

Food Security in the UAE

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The United Arab Emirates is “food secure”; its supermarkets display food from around the globe and the buffets in its hotels are overflowing. Business travelers often complain about gaining weight while traveling in the emirates. Most of this food is not produced in the UAE, but imported—food security does not require food self-sufficiency. The UAE has a high per capita income and can afford to finance food imports. Income inequality is high – as anecdotal evidence in the face of a dearth of statistics would suggest – but no one needs to go to bed hungry, as long as wages are paid.

The global food crisis of 2008 unhinged this sense of security. Rising food prices alone were manageable for an oil- and cash-rich country like the UAE, but trade restrictions by food exporters such as Argentina, Russia, India and Vietnam were disconcerting and raised memories of vulnerability to food import disruption.

The UAE reacted with three different measures: price controls, a build-up of strategic storage, and the announcement of agro-investments abroad, many in countries that are food insecure, such as Sudan or Pakistan. This article explores the motivation for these policy steps and discusses their viability. It argues that price controls are untenable in the long run if not accompanied by some form of subsidy. Strategic storage would benefit from international or regional cooperation in order to pool capacities and avoid unnecessary and expensive storage. Finally, it suggests reasons as to why such a large gap exists between the announcement of agro-investments and their actual implementation. Major obstacles have included insufficient infrastructure, difficult framework conditions, and political backlashes in target countries on the one hand, and lack of capacities in the UAE and complicated financing in the wake of the global financial crisis on the other.

The strengthening of international food markets and regulations will be more important for UAE food security than the search for exclusive bilateral access to food production from food insecure countries, which will likely prove elusive in a crisis. There are many areas of food security that deserve greater attention and can be tackled on a national level. Unhealthy diets cause diseases like obesity and diabetes, water management can be improved and food accessibility for vulnerable segments of the population can be maintained by tackling violations of labor laws. Finally, economic diversification not only has the potential for job creation, but will affect food imports options in the long run.

Mistrust in Markets:

The Global Food Crisis 2008 and the UAE's Reaction

Price Controls

In the wake of the Arab Spring, governments across the Middle East have used welfare payments to preempt public discontent.¹ The provision of affordable services, utilities and public sector jobs is important for political legitimacy. In the rentier states of the Gulf they constitute a *quid pro quo* for lack of political participation. The UAE's subsidy regime is less extensive than that of Egypt, Iran or Saudi Arabia. It focuses on fuels and the provision of electricity and water at cheap rates for UAE and GCC nationals. The UAE does not have formal food subsidies in place as in Saudi Arabia, which supports prices for various staple foods and livestock fodder like barley, adjusting them flexibly depending on world market conditions.² The UAE has also not had to resort to *ad hoc* measures like those taken in Kuwait, where the government announced the free distribution of staple foods to locals over a 14-month period as part of a general subsidy package.

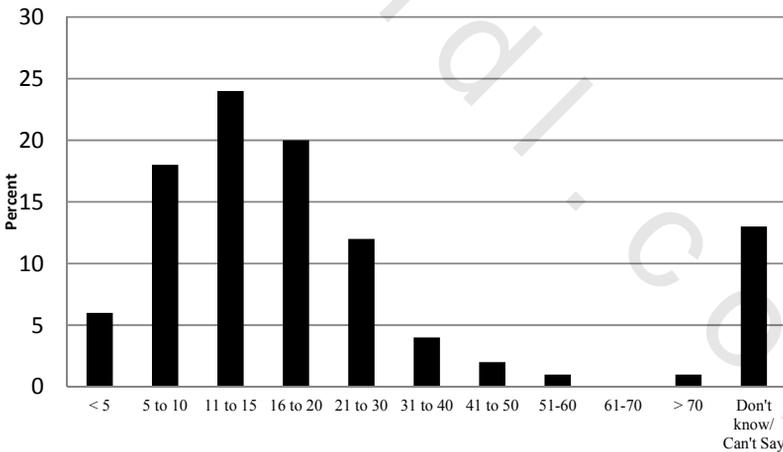
Like Qatar, the UAE has raised public sector wages and implemented price controls. Pay hikes started at 35 percent and reached 100 percent for employees of the federal judicial authority, the ministry of health and teachers at the ministry of education.³ At least 80 percent of the national population is employed by the public sector and these measures have primarily improved their purchasing power. The largely expatriate workforce in the private sector did not immediately benefit.

The share of food in the general Consumer Price Index (CPI) in the UAE is relatively low at 14.3 percent, compared to 26 percent in Saudi Arabia and 18 percent in Qatar.⁴ Yet the UAE CPI is outdated and the International Monetary Fund (IMF), banks and international think tanks have questioned official inflation estimates in the past.⁵ Lack of reliable data hampers policy formulation, and a much needed reform of the CPI is currently being undertaken by the Ministry of Economy.

Lower income groups are particularly affected by food inflation, as they spend a relatively high share of their disposable income on food. According to a survey by Bayt.com and YouGov Siraj in 2007, people in the UAE generally spent between 10 and 20 percent of their disposable household income on food. This is similar to levels in developed countries and considerably lower than in developing countries, where this ratio can reach 40 percent or more; but there were also quite a few people in the UAE who spent up to 30 and 40 percent of their disposable income on food (see Figure 10.1).

Figure 10.1

Percentage of Disposable Income spent on Food in UAE, 2007



Source: Bayt.com/YouGov Siraj, “Research Results, Rents, Transports and Costs,” October 2007 (http://img.b8cdn.com/images/uploads/article_docs/rents_bayt_en.pdf_20090609081905.pdf).

With over 3,000 interviewees in the UAE the Bayt/YouGov Siraj survey had a considerable sample size. Of the respondents, 26 percent had an income below \$1,001. This does not leave room for great differentiation between poorer segments of the population; the relative difference between \$200 and \$800 is more substantial than between \$3,000 and \$4,000. As the survey was conducted online, there might have been a considerable sample bias, since poorer, blue-collar workers often have limited internet access. Bias is also reflected in the relatively low sample size of 31 percent of Asians overall, even though they constitute a majority of the population of the UAE. In sum the survey revealed that a large part of the UAE population spends a relatively small share of their income on food, similar to developed countries. However, the survey also contained a group of people who needed more than 30 percent of their incomes to buy food. They made up only eight percent of the sample – possibly due also to underrepresentation – while their relative size might be higher in reality.

