. May 25th, Bath: Maplecroft. Online: http://maplecroft.com/about/news/water_stress_index.html [Accessed: 26/08/2011]
- Met Office, 2009. Climate Change: Middle East. Exeter: MET
- Musaiger, A. O., Al Hazzaa, H. M., Al-Qahtani, A., Elati, J., Ramadan, J., AboulElla, N. A., Mokhtar, N. Kilani, H. A., 2011. Strategy to combat obesity and to promote physical activity in Arab countries. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, Vol. 4 (March), pp. 89-97.
- National Intelligence Council (NIC), 2008. Global Trends 2025 - A Transformed World. NIC 2008-003. Washington, D.C.: US Government Printing Office.

- Nelson, G. C., Rosegrant, M. W., Koo, J., Robertson, R., Sulser, T., Zhu, T., Ringler, C., Msangi, S., Palazzo, A., Batka, M., Magalhaes, M., Valmonte-Santos, R., Ewing, M., Lee, D., 2009. *Climate Change: Impact on Agriculture and Costs of Adaptation*. Washington, D.C.: International Food Policy Research Institute (IFPRI)
- Ng, S. W., Zaghoul, S., Ali, H. I., Harrison, G., Popkin, B. M., 2011. The prevalence and trends of overweight, obesity and nutrition-related non-communicable diseases in the Arabian Gulf States. *Obesity Reviews* (2011) Vol. 12, Issue 1, pp. 1–13.
- O'Grady, Sean, 2011. The coming hunger: Record food prices put world 'in danger', says UN. *The Independent*, 6 January 2011, London. Online: <http://www.independent.co.uk/news/world/politics/the-coming-hunger-record-food-prices-put-world-in-danger-says-un-2177220.html> [Accessed: 23/08/2011]
- Oxford Business Group (OBG), 2008. Bahrain - Investing in Food Security. 22 August. London: OBG. Online: http://www.oxfordbusinessgroup.com/economic_updates/investing-food-security [Accessed: 23/08/2011]
- Oxford Business Group (OBG), 2011. Saudi Arabia: Focus on food security. 25 April. London: OBG. Online: http://www.oxfordbusinessgroup.com/economic_updates/saudi-arabia-focus-food-security [Accessed: 23/08/2011]
- Pradhan, S. R., 2008. Inflation in the GCC - Are Subsidies the Antidote? (GRC Analysis). March. Dubai: Gulf Research Center
- Reuters, 2011a. Egypt freezes Saudi Prince Alwaleed land. Cairo. April 10th. Online: <http://www.reuters.com/article/2011/04/10/us-egypt-alwaleed-idUSTRE7392GT20110410> [Accessed: 23/08/2011]
- Reuters, 2011b. Food prices send Oman inflation to 25-month high. *Arab News*, July 10th. Online: <http://arabnews.com/economy/article469263.ece> [Accessed: 25/08/2011]
- Rice, X., 2008, "Abu Dhabi Develops Food Farms in Sudan", *The Guardian*, 2 July. Online: <http://www.guardian.co.uk/environment/2008/jul/02/food.sudan> [Accessed: 24/08/2011]
- Rosenzweig, C., Casassa, G., Karoly, D. J., Imeson, A., Liu, C., Menzel, A., Rawlins, S., Root, T.L., Seguin, B., Tryjanowski, P., Hanson, C. E., 2007. Assessment of observed changes and responses in natural and managed systems. *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Parry, M. L., Canziani, O. F., Palutikof, J. P., van der Linden, P.J. (eds.). Cambridge: Cambridge University Press, pp. 79-131.
- Roy, J., 2010. GCC Becomes the Largest Food Importer", in: TOBOC - An International Initiative for Global Trade, February, 17th. Online: <http://www.toboc.com/tradenews/Gcc-Becomes-The-Largest-Food-Importer/1451.aspx> [Accessed: 20/08/2011]
- Russell, J. A., 2009. Environmental Security and Regional Stability in the Persian Gulf. *Middle East Policy*, Vol. 16, No. 4, pp. 90 – 101.
- Sale, P. F., Feary, D. A., Burt, J. A., Bauman, A. G., Cavalcante, G. H., Drouillard, K. G., Kjerfve, B., Marquis, E., Trick, C. G., Usseglio, P., Van Lavieren, H., 2011. The Growing Need for Sustainable Ecological Management of Marine Communities of the Persian Gulf. *Ambio*, Vol. 40, No. 1, pp. 4-17.
- Schubert, R., Schellnhuber, H. J., Buchmann, N., Epiney, A., Griefhammer, R., Kulesa, M., Messner, D., Rahmstorf, S., Schmid, J. (German Advisory Council on Global Change), 2008. *Climate Change as a Security Risk*. London and Sterling, VA: Earthscan
- Sen, A. K., 1981. *Poverty and Famines: An Essay on Entitlement and Deprivation*. Oxford: Clarendon Press.
- Sen, A. K., 1982. The Food Problem: Theory and Policy. *Third World Quarterly*, Vol. 4, No. 3, pp. 447-459.
- Sfakianakis, J., 2008: "Giving a boost – Helping cope with the rising cost of living". SABB Economic Reports. February. Riyadh: Saudi British Bank [SABB].
- Sheppard, C., Al-Husiani, M., Al-Jamali, F., Al-Yamani, F., Baldwin, R., Bishop, J., Benzoni, F., Dutrieux, E., Dulvy, N. K., Durvasula, S. R. V., Jones, D. A., Loughland, R., Medio, D., Nithyanandan, M., Pilling, G. M., Polikarpov, I., Price, A. R.G., Purkis, S., Riegl, B., Saburova, M., Namin, K. S., Taylor, O., Wilson, S., Zainal, K., 2010. The Gulf: A young sea in decline. *Marine Pollution Bulletin*, Vol. 60, pp. 13–38.
- Smaller, C., Mann, H., 2009. A Thirst for Distant Lands: Foreign investment in agricultural land and Water. Winnipeg: International Institute for Sustainable Development (IISD) Online: http://www.iisd.org/pdf/2009/thirst_for_distant_lands.pdf [Accessed: 20/08/2011]
- Sparavigna, A.C., 2011. The decreasing level of Toshka Lakes seen from space. Cornell University Library. Online: <http://arxiv.org/ftp/arxiv/papers/1107/1107.4430.pdf> [Accessed: 24/08/2011]
- Subbaraman, R., Varma, S., Darby, S., Job, O., 2010. *Global Economics and Strategy - The coming surge in food price*. September. London: Nomura.
- The Economist, 2009. The United Arab Emirates and Sudan - An odd deal over land. Print edition, July 9th. London: The Economist.
- The World Bank, 2007. *World Development Report 2008 - Agriculture for Development*. Washington, D.C.: The International Bank for Reconstruction and Development / The World Bank.
- The World Bank, Food and Agriculture Organization of the United Nations (FAO), International Fund for Agriculture Development (IFAD) (eds.), 2009. *Improving Food Security in Arab Countries*. Washington, D.C.: The World Bank. Online:

