Introduction

Sustainable Development in the Gulf

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Sustainable development has emerged as a prominent issue in the twenty-first century. Indeed, it is arguably going to be *the* issue with growing evidence of unsustainable use of the world's resources, such as its fossil fuel reserves, and related environmental pollution, for instance alarmingly evident in climate-change predictions (Adams 2001; Baker 2006; Robertson 2014). The column inches, research resources and teaching time devoted to sustainable development and associated topics the world over since the late 1980s are colossal. They contrast with the position in the Gulf and Middle East region where, until recently, regardless of environmental concerns plain to see with harsh climate and scarcity of water, countries have shown little interest in sustainable development. The goal was economic growth with scant regard to environmental issues. They sought rapid industrialization and urbanization, often featuring environmentally unfriendly technology, without apparently considering the negative consequences, such as destruction of natural resources and pollution. There is increasing realization that secure long-term development cannot be achieved at the expense of the environment.

There is an urgent need for awareness and discussion of sustainable development in the region. It is on a doubly unsustainable trajectory: first, in supplying non-renewable oil and gas to the rest of the world to meet current unsustainable global energy demands, worryingly polluting the atmosphere further with CO_2 laden gases; second, in using the enormous revenues it receives from these energy exports to develop large urban conurbations that will prove unsustainable on the region's resources when non-renewable fossil fuels are exhausted, as is already evident with water supplies dependent on energy-hungry desalination plants and the pumping of groundwater from deep aquifers at rates way beyond natural replenishment.

The United Arab Emirates and Qatar currently have the largest ecological footprints of any nations in the world. They are also the unenviable holders of world-record carbon footprints, with Kuwait coming in third place in that league table and Saudi Arabia eleventh (Ewing et al. 2010: 19). The ecological footprint indicates our impact on the planet; it is a global carrying capacity calculation that tells us the land area needed to provide us with what we consume (food, goods, energy etc.) and to absorb our waste (Wackernagel and Rees 1996). It may be expressed in global hectares (1.9 ha per person is the world's carrying capacity) or number of planets required if everyone were to enjoy the same standard of living (it would require more than five planet Earths for all of us to live like Gulf citizens, which is clearly out of the question).

The idea for this book originated when I accepted a post to teach and research sustainable development at Qatar University, funded by Shell, one of the multinational energy companies that have a large stake in the country's liquid gas developments.[1] Few can resist commenting on the post's irony when told about it. But it indicates something hopeful, I believe, namely a widespread wish for us to get back onto a sustainable pathway, all of us (energy company employee or green activist) inhabiting the one planet. Or maybe for the cynical it just so happens that capitalist economic interests coincide with environmentalist concerns. No one denies that fossil fuel reserves are finite and will probably run out in a few decades (even with newly discovered sources such as 'frackable' gas containing shales). Consequently, we must find alternative sources of energy, and renewable ones are logically the more secure and have become a priority with mounting evidence of the environmental damage caused by non-renewable ones.

The magnitude of the challenge of establishing a sustainable development programme at the University soon became evident. No ecological footprint calculation is necessary to tell the visitor to the Gulf that the energy-profligate lifestyle is unsustainable. However, awareness of sustainable development or 'green' issues more generally proved to be hazy at best among Qatar University students. They were not alone. Tenure of the chair, for instance, required membership of Shell's 'Sustainable Development Committee' where the subjects discussed ranged from the excellent safety record at a gigantic liquid-gas-processing-plant construction site (a health and safety issue) and the funding of a garment-factory project for women in a town affected by the plant's construction (a community outreach issue).[2] When I turned to the daunting task of teaching sustainable development, I found that while the best way to engage students' interest was to address familiar issues that feature in their lives, there is little written on the topic in a Gulf context, or even a Middle East one. So the

idea of this book was born to introduce sustainable development, both to encourage students to ask what the implications are for their region and to have the confidence to draw on their cultural heritage in thinking about the issues (Ansari 1992; Foltz, Denny and Baharuddin 2003).[3]

The book aims to give a wide-ranging introduction to the field of sustainable development focusing on the Gulf region generally, although not exclusively. It innovatively teams university faculty and government personnel from the Gulf and wider Middle East region with colleagues from Europe and North America whose research interests focus on sustainable development. In this way, the volume ties together a well-informed regional focus with an in-depth understanding of sustainable development issues and research, drawing on experience from various regions of the world, including Africa, Pacific, Asia and Latin America. It outlines the context, contemporary and historical, local and global, of the sustainability debate. It is structured according to key themes. Each contributor outlines principal concepts and foci that their respective field brings to bear on sustainable development (such as the environment, health, urbanism etc.), before reviewing and discussing current problems and debates, and proposing areas for future research and policy analysis. In this way, each chapter deals with cutting-edge issues central to the Gulf in the context of global development initiatives and dilemmas and overarching concerns central to sustainable development.

The volume is designed to be useful to those teaching and studying sustainable development, particularly in the Gulf and wider Middle East region, and also beyond. It is aimed at a general audience interested in the issues and seeks to inform discussion central to development and sustainability, both within educational (school and university) contexts and beyond, between interested parties in government and industry and wider public. What does it mean to be sustainable in a region reliant on oil revenues and in the throes of an economic development boom? What are the challenges faced? What needs to happen now and in the future to enable the Gulf region to achieve sustainability? How are obstacles to the creation of a more sustainable lifestyle being tackled? It is such questions that are the focus of this book.

The Gulf

The Gulf, or *Khaleej* in Arabic, comprises a shallow body of water extending from the Shatt al-Arab delta in the northwest to the narrow Strait of Hormuz in the southeast.[4] It is surrounded by Saudi Arabia, United Arab Emirates, Qatar, Kuwait, Bahrain, Oman, Iraq and Iran; the former six

countries comprise the Gulf Cooperation Council, which is a political and economic union (figure 0.1). It is a hot subtropical desert region. Rainfall is low (approximately 80 mm per annum) and temperature high (reaching 50˚C and beyond in the summer). Rocky hills, gravel plains and sand dunes (figure 0.2) are common features with saline mudflats and some beaches along coasts (Osborne 1996). Vegetation is sparse in this harsh arid environment, comprising a few drought-tolerant trees and perennial grasses together with some dwarf perennials and annuals, some of which bloom after rains; it includes salt-tolerant halophytes on the coast (Batanouny 2001). Wild animals include rodents (jerboa, gerbils), antelope (oryx, sand gazelle), goats (ibex, tahr), lizards and snakes and many migratory and local birds (pelicans, cranes, flamingos etc.). Wildlife is vulnerable in this fragile and austere natural environment (Gross 1987). There is also a rich marine fauna including dugong, dolphins and turtles, with

Figure 0.1. The Gulf region.

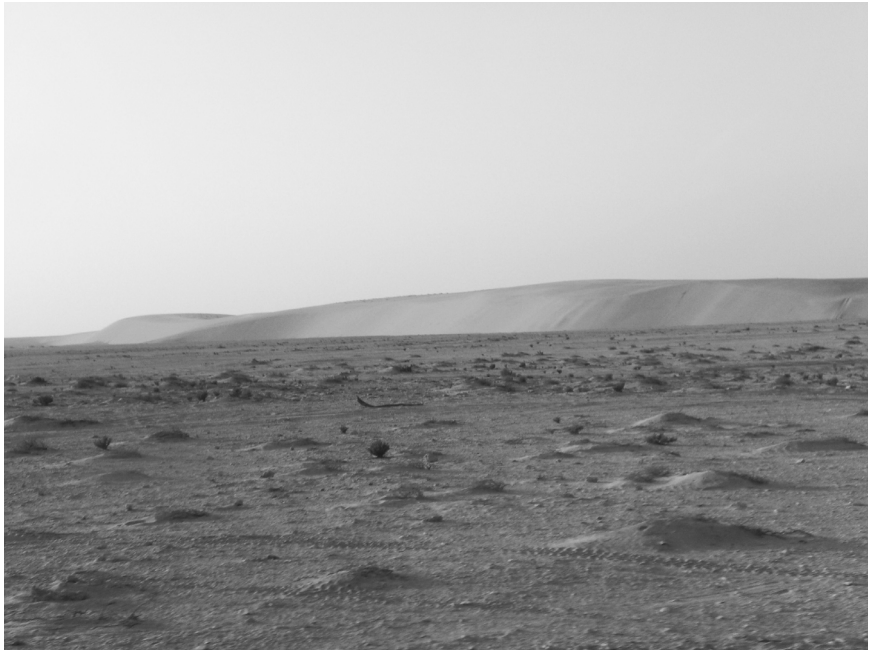

Figure 0.2. Desert environment at Khor al Udayd, S. Qatar.

extensive areas of coral reef and mangrove swamp (figure 0.3) supporting a range of fish and crustaceans. Some of these are at risk with the destruction and pollution of habitats, notably the major oil spillages occurring in recent wars.