Obviously, pay hikes in the public sector have not directly addressed the situation of the lowest paid. Yet, UAE authorities have also been concerned about food price hikes. They implemented price controls for up to 700 commodities ahead of the inflation-prone Ramadan season in 2011.⁶ This created a problem, in that the UAE does not have a system of consumption subsidies like Saudi Arabia. Once world market prices exceed a level at which a profit can be made within the confines of the price ceilings, traders will incur losses. Either they will stop offering the respective items and a black market with higher prices will develop, or controlled staple foods will need to be cross-subsidized with other sales. Retailers in fact started to complain about the situation and some stopped offering those goods for which prescript sales prices were below profitable levels.⁷ The UAE would need to introduce food subsidies like other countries in the region, if it wanted to keep food prices in certain boundaries. In an environment of growing global food prices, price controls alone are not viable in the long run.

Strategic Storage

Global stocks-to-use ratios for grains and oilseeds were at historic lows in 2008. At 14 percent they were even one percent lower than during the world food crisis of 1973/74; even though the price increases were smaller in relative terms than during the 1970s.⁸ Utilization of crops had outpaced

production in the preceding years and created a draw on existing stocks. The causes have been widely debated. On the demand side, biofuels, population growth and the growing meat intake of diets in emerging markets weighed in. On the supply side, productivity growth in developed markets petered out. Switches in agricultural policies in the European Union and the United States from price support of commodities to monetary support of farmers reduced production and the need for storage to stabilize prices. To make matters worse, agro-exporters like Argentina, Russia and Vietnam implemented export restrictions out of concern for their own food security and China – traditionally a large stockpiler for strategic reasons – did not make its reserves internationally available as it had done earlier in the 2000s, when it acted as a supplier of last resort. Instead, it taxed grain and rice exports as well. Ultimately only the US and Thailand remained in the rice market as exporters.⁹

Once beaten twice shy, the Gulf countries have identified an increase of strategic storage as an important ingredient of managing food import dependence. Oman had the most extensive system in place before the food crisis. At that time it covered 3–4 months of staple food needs.¹⁰ Storage was increased to one year for rice, six months for edible oils, milk and sugar, and to 3–5 months for wheat.¹¹ The handling capacities at the ports of Sohar and Salalah were extended as part of the expansion of storage facilities.¹²

In Saudi Arabia, Deputy Minister of Agriculture Abdullah Al-Obaid announced the build-up of strategic storage for rice and wheat for 3–6 months of consumption in April 2009.¹³ In 2011, Minister of Agriculture Fahd Balghunaim increased that level and declared that a 12-month storage for wheat should be achieved by 2014.¹⁴ This is similar to the level of the Third Five-year Plan (1980–85), when Saudi Arabia increased targeted capacity to 12 months, up from the prevailing six months that were stipulated in the plans of the 1970s.¹⁵ The fact that storage was so much lower before the current food crisis in 2008 illustrates the relative neglect of strategic storage during the period of low global food prices. Like Oman, Saudi Arabia has also expanded port handling facilities in Jeddah, Yanbu, King Abdul Aziz Port/Dammam and Jubail.

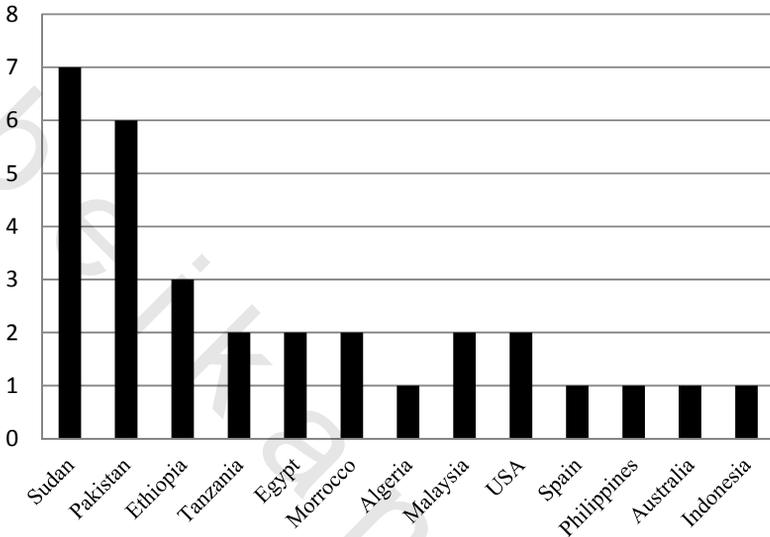
The UAE decided to build up a strategic food reserve as well in order to reduce exposure to market volatility. Then the issue somewhat

disappeared from the headlines, possibly because global food prices corrected sharply in the second half of 2008 and reduced the sense of urgency. Only by 2010, food prices crept upwards again and the federal Ministry of Economy announced that it had given the green light to an implementation plan for storage facilities following a feasibility study.¹⁶ In 2012, it seemed that the first steps of implementation were considered, with the private sector playing an important role in the storage administration.¹⁷ The long lead time and the fact that no further details like the storage amount were provided, suggests that the topic is regarded as less important in the UAE than in Oman or Saudi Arabia. In 2007, the Abu Dhabi Food Control Authority was given the task of attending to issues of food safety and domestic agriculture in the largest emirate. However, the UAE does not have a prominent, centralized planning agency for food security issues like the Qatar National Food Security Program (QNFSP) or a coordinating body like the King Abdullah Initiative for Saudi Agricultural Investment Abroad (KAISAIA). Possibly the federal structure of the UAE makes decision-making and consensus building more difficult. At the same time, emirate-level institutions curtail the authority of federal institutions.