<http://siteresources.worldbank.org/INTMENA/Resources/FoodSecfinal.pdf> [Accessed: 25/08/2011]

The World Bank, 2010. Rising Global Interest in Farmland - Can It Yield Sustainable and Equitable Benefits? Washington, D.C.: The International Bank for Reconstruction and Development / The World Bank

The Saudi Gazette, 2011. Kingdom holds talks to increase food reserves. 16th January. Riyadh and Jeddah: The Saudi Gazette. Online: <http://www.saudigazette.com.sa/index.cfm?method=home.regcon&contentID=2011011691383> [Accessed: 24/08/2011]

Ulrichsen, K., 2009. Gulf Security – Changing Internal and External Dynamics. Policy Paper for the Kuwait Programme on Development, Governance and Globalization in the Gulf States. London: London School of Economics and Political Science.

United Nations Development Programme (UNDP), 2006. Human Development Report 2006 - Beyond scarcity: Power, poverty and the global water crisis. New York: UNDP

United Nations Economic and Social Commission for Western Asia (ESCWA), 2006: *Arab Region State of Implementation on Climate Change*. Beirut: ESCWA/UNEP-ROWA/League of Arab States

United Nations Environment Programme (UNEP), 2007. Sudan Post-Conflict Environmental Assessment. Nairobi: UNEP.

United Press International (UPI), 2010. Gulf States face food crisis. UPI, May 27th. Online: http://www.upi.com/Business_News/Energy-Resources/2010/05/27/Gulf-states-face-food-crisis/UPI-43931274983541/ [Accessed: 25/08/2011]

United States Department of Agriculture - Foreign Agricultural Service (USDA-FAS), 2009. Iraq: Drought & Irrigation Shortages Decimate Wheat Harvest in 2009/10 [Report May, 12, 2009] Washington, D.C.: USDA

Von Grebmer, K., Nestorova, B., Quisumbing, A., Fertziger, R., Fritschel, H., Pandya-Lorch, R., Yohannes, Y., 2009. 2009 Global Hunger Index - The Challenge of Hunger: Focus on Financial Crisis and Gender Inequality. Bonn, Washington D. C., Dublin: Deutsche Welthungerhilfe (German AgroAction); International Food Policy Research Institute (IFPRI); Concern Worldwide.

Welthungerhilfe, 2009. Land grabbing – poor people are losing the ground beneath their feet. Policy Brief, No. 8 (April). Bonn. Deutsche Welthungerhilfe. Online: http://www.welthungerhilfe.de/fileadmin/media/pdf/Englische_Seite/Themes/IN_BRIEFNo.8_LandGrabbing.pdf [Accessed: 25/08/2011]

Williams, J.W., Jackson, S.T., Kutzbach, J.E., 2007. Projected Distributions of Novel and Disappearing Climates by 2100 AD. PNAS Early Edition for the week of March 26, 2007.

World Health Organization, 2011. WHO World Indicators. Saudi Arabia. Online: <https://apps.who.int/infobase/CountryProfiles.aspx> [Accessed: 25/08/2011]

World Trade Organization (WTO), 2009. International Trade Statistics 2009. Geneva: World Trade Organization.

World Travel & Tourism Council (WTTC), 2011. World Economic Impact Research Report. London. 14 February 2011

Wright, B., Cafiero, C., 2011. Grain reserves and food security in the Middle East and North Africa. Food Security, Vol. 3, Suppl. 1, pp. S61–S76.

Zoomers, A., 2010. Globalisation and the foreignisation of space: seven processes driving the current global land grab. Journal of Peasant Studies. Vol. 37, Issue 2, pp. 429-447.