The Gulf has good fishing grounds exploited by dhow fleets. The pearl oyster was also previously important to the local economy but diving largely ceased in the 1930s with production of the cultured pearl. The herding of camels, goats and sheep by nomadic Bedouin was also significant with some farming around oases of dates, alfalfa, beans and other vegetables. Today the Gulf States derive most of their income from oil and gas (Kubursi 1984). The region is the world's largest source of crude oil and gas with over 50 per cent of global oil reserves and some 40 per cent of gas reserves, and related petrochemical industries are the mainstay of the economy such as petrol refining and liquefied natural gas production. They are funding a development boom with numerous infrastructure and other construction projects. The regional economy depends on large numbers of migrant workers to supply the necessary labour, largely from South and Southeast Asia with some from neighbouring Arab and North African countries, Europe and America. The influx of migrant labour, greatly outnumbering Gulf citizens, gives rise to an 'us and them' attitude

Figure 0.3. Mangroves at Qurm, Oman.

that promotes loyalty to current political arrangements that 'keep them in their place'. The per capita incomes of citizens are among the highest in the world. The state is also seeking to invest the returns on oil and gas to build up an economy that will be able to support the current standard of living when these non-renewable resources run out or the world switches to more sustainable energy sources, with considerable investment, for instance, in education and also foreign capital assets, including land acquisitions elsewhere (notably parts of Africa) in an attempt to ensure future food security.

The southern Gulf States speak the same Arabic dialect and have a regional culture. They are culturally conservative Muslim nations. The Gulf Cooperation Council comprises hereditary monarchies with limited formal but considerable informal political representation. The rulers comport themselves as benevolent leaders who use traditional tribal consultation channels in making decisions, their administrations adhering strictly to Islamic *shari'a* law, ensuring security for all (Gause 1994). They distribute the oil and gas revenues so as to bolster their hold on power, particularly seeing that they keep influential families and tribal sheiks content, and further cement allegiances with appointments to powerful posts in the state administration and through marriage. A small elite of

mostly related persons holds political power; prime ministers and many cabinet ministers belong to ruling families, which invariably control foreign affairs, defence and interior portfolios. It is a continuation of the tribal tradition of buying loyalty and alliances, and skilfully manipulating relations between internal factions and external enemies to counterbalance one another (Eickelman 1981: 361–363; Netton 1986; Zahlan 1998: 21; Abdulla 2000).

While the Gulf States are experimenting with forms of popularly elected advisory councils and representative legislatures, the ruling families retain control of the majority of seats, ensuring that their central autocratic authority remains intact with all decision making in their hands (Peterson 1988; Nonneman 2007). To the outsider they may look like fragile political arrangements, particularly in view of the recent 'Arab Spring', but they have proved surprisingly resilient so far. And all citizens share in the petroleum-derived wealth with, for instance, free health care, welfare services and education, and free utilities (water and electricity), no taxation, low fuel costs and subsidized goods, massive investment in infrastructure shared by all and employment for those who seek it, much in the expanded state bureaucracy. In short, the state, as the owner of most national assets and the main employer, encourages dependency. They are not arrangements likely to foster the frugality necessary for sustainable lifestyles that are within, and represent equitable consumption of, the planet's limited resources long term.

From the Past to the Present

It is informative to set contemporary concerns about sustainable development within an archaeological context, with the Middle East region witnessing the collapse of several unsustainable civilizations in the past. In the first chapter, Mark Manuel, Robin Coningham, Gavin Gillmore and Hassan Fazeli remind us that concern with sustainability, while currently a hot topic – particularly with dire warnings about human-induced climate change – is not new. Looking at sustainable development issues from an archaeological viewpoint is noteworthy given the short-term focus of most writing on development. Rather than repeatedly make the same mistakes, we have lessons to learn from the past.

The early kingdoms of Mesopotamia and the eastern Mediterranean broke down in the Late Bronze Age about 4,200 years ago. There was political instability, central authorities collapsed with violent struggles for power, depopulation occurred notably in urban areas and disruption of long-distance trade led to shortages of certain goods. The reasons for all

of this are unclear. Some think that sudden climate change led to the collapse, with a drop in rainfall resulting in extended drought, crop failure and famine (Fagan 2004: 127–146; Rosen 2007). The shortages resulted in overpopulation crises (Babylonian seals from 1600 BC mention problems of overpopulation; Cohen 1995). Others note migration or possibly invasion by Indo-European populations, such as Dorian, Thracian and Macedonian peoples, movements perhaps triggered by environmental change (Yoffee 2005: 131–160). Yet others cite increased warfare featuring new weapons and tactics, perhaps exacerbated by environmental problems and associated socio-economic stresses and shortages of goods. The disturbance of maritime trade by 'Sea People' pirates would have increased the pressure on these fragile civilizations.

While archaeologists have previously approached the issue of sustainability in the idiom of the collapse of civilizations, which they long attributed to single momentous events such as natural catastrophes or foreign invasions, they are critical of such rather simplistic 'crash of society' interpretations today and argue that several factors more likely contributed to the crashes with complex social, economic and environmental interactions. A combination of factors was perhaps more likely behind the disruption experienced by Late Bronze Age states, the socio-political complexity of which – political centralization and economic specialization – proved a weakness and contributed to a 'general systems collapse' (a response to complexity that features recourse to simpler arrangements, in this case a return to small city states; Tainter 1988). The complex societies proved fragile in the face of social unrest occurring between states, with citizen revolts and wars, inflamed by fickle mercenaries.

The archaeological evidence (figure 0.4) also suggests that some civilizations evinced long-term sustainability, constantly adapting to changing environmental and political-economic conditions. Manuel, Coningham, Gillmore and Fazeli, for instance, argue that archaeological evidence from the Chalcolithic communities of the Central Plateau of Iran, dating from 7,000 years ago, shows that they sustainably adapted to the marginal semi-arid environment over extended periods of time, moving their settlements as water courses shifted, skilfully using irrigation channels to manage water supplies. The evidence of pottery wheels and ceramic kilns point to craft specialization in places such as Tepe Pardis, where large deposits of suitable clay occurred, with inhabitants producing pottery that could be traded elsewhere, showing how appropriate use of resources and technology allowed for craft specialization and long-term sustainable settlement. It is an early example of how trade, exploiting local natural advantages in raw materials, can sustain communities, so long as the exploitation remains within sustainable limits.

Figure 0.4. Archaeological dig at Zubara, N. Qatar

The archaeological evidence of communities in the Middle East relying on craft specialization and trade to overcome arid region environmental constraints is a forerunner of today's Gulf arrangements, where over 90 per cent of food stuffs are imports exchanged for gas and oil exports. Commerce is a central theme in both capitalist- and socialist-informed economic development discourse. But can we learn to manage it and avoid the unsustainable booms and busts, as experienced in calls for regulation and then deregulation of markets (recently manifest in development as 'structural adjustment' with crippling effects on many Third World economies), and consequent deleterious impacts on economic activity as one interest group or another – banks, companies, unions – gets the upper hand and ruthlessly exploits its advantage to profit from others?