Foreign Agro-Investments

Like other GCC countries the UAE has announced foreign agro-investments to gain privileged bilateral access to food production. Established food exporters like the US or Australia have not ranked very prominently; Sudan and Pakistan have been the most favorable investment destinations, followed by Ethiopia (see Figure 10.2). These countries might be geographically close and offer logistical advantages, but they are food insecure. They were the top three recipients of food aid from the World Food Program (WFP) in 2010.¹⁸ Pakistan also suffers from a physical water shortage and has high inequality of land ownership.

Not surprisingly, so-called “land-grab” investments are highly controversial. Advocacy groups argue that they compromise local food security and the customary land rights of small-scale farmers and pastoralists, while benefits in the form of jobs, compensation and business opportunities are limited. The World Bank has deplored the abysmally low job creation of capital intensive large-scale investments.¹⁹

Figure 10.2**Agro-projects and MOUs Announced in the UAE, 2008–2011**

Source: “Food Crisis and the Global Land Grab” (www.farmlandgrab.org).

The UAE and other Gulf countries have faced resistance to their agricultural projects. In Sudan there have been violent protests against the Merowe dam, which is co-funded by Gulf development funds like the Abu Dhabi Fund for Development (ADFD) and has led to the resettlement of 40,000 people. Similar displacements are expected after the ongoing heightening of the Roseires dam.²⁰ In Ethiopia the government resettles local populations, often by force, in order to make land available to foreign investors which it hopes will help to spur an agriculture-led industrialization. Among prominent investors is the Saudi Star company of Saudi billionaire Mohammed Al-Amoudi (whose farm was attacked by gunmen in 2012, resulting in the death of several workers).²¹ When the UAE negotiated possible agro-projects in Pakistan it tried to guarantee “a blanket exemption” from export restrictions that Pakistan had implemented out of concern for its domestic food security. Pakistan was only ready to grant such privileges in specifically proposed agricultural free zones.²² In Baluchistan in western Pakistan, the regional government

blocked direct deals between UAE private investors and Pakistani landowners after farmers protested. The central government stipulated in the aftermath that outside investors must enter sharecropping arrangements with local farmers on a 50:50 basis. At the same time, Pakistan is interested in foreign investments and increased the amount of farmland open to foreign investors to three million hectares.²³ It also offered Gulf countries a security force of 100,000 men to protect farm assets. This is a strong hint at the intricate socio-economic conflicts that such large land transactions would involve.²⁴ The Saudi Minister of Industry and Commerce, Ali Reza, conveyed to US diplomats in a WikiLeaks cable that an agricultural project in Pakistan was not pursued, "because the Saudi Government and its companies did not believe they could manage the security issues involved."²⁵

These examples show the considerable ambiguity of foreign agro-investments. Gulf countries argue that a win-win situation is possible, with Gulf countries supplying the capital and target countries the land and labor. There is indeed a strong need for investments in agriculture. Irrigation infrastructure in the Sudanese Gezira scheme or the Punjab in Pakistan need to be rehabilitated. To be successful any agricultural investment not only needs to bring the local population on board, but also needs to be part of a broader process of development planning by respective national institutions. Corruption and a lack of governance in target countries are often obstacles in this regard. This was one reason why the plans of Gulf countries to develop Sudan as an Arab bread-basket in the 1970s failed.²⁶ On the other hand, local technocrats in Sudan have complained about an occasional approach by Gulf investors to reduce transaction costs by gaining privileged access to individual politicians and bypassing national institutions of development planning.²⁷

So far, agro-investments by the UAE and other Gulf countries have lagged far behind announcements. The media perception that Gulf countries were already producing food abroad on a large-scale to cover their food needs is inaccurate.²⁸ The political backlash, lack of infrastructure and governance in target countries, and reduced availability of finance in the wake of the global financial crisis have been reasons for the implementation gap. In Pakistan, the World Bank did not find signs of a single implemented project.²⁹ In Sudan, about 100 kilometers south of Khartoum, the Zayed al-Khair project of the UAE based Al-Anhar Group

has existed for over ten years, but less than 10 percent of a total acreage of 40,000 feddans are actually planted. In the rain-fed area around Gedaref the UAE's Al-Zafra Group recently left a project after only one season of cultivation. A large project that the ADFD announced has not been started at all yet.³⁰

The UAE's sizable food imports continue to come primarily from established agro-exporters like Canada, Australia or Brazil, and less so from developing countries. Pakistan and India play an important role for supply of basmati rice, but do so without Gulf agro-investments. As long as markets stay open Gulf countries are food secure, because foreign farmers want to make money. Helping them to do so might be better achieved through trade agreements and contract farming. The fully owned plantation model that Gulf countries mostly aspire to in developing countries is less suitable.³¹

UAE Domestic Agriculture: Cherished and Unsustainable

Agriculture is regarded as an important tribute to ancestral land, traditions and food security in the UAE, yet it is unsustainable in its current form. For Sheikh Zayed bin Sultan Al Nahyan, the founder of the UAE, the free distribution of water and the promotion of agriculture via subsidies were important sources of legitimacy.³² The UAE has granted land and subsidies to nationals to help them set up farms as part of its generous welfare system. Actual operation of the farms is mostly in the hands of expatriate labor. Often the farms have the character of weekend leisure gardens with attached agricultural production units rather than fully fledged commercial operations. Subsidized purchasing prices apply to dates, and in Abu Dhabi also to green fodder. Only vegetable production is market-based.

Water scarcity is the biggest challenge for UAE agriculture and the reason for its lack of sustainability. The United Nations Food and Agriculture Organization (FAO) advised in 1973 against a "massive effort to expand agriculture" for this reason.³³ Yet, the 1970s saw the build-up of essential infrastructure, and the 1980s the implementation of projects and marketing operations.³⁴ The cultivated area more than tripled between

1994 and 2003, and irrigated areas increased from 67,000 hectares (ha) to 226,600 ha over the same period.³⁵

The government has tried to forge production growth through pilot farms and research stations. A five-year plan in 1968 emphasized agricultural development and a number of research stations were set up to develop locally adapted crops.³⁶ Extensive research was undertaken in the second half of the 1970s; in 1983, the government set up a model farm.³⁷ The International Center for Biosaline Agriculture in Dubai was established in 1992 and supports research on desert hardy and salt tolerant crops as well. However, dissemination of such crops and other research results has been limited and water consumption in agriculture remains inefficient.

Self-sufficiency in food production was a “matter of principle” for Sheikh Zayed, according to an official portrayal.³⁸ This goal was never achieved. Only fruits, vegetables, fish and eggs had relatively high ratios of self-sufficiency in 2008 (see Table 10.1). However, some of these numbers appear inflated given the recent upward revision of population figures and the cosmopolitan display of fruits and vegetables from all over the world in UAE supermarkets.³⁹

Table 10.1

Self-Sufficiency Ratios UAE (% , 2008)

Cereals (total)	1
Potatoes	10
Pulses	10
Vegetables	38
Fruits	66
Meat (total)	21
<i>Red Meat</i>	12
<i>Poultry</i>	23
Fish	72
Eggs	51
Milk and Dairy Products	17

Source: Arab Organization for Agricultural Development, *Arab Agricultural Statistics Yearbook*, vol. 29, 2009 (http://www.aoad.org/Statistical_Yearly_Book_Vol_29.pdf).

Water has not only been lacking, its use has been disorganized and inefficient. Extensive water usage for afforestation, parks and leisure

gardens has diverted it away from food production. The work of agricultural research centers has had no centralized coordination. Overlapping institutional responsibilities and the federal structure of the UAE have complicated decision-making. Coordination was limited between the federal Ministry of Agriculture, the departments of agriculture in Abu Dhabi and Al-Ain and the municipalities in other emirates that were in charge of distributing land.⁴⁰

In 2003, three-quarters of the UAE's 255,000 cultivated hectares were used for permanent crops—mostly date palms, followed by fodder and vegetables.⁴¹ The UAE does not have the kind of large-scale subsidized wheat production that Saudi Arabia has decided to phase out by 2016. However, it does have a substantial livestock sector. Over two million animals have high feedstock needs. Currently Rhodes grass accounts for 60 percent of water use in agriculture. It is targeted for a phase out in order to preserve water resources. Green fodder will need to be increasingly imported.⁴²

UAE agriculture is at times identified as an important pillar of food security. The opposite is true: its contribution to food supplies is only a fraction of total consumption, at the same time it is compromising water security because it is the country's largest water consumer. There is not enough water around for the maintenance of current agriculture, not to mention its expansion. Considerable leverage on a national level exists, however, in a number of overlooked policy fields that are crucial for a broad based concept of food security. They will be discussed in the following section.

UAE Food and Water Security: Some Policy Suggestions

International Markets: If You Can't Beat Them, Join Them

Gulf countries express a fundamental mistrust of global food markets when they increase strategic storage and try to gain privileged bilateral access to food production. This mistrust is informed by the export restrictions placed on food exporters in 2008, but also by earlier experiences of geopolitical supply disruptions. During World War I and II, food supplies were fragile and depended on political alliances. During the 1970s, food trade was politicized and the US contemplated grain

embargos against Arab countries in retaliation to their oil boycott.⁴³ Still, with all justified caution, it must be stressed that global food markets have served the Gulf countries well, even during crises. Their replacement by some bilateral autarky would be unrealistic; therefore, the challenge is to make them more reliable and predictable through enhanced international cooperation.

The World Trade Organization (WTO) allows food export restrictions at times of crisis, as Saudi Arabia's former WTO chief negotiator Fawaz al-Alami has pointed out when arguing against Gulf agro-investments. Because of their lack of reliability, he recommended the build-up of strategic storage instead.⁴⁴ Gulf countries are implementing such programs now as outlined above. Yet, they do so on a national level, without international or even regional coordination. The International Food Policy Research Institute (IFPRI) has pointed out that the additional demand of a rapid expansion of national storage might cause the very problem it seeks to address: tight global food markets and rising prices. Instead, IFPRI has suggested an international food reserve to avoid unnecessary and expensive storage.⁴⁵ Such a reserve has been debated in development circles since the 1950s. States have been reluctant to give up sovereignty in this matter and there are issues of practicality. Yet, there is a strong case for increased international cooperation of some form. The Middle East actually offers a case study. The Allied Middle East Supply Center in Cairo avoided excessive storage during World War II by pooling reserves all over the region.⁴⁶ Similar arguments for regional cooperation today have been made.⁴⁷

Hence, the UAE and other Gulf countries may consider increasing cooperation in the Middle East and pushing their case more prominently in international organizations like the WTO or the FAO. To do so they would need to beef up their capacity to communicate on an institutional level. Gulf bureaucracies are sometimes top heavy, driven by single personalities and lack qualified human resources with discretionary power on an intermediate level. As financial speculation in agricultural commodities has contributed to increased volatility and overshooting of prices,⁴⁸ reforms to the financial architecture would be in Gulf countries' best interests. Again, they could align themselves with initiatives on the international level. As major financiers of global imbalances, their voice

certainly carries weight. Another recently emerging strategy is Abu Dhabi's plan to establish a food-trading house to gain a foothold in a market that is so far dominated by a few large trading houses like ADM, Bunge, Cargill and Dreyfus.