Economic and social arrangements are clearly an aspect of the sustainability or otherwise of current developments, as shown by the growth mentality of market economics thwarting any prospect of a sustainable equilibrium state, as I will discuss in this book's conclusion. Rodney Wilson asks in chapter 8 if Islamic economics could offer a resolution to the conflict between growth and sustainability. The application of Islamic principles to finance has proved successful and this could potentially contribute further to the promotion of sustainability. The performance of

Islamic banks during the recent global financial crisis was more reliable than other institutions that engaged in the unsustainable trade of dubious and ultimately toxic financial assets. Islam promotes a more cautious approach to finance, avoiding speculative dealings and sharing risk fairly (Wilson 2008). It could be argued that Islamic finance is better suited to funding long-term sustainable development projects. The principles of *shari'a* compliance parallel those of ethical or socially responsible investment, which aim to invest in ecologically friendly activities and eschew those that damage the environment. Islamic institutions have developed screening methods to distinguish between acceptable and unacceptable activities that have the potential to promote sustainability by persuading businesses to change their practices. Furthermore, Islamic views on the custodianship of natural resources (Ansari 1992; Foltz, Denny and Baharuddin 2003) chime with financial mechanisms designed to promote environmentally responsible practices, such as trade in carbon credits. We should not however have unrealistic expectations for Islamic financial institutions managed by fallible human beings, some of which were involved in Dubai's speculative property crash, which posed questions about how compliant their practices were with *shari'a* law.

What is Development?

Before proceeding further, it is perhaps as well to have some idea of what we understand by the term *sustainable development,* which for many is synonymous with *economic development,* although how the two could be squared is a mystery. Development is not working like those who advocate it suggest it should be, and apparently it never has – or to put it more charitably, the returns on the considerable resources invested in it have been disappointing, not to mention the less charitable view that the funds have been used for dubious imperial purposes or to promote corruption. Since its inception after the 1939–45 war with the founding of the Bretton Woods institutions – when development replaced colonialism as the way in which the 'civilized' (or as it now became, the 'developed') world was going to advance the interests of those it thought less fortunate – we have seen promise after promise broken and goal after goal missed. The failure of development to deliver has resulted in it becoming one of the most fashion driven of pursuits, as those involved go from one 'solution' to another in the hope of hitting upon the 'right' one – modernization and trickle-down to structural adjustment and trade liberalization, women in development to gender and development, basic needs to poverty alleviation, integrated rural development to participation in its many acronymic

forms, delivery via multilateral versus bilateral versus non-governmental organizations – to mention a few.

Sustainable development is one of the approaches currently much in favour (Roorda 2012; Robertson 2014). Is it going to deliver where the others have failed? Some will argue that it cannot afford to fail if life as we know it on this planet is to continue for many more decades. While the perceived needs of so-called underdeveloped nations drive the push for sustainable development to a considerable extent, equally evident is the growing sense of an impending global environmental crisis. Public opinion is increasingly supportive of action to promote sustainability, with reports of growing problems such as global warming and ozone depletion due to atmospheric pollution, increasing toxic contamination of the world's oceans, deforestation and land degradation on unprecedented scales, problematic disposal of dangerous radioactive waste, increasing levels of electromagnetic radiation with unknown health implications, and concerns about genetically modified organisms getting into ecosystems with unforeseen possibly disastrous consequences.

The idea of sustainable development is, like that of development generally, highly contested with many competing versions to demonstrate that they have the 'solution' (Adams 2001: 4–6; Grainger 2004: 20; Baker 2006: 25–27). According to some pundits there are almost as many definitions of sustainable development as there are commentators on the topic (Redclift 2002: 275).[5] It suggests some confusion, to say the least, if we cannot agree on what it means, as we potentially have people talking past one another, making debate on a difficult issue considerably more difficult, if not impossible. I do not wish to engage in a dry discussion about definition as such, but rather to ask what might be at the root of this confusion and lack of consensus, which suggests some profound contradictions, over what comprises sustainable development (Pezzey 1989).

We encounter problems at the outset with the noun *development* (Adams 2001: 6–9), which clearly augurs problems when we discuss sustainable development. It is strange that while those responsible for effecting development have passed from one fashionable 'solution' to another, they have remained stubbornly convinced that their aims and assumptions are correct. They seem to think that it is simply a case of finding the right recipe or method to achieve development as *they* conceive it. No one questions the fundamental idea of development itself; whereas the many failed half-baked-recipe approaches suggest that something is awry here.

The discrimination between developed and underdeveloped regions or nations is a manifestation of the problems that we face in defining development. We use vague terms such as First World and Third World countries or those of the North and South. If we take the latter discrimination,

while there are some poor nations in the southern hemisphere (such as Tanzania and Mozambique), there are obviously wealthy ones too (such as Australia and New Zealand). The Middle East, classified as a developing region, further illustrates this point. While we do find some desperately poor countries there – war-torn nations such as Palestine, Syria and Iraq – we also find some affluent ones such as Qatar, the United Arab Emirates and Kuwait; to speak of these as undeveloped regions compared to Europe and the United States makes little sense.

Development implies progress of a sort that we can assess, or better measure, largely technologically driven change. It also assumes a certain political-economic order, predominantly the capitalist market, to effect the efficient production and distribution of the fruits of progress. At root, these assumptions rest on the theory of evolution, applied not to the fitness of biological organisms but to the material conditions of human communities (Hinterberger 1994). When talking about development, many have such a quasi-biological or material-related perspective in mind (Reid 1995: 139–142), which current development discourse expresses according to economic measures targeted at reducing poverty. The present aim of development, if we can believe the Millennium Development Goals and if we can agree how to measure poverty (which is notoriously difficult to assess), is to halve poverty globally by 2015.[6] In elementary terms, the aim in this materialistic view is to ensure that people enjoy 'food security', that is have sufficient food to eat, and 'basic health rights', that is do not suffer and die from preventable illnesses. These are goals to which I assume most humans can sign up for whatever their culture, as few of us likes to go hungry or fall ill. In other words, our biology is universal, whatever our religion, politics, social order etc.

Planning for Development

The development-as-evolution view informs the activities of national and international agencies as they seek to intervene and promote what they consider to be positive change. It commonly takes the form of so-called top-down interventions, such as have characterized these activities since colonial times and continue to this day, albeit often under participatory guises. These are interventions planned and implemented by agencies outside, and in political terms above, the communities subject to them, spoken of as the beneficiaries. These top-down interventions are associated with the theory of modernization (box 0.1)–which assumes that lesser-developed regions will imitate the West when the conditions are right for so-called take-off to self-sustained economic growth (Shepherd 1998: 1–10).

As several of the contributions to this book will show, the Gulf States illustrate the centralized planning approach well, as it is popular with the region's governments, perhaps predictably in view of their autocratic constitutional arrangements. The chapter by Trudy Tan, Aziza Al-Khalaqi and Najla Al-Khulaifi, all development planners, introduces this approach in the context of a discussion of the Qatari governments' development strategy – as set out in the *Qatar National Vision 2030* and the country's *National Development Strategy, 2010–2016* – which address issues of sustainable development from a general policy perspective. These documents define long-term national development goals, outline strategies to achieve them and provide a framework for their implementation. The plans build on the principles of sustainable development and rest on four so-called development pillars: Human, Social, Economic and Environmental Development. They identify the challenges the country has to address to prevent uncontrolled expansion, balancing between economic growth, social needs and environmental stewardship, modernizing while preserving Arab traditions, managing the size and skills of the expatriate labour force, and, with a nod to the UN's definition of sustainable development, overseeing growth so as to meet the needs of the current generation without compromising the ability of future generations to meet theirs. The plans set out the route that Qatar needs to follow to become an 'advanced, just and caring society' able to sustain prosperous development and provide all with a high standard of living, and also contribute to global development.

Box 0.1. Materialistic (Modernization) Approach

Classic examples of top-down projects include the cotton programme of Sudan, the groundnut scheme in Tanzania, lower Indus irrigation projects in Pakistan and the flood defences across Bangladesh. The Gezira Scheme in the Sudan, started a century ago, set out to establish cotton as a cash crop (Gaitskell 1959; Barnett 1977a). It invested heavily in agronomic research to improve crop yields, devising complex crop rotations featuring cotton, sorghum, hyacinth beans, wheat, groundnuts and fallows to manage soil fertility, particularly nitrogen, which is deficient in the region's difficult-to-manage dark cracking clays (vertisols). It devised crop-management regimes featuring spraying with biocides, as cotton is susceptible to pests and diseases such as boll worms, bacterial blights and viruses. It also engaged in considerable engineering work, notably on the Sennar and Al Roseires dams and associated canal networks to supply water for crop irrigation. All of this work was undertaken without consultation of the local population. The Scheme divided the irrigated region, extending to almost one million hectares, into standard plots let to individual tenants and employed advisors to direct their activities – when to cultivate, how, what crops to plant – all farm-

ers having to follow an eight-course rotation. It supplied seed, fertilizers and hired machinery, and controlled the irrigation regime and cotton marketing arrangements, deducting the costs from tenants' earnings.

While the scientific research was sound, there was little interaction between the technical advisers and local people, which led to problems when tenants encountered difficulties with the cultivation regime. They came to resent the scheme for several reasons. They sensed that the heavy demands cotton made on the soil were environmentally unsound and they railed against not being able to grow the crops they wanted. The demand that they pay for irrigation water for cotton further exacerbated resentment of the crop altogether. Regardless of the scientific research, the heavy machinery used in cultivation badly compacted the heavy soil, making it increasingly difficult to work. The silting up of canals reduced the efficiency of the irrigation system, and pests and diseases increased, spreading rapidly with the mono-cropping of cotton. Delays in payments for cotton as a result of bureaucratic complexities and inefficiencies further frustrated the tenant farmers, as did the unpredictability of cotton earnings compounded with fluctuations in its market price.

The farmers rebelled against the scientific rotation scheme, inserting crops that would sell on the local market. Soil fertility declined with the rotation disruption, notably where farmers increased cultivation of nitrogen-demanding sorghum to feed an increasing population. With the decrease in their incomes, they could not afford inorganic fertilizer nor could they afford herbicides to control the increased weed infestation. The standard of people's diets declined along with their health, exacerbated by a drop in water quality as a result of biocide pollution and irrigation-system failures that led to increased waterborne disease (such as snail-borne bilharzias). The weakened labour force took less care of cultivations. The growing population added to these problems, with the government succumbing to demands from tenants to divide their holdings between children, resulting in a fall in their average size from forty acres to fifteen, which was not economically viable. Many younger persons left the region, depleting families of workers and obliging some tenants to employ day labourers, thus undermining the scheme's capitalist logic of harnessing individual interests through the profit motive, these workers having no long-term investment in holdings (Barnett 1977b, 1978; Barnett and Abdelkarim 1991).

In addition, there are political problems that further show the scheme's insensitivity to local arrangements (see also Castro 1998). Armed guards were employed to keep out cattle pastoralists who traditionally graze their animals in the Gezira region, only to find out that these nomads were accustomed to fighting over pasture access. Periodic political upheaval in the Sudan added to these local problems, notably tensions between the north and south, with a long, drawn-out and highly disruptive civil war. The Gezira Scheme illustrates how a top-down programme has trouble planning for the intricacies of real life, finding itself in a self-reinforcing downward spiral involving a complex combination of environmental, agricultural, economic,

social, political and health issues. Experts have suggested various measures to reverse the decline, such as constructing a new dam, pumping underground water, new cropping rotations, revised tenancy agreements and new roads to reduce transport costs, which largely amount to more of the same, overriding on local concerns.

Any national sustainable-development policy demands supporting environmental legislation to make it a reality, as Wesam Al Othman and Sarah Clarke point out in chapter 5, drawing on several key legal environmental cases. Until recently, such legislation was lacking in Gulf Cooperation Council countries, as is evident in Qatar, which has only had a Ministry of the Environment since June 2008 focusing on policy-making and implementation. But in the last decade or so, the amount of environmentally related legislation and associated regulations has increased markedly. Governments have also demonstrated their increased commitment to such developments as signatories to key international environment treaties. But they also need to address the lack of reliable data on the environment, against which to assess progress in protecting it from damaging development, which implies a robust research process to strengthen the legislative programme. And they have to promote necessary environmental management skills among those responsible for the implementation of legislation.

Predictably, the grand-plan approach to development is subject to considerable criticism. In his chapter, Bahaa Darwish focuses on the 2nd National Human Development Report commissioned by the Qatari government to assess challenges facing the *National Vision 2030*'s implementation. The report identifies three particular challenges that demand attention: water security, climate change and the marine environment. But its assessment of the obstacles facing sustainable development as envisioned in terms of balancing economic growth, social needs and environmental management are bland given the magnitude of these challenges. Words are fine, he argues, but action is necessary to make them reality. And action implies awareness among citizens and others of the stakes involved in advancing the sustainable agenda, which relates to the challenges of participatory approaches discussed below. Furthermore, the various plans of the Gulf are too insular, defining long-term national development goals and strategies only, which is not enough. Sustainable development demands a transnational approach to tackle the problems that face today's interconnected globalized world or the best-laid plans at home to achieve economic development while ensuring local environmental and social sustainability are likely to unravel under external pressures.

Whatever the criticisms and problems of development approached in this planned or 'biological' material-informed way – and they are many, as discussed here in several chapters – it is the only way that we can legitimately talk about development in terms of objective progress. We can, for example, objectively measure improvements to communications, and if speed of communication is thought to be an improvement – from fork-stick runner and smoke signals to telegraph, video-conferencing and mobile phones – then we can talk of development in the sense of progress, or faster communication. It is also arguably the only way that we might morally be able to interfere in the lives of others. In other words, if we think that we have the wherewithal, the technology, to assist in the alleviation of chronic poverty – namely ensure 'food security' and 'basic health rights' – and people wish to avail themselves of such assistance, we surely have a moral obligation to help. If we have nothing to offer in this biological-material sense, what are we doing interfering in their lives in the name of development, unless it is, as some left-wing commentators suggest, the reverse of humane assistance, cynically to further exploitative relations (Middleton and O'Keefe 2001)?

Urban Sustainability

An issue that has attracted considerable planning attention is the rapid growth of urban areas. The unprecedented rate of urbanization, epitomized in Dubai's rapid expansion, has become a prominent issue with respect to sustainable development in the affluent Gulf region. The Qatari government, for instance, has invested heavily in drawing up plans to guide future development of Doha, the capital city. In his chapter, Khondker Rahman describes how the Qatar National Master Plan seeks to manage future expansion of urban infrastructure, and commercial, industrial and private real estate, given projections of continued astronomical rates of population growth. It is an insightful introduction into the planning process. The plan gives policies and strategies to guide urban development sustainably up until 2032 together with the monitoring and evaluation criteria to ensure goals are met.

Cities feature prominently on the sustainable development agenda, as Andrew Gardner points out, with the urban sustainability movement promoting initiatives and arguing that urban densities of settlement lead to economic and environmental efficiencies (Newman and Jennings 2008). He identifies a number of challenges to sustainability in the rapid urbanization occurring in the nations of the Arabian Peninsula, notably that political stability is linked to burgeoning urban expansion. The growth

of cities relates to the legitimacy and authority of the Gulf States' ruling families, with mega-urbanization a way for them to share petroleum-derived wealth with their citizens. They cannot afford calls for sustainability to stunt urbanization projects, by which they distribute a substantial part of their rentier economy incomes. The importance of urbanization to current political-economic arrangements relates to the fixation on centralized master planning, as discussed here by Tan, Al-Khalaqi and Al-Khulaifi, Rahman, and Darwish. The prominence of 'super-modernism' in the urban planning discourse of the Gulf region, while it deploys contemporary sustainable development rhetoric, may nonetheless exacerbate current unsustainable trends.