Water and Food Security

The UAE has the highest water consumption per capita in the world—even higher than in the United States or Canada, and about double that of most European countries. For a water-scarce country, this is both flabbergasting and unsustainable. The vast majority of water is consumed by agriculture and its irrigation needs. The concept of food self-sufficiency collides with water security, which is an indispensable part of food security. Renewable water reserves are abstracted many times over replenishment rates. Non-renewable fossil groundwater is mined at alarming rates. At current consumption rates, groundwater resources will be depleted within 20–40 years.⁴⁹ The only alternative would then be desalinated water, which is prohibitively expensive for agricultural use. The first desalination plant of the UAE was installed in Abu Dhabi in 1976 and capacity has been expanding ever since. Cities now rely on it almost exclusively. If desalination plants failed due to an oil spill or sabotage, cities would run dry within two days. For this reason, Abu Dhabi has started to build up a strategic water reserve in suitable geological formations.⁵⁰ Currently desalinated water is predominantly used for residential purposes, landscaping and home gardens. Yet 11 percent of desalinated water production is directed to agriculture, according to the Abu Dhabi Water Resources Master Plan, which suggests the actual figure might possibly be far higher.⁵¹ This allocation of desalinated water is economically wasteful and ecologically questionable.

There is an urgent need in the UAE to reduce water consumption. Water tariffs need to reflect the actual costs of making water available. Subsidies should be cut radically. In as far as cheap or free water is regarded as indispensable for political legitimacy, it could be substituted by transfer payments. The important thing is to bring consumption down; to this end, agriculture needs to be reduced and redirected towards more value-added and less water-dependent products. The substantive livestock industry produces feces that constitute an additional threat to groundwater

quality and must be pushed back. The same is true for Rhodes grass cultivation, which consumes about 60 percent of agricultural water use. Water saving technologies like greenhouses, drip irrigation and drought tolerant crops should be disseminated more widely.

Unhealthy Diets and Obesity

Food security requires access to healthy and nutritious food for all people at all times. In that sense it is threatened in the UAE by an abundance of calories, not a lack thereof. Unhealthy diets, excessive intake of calories and lack of physical exercise have caused an obesity and diabetes epidemic in the UAE. Obesity rates have trebled since 1980 and remain at 34 percent. Globally, the UAE and Saudi Arabia are among the top five countries affected by diabetes, with prevalence rates of around 13 percent.⁵² The dietary change towards greater portions of meat and dairy products, processed foods and sugar that is now taking place in emerging markets like China and India had already started in the Gulf region in the 1970s.

Obesity and diabetes severely curtail the well being of a person and his or her ability to work. They cause an incalculable risk to national wealth. The gravest effects often only show after a patient has suffered for decades from the condition. Pushing them back is an urgent policy requirement. Awareness campaigns and promotion of physical exercise in schools and communities can help, but in the end there is no way around more robust legal measures, which can be contentious among food industry representatives. Like similarly affected OECD countries the UAE will need to consider measures like taxation of fast food, and better product information that allows consumers to make informed choices.

Scarcity amidst Plenty? Food Accessibility of the Blue-Collar Workforce

Asian blue-collar workers constitute a substantial section of the population in the Gulf. In the UAE, Qatar and Kuwait they outnumber locals and expatriates from other continents.⁵³ Blue-collar workers have suffered most from food inflation as they spend a relatively high share of their income on food. At times, non-payment of wages have further

aggravated their situation and a number of wildcat strikes have occurred in the UAE and other Gulf states.

Often there is a tendency in the Gulf countries to portray migrant workers as a security risk. The Bahraini Minister of Labor went so far as to call Asian labor migration “a danger worse than the atomic bomb or an Israeli attack” in 2008.⁵⁴ Obviously, such statements do not do justice to the economic contribution of expatriate laborers and their legitimate grievances.

Social peace and food security are important in safeguarding stability. During the food crisis of 2008 UAE officials were particularly concerned about the price of rice, the main staple food of the Asian worker community.⁵⁵ The importance of mediating institutions was acknowledged by enhancing the role of the labor courts to address violations of labor laws. In cooperation with Indian counterparts the UAE has also tried to remedy problems with the recruitment process in expatriates’ home countries. A reliance on ruthless agencies often results in high indebtedness among expatriate laborers before they even arrive in the UAE. Still more can be done. Transparency and the powers of the labor courts could be increased, while disadvantageous aspects of the sponsorship system – like the widespread practice of confiscating the passports of blue-collar workers during their contract period – could be abolished.

Ever since Nobel laureate Amartya Sen’s seminal research about historical famines in India and Ethiopia, we have tended to view food insecurity as a political and social construct, not just as a technical challenge of agricultural productivity and food distribution.⁵⁶ On a macro-level the UAE is food secure and, indeed, people consume too many calories. The country is far removed from famine scenarios. Yet on a micro-level, parts of the blue-collar workforce can face a lack of entitlements and food accessibility. It is of vital importance that the state empowers institutions able to address such issues, especially in the case of an economic or political crisis when such entitlement shortages could become more widespread.

Economic Diversification

The ability to finance food imports from water-rich countries is the condition *sine qua non* of UAE food security. Because the UAE has ample oil revenues, it is food secure. Economic diversification not only can reduce one-sided exposure of the economy and provide jobs for the young population, it is also important in financing food imports in the long-term, if oil production and revenues decline.

Table 10.2
Oil and Gas Dependence of GCC Economies in 2010 (%)

	Saudi Arabia	UAE	Kuwait	Qatar	Oman	Bahrain
Hydrocarbon / GDP	52	34	52	57	54	25
Hydrocarbons / Gov. revenues	90	76	81	55*	85	80*
Hydrocarbons / Exports	86*	35*	95	90	66	76*

Source: International Monetary Fund (IMF), Chapter IV Consultation, Staff Reports (2011: Kuwait, Saudi Arabia, UAE; 2010: Qatar, Oman; 2007: Bahrain). GDP figures from IMF, "Gulf Cooperation Council Countries (GCC): Enhancing Economic Outcomes in an Uncertain Global Economy," (Washington DC, 2011).

Notes: Figures are rounded estimates. (*) Figures for hydrocarbon exports of Saudi Arabia and UAE include refined products. Investment income of state-owned hydrocarbon companies in Qatar is subsumed under non-hydrocarbon revenues and the investment income of state-owned companies in general. The latter's share in government revenues was one quarter in 2010. Bahrain's numbers for the hydrocarbon shares of government revenues and exports are from 2007.