The master planning of the 'sustainable' Gulf city plays to a national imagination that is keen to be modern, as Gardner point out, subscribing to foreign criteria of modernity that have globally unsustainable implications, which combined with political imperatives, inhibit the region using its extraordinary wealth to be a world leader in sustainable urban design. Instead, Gulf cities are competing to build the highest (figure 0.5), largest and most avant-garde developments on the planet. In a couple of decades they have become global hubs served by their burgeoning national airlines. The surprising cities of the Gulf such as Dubai, Doha and Manama are designed and built, as Ali Alraouf and Sarah Clarke point out, with little regard for local and global environment. The call for sustainable building design and urban planning has gone largely unheeded to date. The residents of the ever sprawling and pedestrian-unfriendly cities drive everywhere, often in large 'gas-guzzling' vehicles. Alraouf and Clarke argue that

Figure 0.5. The world's tallest building: Burj Khalifa in Dubai.

sustainable approaches are necessary to guarantee the future of these cities with their futuristic buildings. They advocate adoption of a 'smart' low-carbon compact city model (Hinte, Neelen and Vollaard 2003) that reinterprets traditional elements using new technologies and is sympathetic to local cultural context and endorses sustainability. Furthermore, they argue, there is a need to plan contemporary cosmopolitan Gulf cities with all residents in mind, which adequately accommodate everyone.

A crucial issue with respect to urban sustainability that attracts insufficient attention is waste disposal, a topic that many prefer to brush under the proverbial carpet. But waste is something that we cannot ignore without monumental environmental costs and health risks, as Sarah Clarke and Salah Almannai argue in their chapter. They point out that the higher the annual income – and Gulf citizens have some of the highest in the world – the larger the volume of municipal waste generated per capita, underlining the need for comprehensive integrated waste-management systems in the region. All nations face the challenge of how to deal with the waste resulting from everyday life, but as they move along the 'development path', with increasing industrialization and urbanization, casual disposal of waste – such as typified Gulf society half a century ago – is no longer tenable with the environmental and health hazards. Rapidly growing populations and increasing materialism and consumption threaten a crisis. According to Clarke and Almannai, waste disposal in the Gulf region, which until recently relied on landfill, courts serious negative environmental impacts. They recount how the authorities are beginning to adopt an integrated approach to waste management, necessary in any move towards more sustainable lifestyles. They discuss things that promote or hinder best practice, noting that a lack of accurate information hampers planning and organization of sustainable waste management.

Effective waste management is a public health issue, which brings us to another issue sometimes overlooked in discussions of sustainable development, namely health. Any change that fails to improve the health status of a population scarcely merits being described as sustainable. According to one authority, health includes a capacity to cope with change: 'the ability to adapt to one's environment … [it] is not a fixed entity' (*The Lancet* 2009: 781). It is a topic that Mylène Riva, Catherine Panter-Brick and Mark Eggerman take up in chapter 16, pointing out that the promotion of human health has social, economic and environmental benefits. A healthy population, they argue, is both a prerequisite and a product of sustainable development. Research shows that investing in human health, for instance clean water programmes, reduces poverty by encouraging economic growth, and furthers protection of the natural environment. They see parallels in the international agenda regarding rights to health and moves

towards sustainable development, and highlight the need for integrated local, national and global action to achieve both goals. They explore the contribution to sustainable development of 'health impact assessment', another central planning tool used to gauge the outcomes of policies and interventions on a population's health. They examine the health priorities and strategies of the Gulf Cooperation Council and WHO's Eastern Mediterranean Regional Office, two planning bodies that seek to reduce the disease burden of the Arab world, addressing social and environmental factors, and they look at partnerships forged internationally to achieve the Millennium Development Goals in health. They identify some crucial issues regarding inter- and intragenerational equity and sustainability, which demand wider political and research attention, notably to tackle the strains resulting from rapid population growth, skewed economic development and disturbing health profiles, locally and globally.

What is Sustainability?

Returning to definitional issues again, we encounter further problems when we consider the qualifying adjective *sustainable,* which as Fadwa El Guindi points out in her chapter has a myriad of meanings. It more obviously has biological roots, specifically in ecology, and assumes systemic balance. A system is sustainable for the foreseeable future so long as the relationships between components, such as their cycling around the system, remain in equilibrium; that is, the system will continue as it is without structural change due to depletion or degradation of resources. This biological or environmental perspective (box 0.2) is the one that comes to most people's minds when they talk about sustainable development (Marten 2001; Raynaut et al. 2007: 22). It again relates to phenomena 'out there' that we can measure, having decided what are the critical factors concerning sustainability in any system.

Box 0.2. Ecological Sustainability

A well-known example of sustainability in the ecological sense concerns the management of soil nutrients in farming. We see this in shifting cultivation where people manage soil fertility not by rotating crops on the land or using fertilizer inputs but by rotating their use of the land (Nye and Greenland 1960). After cultivating an area for a limited period – with yields declining through a possible combination of decreasing available nutrients, build up of disease and pests, and weed infestation – they abandon it to fallow for many years and so that secondary forest may establish itself. Perhaps a gen-

eration later, descendants may clear the rejuvenated site again, burning the natural vegetation to release stored nutrients for crop uptake, the ash acting as a fertilizer. Extensive shifting is not inevitable under such regimes; where soil conditions permit, people may evolve sustainable cropping regimes that allow them to practice near sedentary farming, as on volcanic ash soils in the New Guinea highlands with staple sweet potato cultivation (Sillitoe 1996). So long as the population remains in balance with land resources, this farming regime, which has long had a maligned reputation in development circles, can go on indefinitely in long-term balance with the cycling of the natural ecosystem. The demographic-resource-balance caveat applies to any farming system; however, a shifting one can only support limited numbers compared to others, and its destruction of forest is obvious whereas that of sedentary regimes is in the past and overlooked.

Farmers have devised other ways to manage soil fertility where regimes are sedentary. The Celtic field system of Britain, for instance, involved more-or-less concentrically arranged in-fields and out-fields (Grey 1959). The in-field adjacent to homestead was under continuous cultivation, fertilized with cattle dung from the byre. Crops were rotated with pasture in the nearby out-field, and beyond was an area largely for grazing animals that imported nutrients to the centre. Farmers improved the land with rig and furrow drainage and by using lime to manage soil acidity. They developed various systems of crop rotation. The Romans introduced legume and cereal rotations, in addition to the mouldboard plough. The Medieval period saw the introduction of the three-field system, with two plots under crops at any time and the other fallow; the fields again surrounded by common pasture that supplied some nutrients via manure of grazed animals spread on cultivations. While some argue that the communal land tenure system, where villages redistributed arable plots between families each year in an attempt to ensure equitable use of resources, militated against long-term land improvement, the farming regime was, broadly speaking, in environmental balance. The seventeenth century saw the emergence of sophisticated rotations in England, such as the Norfolk four-course that featured the cycling of wheat, grass and clover (pasture), oats (horse fodder) and turnips, together with fertility maintenance through the application of manure and night soil (the law prohibited tenants selling manure, tantamount to stealing nutrients off the land). It is from these farming regimes that today's organic farming descends with its emphasis on the sustainable management of land resources by the appropriate organic management of nutrient cycling and soil structure, as certified in the UK through the Soil Association.

The implications for sustainable development are intriguing: namely, sustainable implies a relatively steady state, whereas development implies extensive change. While change inevitably occurs, whatever your cultural perspective (as the entropy postulate of the second law of thermodynam-

ics predicts; Reid 1995: 26–27), the point is that from a sustainable perspective it is gradual, not suddenly disrupting the complex relations that characterize any ecological or social system. We face another contradiction. Such gradual change is the process that drives evolution, organisms slowly altering and causing changes in their surrounding environment, including changes in other organisms. But development, unlike evolution, is a rapid process that aims to promote speedy change (e.g. halve global poverty in a mere fifteen years). So is the idea of sustainable development an oxymoron? If so, it explains much about the confusion that surrounds the concept.

The biological or ecological view of sustainability is the one commonly adopted in development contexts. It is the standpoint that descends directly from the Brundtland Commission (1987: 43), which many cite as the juncture that unmistakably put sustainability on the official development agenda. According to the commission, it is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. But this seems disconcertingly out of step with the above ideas and goals that inform development, which prioritize economic growth, use of resources and rapid change now.