Oil revenues in the Gulf countries constituted on average 46 percent of gross domestic product (GDP) in 2010 and around three-quarters of government revenues and total exports (see Table 10.2). Diversification in the UAE is relatively advanced compared with Kuwait or Saudi Arabia, as new sectors have emerged in the fields of services, tourism,

trade and logistics. However, a thriving re-export trade via Dubai also tends to overstate the degree of diversification, as such exports do not really reflect production and economic capacities within the country.

Generally, the oil dependence of the economies of the Gulf has declined since the 1970s because of successful diversification, but it has inched up again in the 2000s as a result of rising oil prices.⁵⁷ In the long-run, renewable energies could be of particular importance in overcoming a one-sided reliance on hydrocarbon revenues. The UAE has already undertaken steps to foster this sector with the establishment of Masdar and the self-set goal to produce seven percent of its energy needs from renewable sources by 2020 (which it has pushed back to 2030, however).⁵⁸

Thus, economic diversification increases food import options and their sustainability in the long run. By creating jobs outside the capital-intensive hydrocarbon sector it also has the potential to enhance food accessibility and enable a more broad-based participation in economic development.

The Lack of Statistics

Any food security planning requires information. Yet, statistics in the UAE are often deficient and need to be improved. The consumer price index (CPI) is outdated and most likely does not accurately reflect consumer baskets. A revision has been planned for a long time, but has not been realized yet. An accurate population count is essential to gauge the amount of food needed, yet until recently there has been great confusion about the real numbers. The UAE massively revised its population figures upward from 4.1 million in 2005 to 8.26 million in the second quarter of 2010.⁵⁹ This was due in part to the fact that the economic boom of the UAE attracted many new migrant workers, but another major factor for the revision was the correction of flawed older data. There is clearly an urgent need to improve data quality in the UAE overall, centralize responsibilities and start to produce more industry-specific data.

Conclusion

International agro-investments have been a widely publicized reaction of the UAE and other Gulf countries to the global food crisis of 2008. Yet, to improve food security other policy fields are more important and the UAE has a considerable number of national levers at its disposal to influence them in its favor. International storage solutions and other forms of multilateral engagement could make global food markets more reliable and predictable. Water security is an indispensable part of food security; ironically, it could be increased by reducing water-guzzling agriculture. The high prevalence of obesity and diabetes are caused by unhealthy diets and constitute a different and possibly unexpected threat to food security. Again, the UAE has the possibility to address these issues with national policies. This is also true for policies of economic diversification and steps to address labor grievances. The former influences food import options in the long run, the latter safeguards the food accessibility of vulnerable segments of the population. After all, food security is usually a problem of food accessibility, not so much of food availability, as Amartya Sen has shown. Food accessibility the UAE can influence nationally, for food availability it will continue to rely on international supplies. The case for international cooperation is strong: like others count on oil exports, the UAE counts on its food supplies.

CONTRIBUTORS

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Mr. Al-Assiri, a national of Saudi Arabia, holds a BSc in Agriculture from King Saud University, Riyadh, and an MSc in Range Management from New Mexico University, USA. He began his career in 1986 as Director of the Range Section of the Range and Forests Department in the Saudi Ministry of Agriculture. In 1995, he became Director of the ministry's Environment Unit. In November 2000, he moved to Manama, Bahrain, to work as Programme Officer and Coordinator for the Subregional Action Programme of the United Nations Convention to Combat Desertification (UNCCD) in West Asia, under the United Nations Environment Program (UNEP). In March 2004, he was appointed Director-General of the Natural Resources Department of the Ministry of Agriculture in Saudi Arabia.

In addition to his technical background and his 32-year career as a national public officer and decision maker, being a United Nations staff member has given him the opportunity to assume administrative and senior managerial responsibilities and has provided him with the capability to collaborate at various levels with colleagues in diverse fields.

PETER ROGERS has served as Gordon McKay Professor of Environmental Engineering at Harvard University since 1974; a member of the Center for Population Studies, Harvard University, from 1966 to 1996; and a member of the Harvard University Center for the Environment (HUCE) since 2000. He is currently a Visiting Professor at the Global Asia Center, National University of Singapore.

Professor Rogers has a wide range of research interests, including: the consequences of population on natural resources development; improved methods for managing natural resources and the environment; the impacts of global change on water resources; and transportation and environment with an emphasis on Asian cities. He has carried out extensive field and model studies on population, water and energy resources, and environmental problems in Costa Rica, Pakistan, India, China, the Philippines, Bangladesh, and to a lesser extent, in 25 other countries.

He is the co-author with Susan Leal of the book *Running Out of Water* (Palgrave Macmillan, 2010). Recent books also include: *An Introduction to Sustainable Development*, with K.F. Jalal and J.A. Boyd (Earthscan, 2008); and *Water Crisis: Myth or Reality*, with M.R. Llamas and L. Martinez-Contina (Taylor & Francis, 2006).

Professor Rogers is Senior Advisor to the Global Water Partnership. He is the recipient of Guggenheim, Twentieth Century, Wenner-Gren, and Maass-White Fellowships, and the Warren A. Hall Medal of the Universities Council on Water Resources (UCOWR). He is also a member of the American Academy of Environmental Engineers (AAEE) and the American Society of Civil Engineers (ASCE), a life member of the Indian Society of Agricultural Engineers, and a Fellow of the American Association for the Advancement of Science (AAAS). Most recently, he received the 2010 Julian Hinds Award from the Environmental Water Resources Institute (EWRI) of the American Society of Civil Engineers.

SEETHARAM KALLIDAIKURICHI is an internationally recognized expert at the Asian Development Bank, with over 20 years of professional experience in development cooperation, infrastructure policy and diplomacy. Since September 2008 he has been a visiting professor on secondment from the ADB at the Lee Kuan Yew School of Public Policy, National University of Singapore (NUS). He is also the founding Director of the NUS Global Asia Institute (NUS-GAI) and the Institute of Water Policy (IWP).