In chapter 12, Nobuyuki Yamaguchi further questions, as a biologist, what comprises a sustainable state, querying the widely assumed synonymity of sustainability with biodiversity conservation. From a biological perspective these may be mutually exclusive, albeit sometimes complementary. The word *sustainability* as used in 'sustainable development', which concerns the continuation of activities that meet human demands, differs from how it is used in 'biodiversity conservation' contexts, which concerns the preservation of natural species and ecosystems. Biodiversity relates to variety among organisms connected in complex ecosystems and assumes a wide range of genetic information both within and between species. Whereas the sustainable use of renewable natural resources concerns not genetic variety but numbers of individuals (or biomass). The population of any species is conserved so long as harvested such that it is able to reproduce in sufficient numbers to avoid extinction – albeit possibly with a greatly reduced gene pool if heavily harvested and with probable negative impact on other creatures and the wider ecosystem. And a previously heavily harvested species that has suffered a large population decline may be sustainably exploited from a simple population size (or total biomass) perspective, as sustainability is ironically achievable regardless of population size or biomass so long as the harvest does not exceed the maximum sustainable yield for the current (and not previous) population (Cowlishaw, Mendelson and Rowcliffe 2005). Used in this way, the sustainability view fails to draw attention to ongoing erosion of

nature's riches. Such sustainability at a 'low' resource level may be used disingenuously as a positive point to hide the extent of the damage that human activities are doing to the planet's biodiversity.

The lack of reliable quantitative data makes it difficult either to assess biodiversity or monitor sustainable use of renewable natural resources, further allowing some parties to create the 'comfortable illusion' of sustainability. Moreover, sustainable yields of biota useful to humans may be more achievable with a reduction in biodiversity or even extermination of certain species – such as killing off pests that reduce crop yields – that interfere with what we seek to harvest (Margoluis 2001). Modern farming methods, for instance, are not in the interests of some organisms (in controlling pests they arguably try to exterminate them), which does not concern the sustainability of farming, unless they inadvertently destroy resources necessary to their continuance – such knock-on changes occur in highly complex ecosystems and have unforeseen adverse effects (for example reducing the numbers of insects needed to pollinate crops). While the extinction of some species due to human activities may not concern the sustainability of those activities, it is of central concern to those who argue that we need to protect the planet's biodiversity.

Environmental Sustainability

A feature of the rapid economic growth of the Gulf region is a large migrant labour population. Workers from around the world – Europe, South Asia, North America and Southeast Asia – are present in large numbers, many working in the construction industry on infrastructure and building projects. The terms and conditions of the region's migrant workers provoke considerable interest, notably those from poorer countries such as Pakistan, India, Nepal, Bangladesh and the Philippines, whose employment circumstances reflect current exploitative global economic arrangements (Longva 1997; Kapiszewski 2001; Gardner 2010). In chapter 9, Ben Campbell looks at migrant labour from a novel angle, arguing that employment of Nepali persons in the Gulf contributes significantly to the well-being of Himalayan forests and the poor communities that depend on them. He points out that not only may economic growth damage the environment but also that lack of economic growth may push the poor to overuse often-diminishing natural resources, particularly with population growth. Sustainable development programmes often seek to protect threatened environments by reducing local pressure on resources, for instance by declaring conservation areas and requiring people to adapt their livelihoods accordingly or find alternative ones. Even where local people

continue to have access to such areas, controls on levels of harvesting to protect the environment often oblige them to meet their consumption needs via the market purchase of commodities. In this event, poor villagers, such as those in the Nepal Himalayas, need access to non-local income-earning opportunities such as the Gulf offers. The sustainability of these arrangements depends on the interlinking of the local and the global. The bio-diverse mountain forests of Nepal can continue in a healthy state only if some of the population can earn cash incomes elsewhere and remit some of their earnings back home.

In view of the ecological assumptions that inform the idea of sustainability, the status of human relations with the natural environment is predictably a central issue with respect to discussions of sustainable development. Conservation features prominently here. The migrant labour remittances view is an interesting take on the topic. The establishment of conservation areas to protect nature and preserve biodiversity, in at least limited selected regions, is a popular response to humanity's unsustainable use of natural resources and consequent degradation, even destruction of the environment. The Qatari government, confronted by the environmental consequences of oil and gas extraction and rapid urban development, strongly supports this approach, having designated about one-tenth of the country a conservation area. In the west of the peninsula, it is the Al Reem Reserve, subsequently declared a UNESCO Biosphere. It is the subject of my chapter with Ali Alshawi; other biosphere conservation reserves in the region are Marawah in the United Arab Emirates and Dana in Jordan.

Marine and terrestrial environments are under threat in the Gulf, as elsewhere, from rapid development. It frequently happens that when we consider protection of the natural world we overlook, as a terrestrial species, the marine environment, for degradation of land resources is so much more obvious to us. James Howard seeks to rectify this oversight, pointing out that protection of marine ecosystems poses particular problems, demanding international cooperation. The world's oceans are not only global in extent but also largely comprise an intercontinental commons, any nations' territorial waters being limited in area such that governments have limited powers. And the oceans are so large, covering some two-thirds of the planet, that we have until recently treated them as bottomless sinks for waste, as Clarke and Almannai discuss in chapter 15, causing increasingly evident pollution, threatening some entire oceanic ecosystems. The health of marine resources is of particular importance to coastal nations, contributing significantly to their economies. This is the case in the Gulf region, where some globally unique marine zones occur, featuring ecosystems adapted to high temperatures and salinities. But they are under

Figure 0.6. A dhow coming into Al Ruwais harbour, N. Qatar.

threat not only from the sizeable and largely unregulated dhow fishing fleets (figure 0.6), but also the construction of extensive infrastructure on the coast, such as the gigantic liquid gas processing facility at Ras Laffan on the Qatar peninsula. These short-term industrial complexes threaten long-term, even irreparable degradation of the marine environment with considerable local and regional consequences, and indeed global ones with the oceans playing a part in regulating the world's climate.

In contrast to seawater, availability of fresh water is markedly limited in the Gulf – a key sustainability issue, as several chapters make clear. Among the driest and most barren regions on earth, largely comprising desert, natural water sources are inadequate to meet the needs of today's burgeoning population. One solution is to use readily available seawater, large desalination plants supplying a considerable part of the water used in the region. In Qatar, for instance, desalinated seawater supplies 41 per cent of water for domestic, agricultural and industrial use, and 99 per cent of drinking water. Another 50 per cent comes from groundwater sources, and the remainder from treated wastewater (Hashim 2009: 112). Regarding sustainable development, both groundwater and desalinated sources

are unsustainable. Extraction rates from groundwater sources exceed rates of natural recharge by 70 per cent or so,[7] predictably where rainfall is negligible; falling in short, occasionally heavy storms in winter months, sometimes flooding otherwise dry wadis. Whereas the desalination process is energy demanding relative to natural sources, and currently dependant on non-renewable fossil fuels (although research is underway to use abundantly available solar power). In addition, the process produces highly concentrated brine effluent (with added anti-scaling chemicals), which is usually pumped back into the sea, increasing salinity in the vicinity of plants, which is naturally high to start with in the Gulf, to the detriment of marine life (Dawoud and Mulla 2012).

Energy Issues

The changes occurring in the world's climate (so-called global warming due to CO_2 emissions) have brought energy issues to the top of the sustainable development agenda; for not only do we have to contend with global dependence on non-renewable fossil fuels and what to do when these inevitably start to run out (so-called peak oil, when supply fails to meet demand), but we also face the problem that their use may lead to catastrophic human-induced climate change and of how we can reduce our emissions of greenhouse gases responsibly. In this context, the development trajectory in the Gulf is doubly unsustainable. Not only are current developments locally unsupportable in the longer term, given the region's dependence on non-renewable oil and gas exports (figure 0.7), but they are also unstable globally in the shorter term, given increasingly urgent

Figure 0.7. Oil refinery at Qasasil, Qatar.

calls for the world to turn to renewable energy sources and break its reliance on hydrocarbons linked to increasing CO_2 levels in the atmosphere.