Under his direction, the two institutes conduct cutting edge research on topics pivotal to the future of Asian cities and the development of effective water policies. As a member of the strategic program committee of the annual Singapore International Water Week (SIWW), he co-produced the first BBC World Debate on water in 2010. At NUS-GAI he coordinates a \$17 million NUS Initiative to Improve Health in Asia (NIHA), focusing on public health policy research and education in the region. He also chairs the NIHA Management Committee and is a member of the NIHA Steering Committee.

Prof. Kallidaikurichi is an active commentator on public policy and his writings have appeared in local publications such as *Today* newspaper. His recent publications include the *Index of Drinking Water Adequacy for the Asian Economies* and *Developing Living Cities: From Analysis to Action*. In recognition of his pioneering contribution to promoting engineering education and public policy, he was elected a Fellow of the Faculty of Engineering of the University of Tokyo in 2009.

HUSSEIN A. AMERY is an Associate Professor at the Colorado School of Mines, USA. He has served as the Director of his department, the Division of Liberal Arts and International Studies, and as the Director of its graduate program in international political economy of resources.

After receiving his doctorate from McMaster University (Ontario, Canada), he was a faculty member at the universities of Toronto (Ontario), Bishop's (Quebec) and Lethbridge (Alberta).

He has written extensively about water management and politics in the Middle East; his publications include *Water in the Middle East: A Geography of Peace* (Texas University Press; ed. with A.T. Wolf), and numerous referred articles and chapters on Islam and the environment,

water resources in Islam, water management and politics in Lebanon, and prospects of a water war in the Middle East. He is currently working on a book manuscript on Arab water security, with a particular focus on the Gulf states.

Dr. Amery has served as a consultant on water issues to the Canadian and American governments, and to various engineering firms and development organizations. He has also been chosen as a Fellow by the International Water Association.

WALEED K. ZUBARI is currently a Professor of Water Resources Management at the Arabian Gulf University. He also holds an administrative position as Dean of Graduate Studies in the University, is Director of the Water Resources Management Program, and is Coordinator of the United Nations UN Water Virtual Learning Center for the Arab Region.

In 1990 Dr. Zubari received a Ph.D. in the field of mathematical modeling of groundwater from the University of Colorado. Since 1990, he has taught numerous courses in the field of hydrogeology, and the management and planning of water resources in arid areas. He has published more than 45 scientific papers via refereed scientific journals, conferences and seminars, and has refereed many research papers submitted for publication in global and regional journals.

Dr. Zubari served as Editor-in-Chief of the *Arabian Gulf Journal of Scientific Research* during the period 2006–2010, and in 2002 he received an award for the best researcher in the field of water resources in the Arab world from the Arab Organization for Education, Culture and Science (Tunisia). He currently serves as a consultant to several UN global and regional organizations, such as UNESCO, ESCWA, UNDP, and UNEP.

Dr. Zubari is an active member of the Water, Science and Technology Association (WSTA), chairing the Board of Directors during the period 2001–2003, and has been Chairman of the Scientific Committee of the Gulf Water Conferences (III, IV, VI, VII, IX, and the forthcoming X). In 2008 he published his first book: *Water Issues and Challenges in the GCC Countries*.

MOHAMMED SALMAN TAYIE is an Assistant Professor of Political Science at the Faculty of Economics and Political Science at Cairo University, and a member of the Egyptian Council for Foreign Affairs. He holds BA, MA and Ph.D. degrees in political science from Cairo University. He has taught a number of courses at Cairo University (Faculty of Economics and Political Science and Faculty of Information) and regional universities in the Arab Republic of Egypt, where he has also supervised several MA and Ph.D. dissertations.

Dr. Al Tayie was the Chief Editor for the Commission on Democracy and Human Rights in the National Dialogue headed by Professor Abdul Aziz Hijazi (2011); a member of the committee preparing the quality and accreditation report at the Faculty of Economics and Political Science (since 2009); the academic supervisor of the Israeli Studies Diploma and human rights awareness courses for students of Cairo University (part of the activities of the Capacity Building Project in the field of human rights supervised by the UN Development Program [UNDP]); and the academic supervisor of the simulation models of the Arab League and the United Nations in the Faculty of Economics and Political Science at Cairo University.

Dr. Tayie provides analysis of select local, regional and international political events on a number of terrestrial and satellite TV channels. He has received a Middle East Research Program grant in Social Sciences (MERC); an award alongside Dr. Fangari at Cairo University for the best theoretical and applied research at the level of the Republic; the award for best Ph.D. thesis at the Faculty of Economics and Political Science in 2005; the award of the Kuwaiti Media Center in Cairo; the award of the Supreme Council for Culture in Egypt; and the Dr. Boutros Ghali award.

Dr. Tayie has participated in numerous academic conferences, seminars and workshops, and is the author of a number of books, the most recent of which is *Management of Water Crisis in the Muslim World: An Islamic Approach to Water Governance* (Cairo: Arab Center for the Humanities, 2010). He has also written numerous papers for journals and produced several specialized scientific reports.

NADIM FARAJALLA began his academic studies in irrigation engineering, attaining an MS in 1989 from Utah State University; but the issues of water scarcity and water quality soon inspired him to study water resources. He subsequently received an MS and later a Ph.D. in environmental engineering from the University of Oklahoma in 1995. From 1990 to 1994, he worked at the University of Oklahoma as a research assistant and from 1994 to 1995 as an instructor.

In 1995, he served as a senior scientist at Stone Environmental, Inc., based in Vermont, where he focused on watershed management projects and studies on the fate and transportation of contaminants in soil. From 1997 to 2002, Dr. Farajalla worked at Dar al-Handasah (Shair and Partners), Beirut, Lebanon, as a Senior Environmental Engineer on major projects in Lebanon, Turkey, Saudi Arabia, the United Arab Emirates, Angola, and Nigeria. Most of these projects involved the development of water supply, sewage and stormwater drainage networks in addition to environmental impact studies, environmental management plans, hydrological studies and erosion assessment and mitigation.

In 2002, Dr. Farajalla joined the American University of Beirut, where he is currently an associate professor of environmental hydrology in the Faculty of Agricultural and Food Sciences, and is the Faculty Research Director of Climate Change and the Environment in the Arab World at the Issam Fares Institute at AUB. Dr. Farajalla is the author and co-author of numerous articles published in international scientific journals, and has delivered presentations at a number of international and regional conferences.

He is still active as a private consultant working on hydrological and environmental studies and major infrastructure projects in Lebanon, Saudi Arabia, Malaysia, Yemen, and Iraq.

MOHAMMED AIT KADI is President of the General Council of Agricultural Development in Morocco. This Council is a high-level policy think tank of the Moroccan Ministry of Agriculture and Fisheries, of which Prof. Ait Kadi was previously Secretary General. Earlier, as Director General of the Irrigation Department, he was in charge of the development and implementation of the National Irrigation Program. He

was also the Chief agricultural negotiator of the free trade agreement between Morocco and the United States.

Prof. Ait Kadi chairs the Technical Committee of the Global Water Partnership. He was the Governor and a founding member of the World Water Council, and President of the organizing committee of the first World Water Forum held in Marrakech in 1997. He is also honorary vice-president of the International Commission on Irrigation and Drainage (ICID), and Vice-president of its Moroccan National Committee (ANAFIDE)

Prof. Ait Kadi is a member of the Hassan II Academy of Sciences and Technology. He serves as a member of the Consortium Board of the Consultative Group on International Agricultural Research (CGIAR), and the Board of Advisors of the World Agricultural Forum. He is a professor at the Hassan II Institute of Agronomy and Veterinary Medicine (IAV) in Rabat, and is the author of numerous publications in the fields of irrigation, water management and agriculture, and rural development.

Prof. Ait Kadi received a Ph.D. in irrigation engineering from Utah State University in the United States, and a doctorate in agronomy from the IAV in Morocco.

NADIM KHOURI joined the UN Economic and Social Commission for Western Asia (ESCWA) as Deputy Executive Secretary in August 2011. Before joining ESCWA, Dr. Khouri spent three years at the International Fund for Agricultural Development (IFAD), a specialized UN agency, where he led investments in poverty-focused rural development and food security as Director of the Near East, North Africa and Europe Region. From 1988 to 2008 he held a number of positions at the World Bank, leading policy and investment work in rural development and environment. While at the World Bank, he led agriculture strategy development and implementation work in the Middle East, South Asia and Latin America and the Caribbean regions.

Dr. Khouri has also worked in the private sector, for a consulting engineering firm based in Beirut, Lebanon. He holds a Ph.D. in Agriculture from the University of Massachusetts and a Masters in Agronomy and Agriculture Development from the American University of Beirut and the University of London.

MOHAMMED DAWOUD received a Bachelor's degree in Civil Engineering (with honors) in 1991, an MSc in Water Science in 1997 from the Faculty of Engineering at Ain Shams University, and a Ph.D. in water resources management within a joint program between the University of Ain Shams and Colorado State University in 2001. He has undertaken a number of water resource management training courses in the Netherlands, the United States, Spain, Canada and Sweden.

Dr. Dawoud is currently Director of Water Resources Management at the Environment Agency in Abu Dhabi, and a board member of the Arab Water Academy. Previously, he was a professor of water resources at the National Center for Water Research in Egypt, and worked as a consultant to a number of international bodies including the World Bank, UNESCO, and ESCWA on projects related to water resource management. He has participated in a number of research projects and studies in Egypt, Saudi Arabia, Nigeria, Oman and the UAE.

Dr. Dawoud is the author of five books published in Arabic, including: Arab Water Security (co-author), published by the Research and Studies Center of the Dubai Police Academy in 2007; Integrated Management and Sustainable Development of Water Resources in the GCC Countries (2008); and Arab Water Security: Toward an Integrated Management and Sustainable Development of Arab Water Resources, in 2009.

Dr. Dawoud has received several scientific awards, including: excellent employee in the administrative field in the Abu Dhabi Awards for Excellence in Government Performance for the year 2009 for the Abu Dhabi Water Strategic Storage Project; and the Sheikh Sultan bin Zayed Al Nahyan Award for Research on the UAE, in the category of Economics and Development, for his book Water Sources and their Role in Economic Development in the UAE in 2011.

ECKART WOERTZ is a senior research fellow associate at the Barcelona Centre for International Affairs (CIDOB). Formerly he was a visiting fellow at Princeton University, Director of Economic Studies at the Gulf Research Center (GRC) in Dubai, and worked for financial services companies in Germany and the UAE, among them Delbrück & Co.—one of the oldest German private banks. He has consulted for international and

regional organizations such as the UN Conference on Trade and Development (UNCTAD), the Jeddah Chamber of Commerce and Industry and the Saudi Ministry of Economy and Planning. As a contributor and commentator to international and regional media outlets such as the *Financial Times*, *The National*, and *Al Arabiya*, he has charted the rapid economic development on the Arabian Peninsula. In his 2005 paper “The Role of Gold in the Unified GCC Currency,” he predicted a long-term bull market in the precious metal, and in his paper “GCC Stock Markets at Risk,” he warned at the beginning of 2006 about the following stock market crash in the GCC. He has also dealt extensively with strategic foreign investments, food security, and the impact of the global financial crisis on the GCC countries. His recent publications include “Oil, the Dollar, and the Stability of the International Financial System” (*Handbook of Oil Politics*, Routledge 2012), “Arab Food, Water, and the Big Land-grab that Wasn’t” (*The Brown Journal of World Affairs*, Fall/Winter 2011), and the edited volume *GCC Financial Markets* (Dubai: GRC, 2012). His forthcoming book *Oil for Food* will be published by Oxford University Press in 2013. He holds an MA in Middle Eastern Studies and a Ph.D. in Economics from Friedrich-Alexander University, Erlangen-Nuremberg, where he conducted research on structural adjustment politics in Egypt.