The need to switch to sustainable energy is a pressing global environmental concern, as Thomas Henfrey reminds us in chapter 6. He discusses three strategies that seek to advance the transition: reduction of carbon emissions from conventional fossil fuel use, development of renewable sources of energy and attempts to reduce energy demand. He points out that current technical limitations regarding efforts both to reduce carbon emissions (such as CO_2 capture and storage) and develop renewable sources (such as wind farms and solar arrays) oblige radical shifts in energy demand, particularly in the wealthiest nations (Fauset 2008). He questions the assumption that our technical ingenuity will solve the problems, in the short term anyway, as it has previously in our history; for instance as evident in the technological changes seen in the archaeological record – such as those in irrigation procedures recounted by Manuel, Coningham, Gillmore and Fazeli – show our ancestors overcame environmental constraints. Furthermore, he argues it will exacerbate our present problems if we think that the inventiveness that has enabled humans to address resource constraints before will allow economic growth to continue blazing away (Heinberg 2011: 156–174). Although we may soon have the technical means to cost-effectively change to renewable energy, this is of little help if it perpetuates a growth-led model of development instead of making this redundant in the long term, as all of the world's resources are finite. The prospects for managing demand are forbidding; the indefinite growth mentality of economics (of any school – capitalism, socialism or whatever) promotes an ever-increasing demand for energy that stymies any efforts to keep it within sustainable limits. It is necessary, Henfrey argues, that newer nations seeking to increase their citizens' prosperity avoid this unrealistic and ultimately disastrous growth mentality and find other ways to develop economies compatible with the world's finite resources (Abramsky 2010; Teske 2010). With this reality in mind, his chapter envisions possible future sustainable energy scenarios in the Gulf region.

The proposition that depending on non-renewable fossil fuel reserves to fund development is an insecure strategy has prompted some to argue that an abundance of such resources can be a liability rather than an asset. This is the reverse of the widespread assumption that plentiful natural resources will equate with economic growth and development. In chapter 7, Emma Gilberthorpe, Sarah Clarke and I explore a popular version of this argument: the resource curse thesis (Auty 1993; Humphreys, Sachs and Stiglitz 2007; Watts 2008). By definition, exploitation of non-renewable resources is, as Henfrey makes clear, unsustainable in the long term, but

the resource curse thesis suggests that it may also be unsustainable in the short term by setting off unsound economic growth. It appears that curse-afflicted resource-rich nations experience less economic development than nations with fewer such resources. It is thought that this happens for several interrelated reasons, including a decline in economic competitiveness due to resource-revenue-stimulated currency exchange rate appreciation, exposure to volatile global commodity markets resulting in unpredictable swings in natural resource revenues, mismanagement of assets by governments and poor investment of wealth nationally, and unstable or corrupt institutions siphoning off resource revenues, with the entrenchment of a wealthy minority and impoverished majority.

The challenge posed by the resource curse thesis is how to convert what is an unsustainable wealth windfall into a sustainable future by investing appropriately and not being cursed and 'blowing it'. In chapter 7, we compare the relevance of the thesis to the Gulf and South West Pacific regions to make the point that the economic and social consequences of resource endowments can vary widely. The resource curse affects these regions in different ways. It more applies to Papua New Guinea, for instance, than Qatar where awareness of some of the pitfalls has the authorities searching for ways to invest hydrocarbon income to ensure a sustainable future, as evidenced by the plethora of strategy documents and plans discussed by Tan, Al-Khalaqi and Al-Khulaifi (chapter 2), Rahman (chapter 3) and Darwish (chapter 4). Also, the curse thesis focuses too much on economic issues, when social ones are relevant too. We can anticipate that different societies will react differently to having abundant natural resources. While the wealth coming from oil and gas royalties in Papua New Guinea is leading to a breakdown in social and political relations, this is not currently evident in Qatar, where social relations are nonetheless undergoing considerable change with urbanization, consumerism and so on.

Cultural Sustainability

Social issues are central to sustainable development, which touches upon a wide gamut of communal issues, wherever the community. International development policy and practice consequently has to address the cultural, as well as economic and technical, aspects of sustainability. It is now widely accepted that development is not, as once thought, solely the preserve of one social science, namely economics, but involves wider socio-cultural issues and all social sciences. A common criticism of the modernization approach, with its top-down economically driven planning, is that it often features little or no local consultation or involvement

of the wider population, omitting those who are going to be subject to any intervention. There are wider issues of sustainability here, relating to the sustaining of development initiatives themselves, as Gina Porter points out in chapter 17. It is argued that those impacted by development plans will surely have a view and relevant knowledge and that involving them should help avoid project failure and further waste of scarce resources (Baker 2006: 1–5). The participatory approach to development emerged from such criticism.

While those involved in central planning increasingly acknowledge the need to involve people, they find it difficult to do so and retain control of the process, so necessary in the Gulf with its aforementioned political connotations. The planners responsible for the Qatar National Master Plan, for instance, realize that the successful achievement of sustainable urban development will depend on local ownership of the process, as Rahman describes, and recommend ways to achieve stakeholder buy-in. But they seem to overlook that involving the local population in drawing up the plan from the start would be more likely to ensure such buy-in. The reaction of Qatar University students during a workshop where the plan was presented and discussed show what may happen otherwise. They dismissed it, directing particular ire at the recommendation that everyone should use public transport more, which they thought demeaning, particularly for females. Clarke and Almannai, in chapter 15, also highlight the significance of public consultation and participation in establishing successful waste-management programmes, suggesting ways to improve communication between the relevant ministries and other stakeholders, including the wider public, whose engagement is essential if a sustainable waste-disposal system featuring recycling is going to be successful.

In chapter 18, Serena Heckler argues that we need to go further in recognizing the centrality of cultural issues to achieve genuinely sustainable development, both environmental and social. It is necessary to consider culture if local stakeholders are going to participate meaningfully in decision making and ensure that local, often sustainable values shape policy and practice. She points out, drawing on her work in Latin America and with UNESCO, how there are many ways culturally to be in the world and that Western-framed economic development may be detrimental to certain cultures, and may even represent an imposition of alien values on people who have quite different views. This relates to a human-rights approach to development and sustainability, notably the universal right to live according to one's own cultural values. It is important to realize the part that culture plays in identity and well-being, and the need to sustain socio-cultural distinctiveness and diversity; for instance to include indicators of cultural integrity in assessing the sustainability of any de-

velopment. Heckler argues that we should use the 'cultural turn', with its championing of the understanding of other socio-cultural perspectives, to critically review current development practice with the aim of extending to local people more autonomy to promote development as they conceive it.

In chapter 19, Fadwa El Guindi picks up on the cultural theme in Arab contexts. She criticizes as shallow approaches to development and growth that rely on bland and tired management-speak slogans, which blithely overlook the complexity of related cultural issues. This is evident, she argues, in Qatar's Development Strategy, which while it acknowledges the distinctive part that the family plays in Gulf society, makes some questionable planning assumptions; for instance about limiting cousin marriage, which is common in the region and features unacknowledged aspects that are analogous to the incest taboo such as milk kinship. She argues for the inclusion of culture in the broad (holistic) sense in sustainability discourse. She points out that other culturally informed ways of being in the world can teach the capitalist order something about sustainability, contrasting the relations between humans and animals in the United States and Arab world. The Arabians have particular relations with falcons, camels and even their goats, which, kin-like, have their own genealogies. Egyptians have close relations with cats, which mummified feline remains suggest possibly date back to Pharaonic times. And the Turks have idiosyncratic relations with birds, their cities featuring numerous, sometimes mini-palatial, birdhouses. In discussing 'humanistic relations' with animals, she highlights harmony and balance as two prominent Arab cultural themes, which resonate strongly with the sustainability discourse and local knowledge advocacy. The implication is that other cultural ways and expressions of associated values may promote sustainable lifestyles.

Local knowledge may have something valuable to contribute to sustainable development by drawing on such sustainable cultural roots (Sillitoe, Bicker and Pottier 2002; Sillitoe, Dixon and Barr 2005). By turning to their cultural heritage, might the peoples of the Gulf region advance a unique approach to sustainable development? For instance, in chapter 13 Alraouf and Clarke point out that the Arab architectural tradition (Mortada 2003), which evolved over millennia to cope with hot arid climate – coming up with some ingenious solutions such as wind towers that are iconic features of the Middle Eastern architectural heritage (figure 0.8) – may have something to teach the emerging sustainable architectural movement, with its green designs and energy-conservation aims. They discuss Masdar City, the futuristic carbon-neutral urban project in the desert adjacent to Abu Dhabi, which deploys some traditional architectural techniques and town designs (Reiche 2009). Such consideration of

Figure 0.8. Wind tower architecture, Qatar University campus.

local building traditions may also contribute to the aesthetics of the built environment, being more culturally appropriate than the globalized steel and glass towers that currently dominate skylines across the region. They contend that truly 'smart' solutions designed specifically for the Gulf will draw on vernacular architecture, combining lessons from the past with designs and technology of the future.

But indigenous knowledge, culture and traditions are disappearing across the Gulf in the name of progress, things which for centuries have enabled the people to survive in a harsh climate while ostensibly preserving the natural environment (Mundy and Musallam 2000). This is something that exercises Kaltham Al-Ghanim in chapter 20 where she explores what local environmental knowledge might contribute to sustainable development and the conservation of natural resources, pointing out that rapid change may erode such knowledge and lead to resource destruction. She argues for the rediscovery of the local environmental heritage of the Gulf region and Qatar in particular – some of which she briefly documents – arguing that its revival will help communities follow more environmentally friendly ways (such as Lancaster and Lancaster 1997 detail).

The loss of such knowledge poses problems in conservation contexts, where participatory co-management is currently popular, involving local populations and superseding reserves that excluded them to protect nature. Local people, it is argued, are more likely to abide by restrictions on access and resource use if they are party to devising these and understand what they aim to achieve. Furthermore they also have much knowledge of the local environment, their activities often contributing to the ecology seen today, which has led recently to the idea of bio-cultural diversity and ensuring its continuance (Maffi 2001; Stepp, Wyndham and Zarger 2002). However, these assumptions may not hold where rapid social and cultural change occurs, such as in the Gulf region, as Ali Alshawi and I explore in chapter 10. The impracticability of the co-management approach seems to imply, paradoxically to us as strong advocates of local participation, turning the clock back to centrally managed arrangements that seek to control human access and local activities, even the prohibition of some to protect plants and animals.

Participating in Sustainability

The participatory approach to development poses further challenges (Kumar 2002; Cooke and Kothari 2001; Hickey and Mohan 2004). Political arrangements in Gulf Co-operation Council (GCC) States, as Gardner points out in chapter 14, make it difficult to see how they can square sustainable urban development – with its democratic emphasis on participatory and grassroots approaches to planning and implementation – with their centralized top-down decision making and management. Furthermore, people need to understand the issues to participate. One response is to advocate education, as several contributors to this volume do. For instance, Al-Ghanim envisages training programmes based on the local environ-

mental heritage of the Gulf to promote ecological awareness and a more sustainable future. In this respect, Darwish argues that it is necessary to raise awareness among Qataris and others of the need to advance the sustainable agenda or else no amount of central planning will achieve such development, echoing the point made above about the Qatar National Master Plan and the need to secure people's buy-in from the start. In the course of their discussion of key legislation aimed at protecting the Qatari environment – the processes that enabled its formation and the administrative arrangements instituted to enforce it – Al Othman and Clarke argue in chapter 5 that lack of awareness obstructs its implementation. In order to make progress, the authorities need to give more attention to increasing public awareness and environmental understanding, so that all sections of society can collaborate in achieving sustainable development objectives. For instance, inadequate waste-disposal arrangements, as Clarke and Almannai argue in chapter 15, reflect limited public knowledge of issues such as recycling and scant appreciation of the consequences of disposing of refuse in environmentally unsound ways.

Meaningful participation involves collaboration between all partners, encompassing local community members, government representatives and non-governmental organizations together with researchers to shape and inform enquiries. Planning and managing such research is difficult, as Gina Porter illustrates in chapter 17 drawing on her experiences with a Ghanaian irrigation project and comparable research conducted in the Middle East region. They reflect the considerable methodological challenges surrounding research into sustainable development. Supplying and analyzing reliable data to inform and support such development requires inputs from and cooperation between a range of disciplines in both the natural and social sciences. In this respect, Porter distinguishes between multidisciplinary and interdisciplinary research – the first featuring disciplinary experts working in parallel and the second having them interacting continuously throughout the research. She argues that the interdisciplinary approach is necessary to further the sustainable development agenda, which requiring cooperation between several fields to further understanding of problems is particularly complex (Klein 1990; Lyall et al. 2011). James Howard, in chapter 11, illustrates the complexity in discussing the challenges that face sustainable development with conservation of marine resources; there are not only the complex interactions between the many stakeholders and sectors involved in developing and protecting coastal regions but also the marine environments themselves comprise complex and often poorly understood ecosystems. And such research, as Fadwa El Guindi points out, is time consuming and cannot be hurried without jeopardizing the results.

The book itself takes an interdisciplinary approach in its in-depth presentation of sustainable development issues in the context of the Gulf and Middle East, framed within a global perspective. It brings together, in a unique association for the Gulf region, a combination of specialists to introduce and discuss sustainable development, including social and natural scientists, architects and planners, economists and health specialists, environmentalists and biologists, ministry personnel and university academics, development specialists and archaeologists, to consider such topics as nature and environment, society and culture, industry and technology, economy and politics, history and geography as these relate to sustainable development.

Following on from the exploration of the concepts of 'development' and 'sustainability' in this introduction, the conclusion explores, in the light of the following chapters, the implications of joining these concepts together in 'sustainable development'. It discusses some contradictions at the heart of the idea, starting with the conflict between capitalist ideas of economic growth and environmentalist ideas of an ecologically steady state, which relate to the sustainability of development itself. Viewing development as a culturally relative concept affords one way of tackling such contradictions. Other perspectives on what comprises the good life, as exemplified in endogenous or indigenous knowledge approaches, suggest a way beyond the inconsistencies of capitalist informed development. The lifeways of hunter-gatherers, ironically considered the least economically developed, illustrate such regard for sustainability. While these perspectives suggest that genuinely participatory approaches should promote sustainable development, there are political obstacles, as pointed out, with powerful authorities that control resources reluctant to relinquish control. Also, not all local communities necessarily subscribe, as noted, to worldviews that may promote sustainable interventions, with the possibility of environmentally unsustainable participation. While we may promote local knowledge for ecologically and culturally sustainable development, we have to exercise caution – one policy does not fit all when it comes to sustainable development.

Notes

1. I gratefully acknowledge Shell's generous funding of the Chair in Sustainable Development that afforded me the opportunity to extend my work into the Gulf region (Fadwa El Guindi, this volume, endnote 1, comments further).
2. It is perhaps to be expected that a company supplying the global economy's addiction to fossil fuels (which is the responsibility of us all) will find the

questions that sustainable development brings up awkward; more relevant attempts to address these included research to sequester CO_2 resulting from the production of liquid gas (which itself is less environmentally polluting than oil per joule of energy produced) and sponsorship of a race between cars powered by renewable energy built by various university engineering departments.

3. I thank Jackie Sillitoe, Fadwa El Guindi, Ursula Koch-Bagley, Mariam Abdel-Hafiz, Sarah Clarke and Hind Al Sulaiti for their invaluable contributions to the sustainable development initiative, and helping to bring about this volume.
4. There is a dispute over whether this body of water should be called the Persian Gulf or the Arabian Gulf and in this book we refer simply to the Gulf.
5. According to Latouch (1995), there are some sixty definitions of sustainable development (cited by Raynaut et al. 2007). Some writers seek to make a virtue of this, such as Reid (1995: xvi) and Adams (2001: 20), who argues that 'far from making the phrase useless, it is precisely because of its ability to host divergent ideas that sustainable development has proved so useful, and has become so dominant'.
6. Poverty is a relative concept; as Jean Cocteau observes in *Les enfants terribles:* 'Wealth is an aptitude, poverty the same. A poor person who becomes rich will display a luxurious poverty' (1961: 91). For example, on joining some closed orders nuns and monks renounce all worldly possessions and consider themselves blessed. There is a large literature on poverty in the 'developing world'.
7. In 2003–2004, total groundwater consumption was 220.829 million m^3 and total aquifer recharge was 67.130 m^3 (Hashim 2009: 115).

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