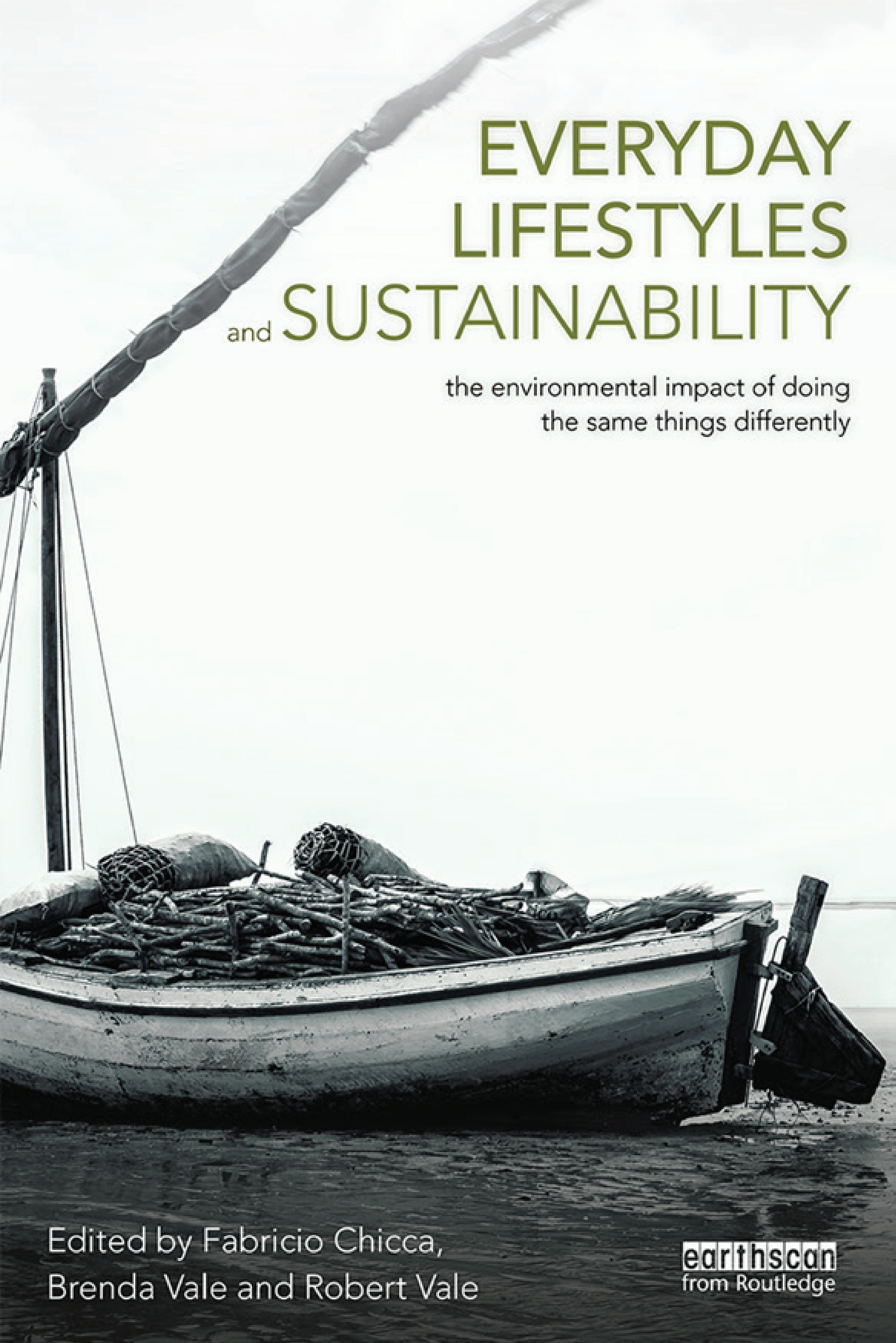

EVERYDAY LIFESTYLES and SUSTAINABILITY

the environmental impact of doing the same things differently

Edited by Fabricio Chicca, Brenda Vale and Robert Vale

earthscan from Routledge

EVERYDAY LIFESTYLES AND SUSTAINABILITY

The impact of humanity on the earth overshoots the earth's bio-capacity to supply humanity's needs, meaning that people are living off earth's capital rather than its income. However, not all countries are equal and this book explores why apparently similar patterns of daily living can lead to larger and smaller environmental impacts.

The contributors describe daily life in many different places in the world and then calculate the environmental impact of these ways of living from the perspective of ecological and carbon footprints. This leads to comparison and discussion of what living within the limits of the planet might mean. Current footprints for countries are derived from national statistics and these hide the variety of impacts made by individual people and the choices they make in their daily lives. This book takes a 'bottom-up' approach by calculating the footprints of daily living. The purpose is to show that small changes in behaviour now could avoid some very challenging problems in the future.

Offering a global perspective on the question of sustainable living, this book will be of great interest to anyone with a concern for the future, as well as students and researchers in environmental studies, human geography and development studies.

Fabricio Chicca is a senior lecturer in the School of Architecture, Victoria University of Wellington, New Zealand.

Brenda Vale is a professorial research fellow in the School of Architecture, Victoria University of Wellington, New Zealand.

Robert Vale is a professorial research fellow in the School of Architecture, Victoria University of Wellington, New Zealand.

This page intentionally left blank

EVERYDAY LIFESTYLES AND SUSTAINABILITY

The Environmental Impact of Doing the Same Things Differently

Edited by Fabricio Chicca, Brenda Vale and Robert Vale

Routledge
Taylor & Francis Group
LONDON AND NEW YORK

earthscan
from Routledge

First published 2018
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
711 Third Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data
A catalog record has been requested for this book

ISBN: 978-1-138-69387-6 (hbk)
ISBN: 978-1-138-69390-6 (pbk)
ISBN: 978-1-315-52913-4 (ebk)

Typeset in Bembo
by Deanta Global Publishing Services, Chennai, India

CONTENTS

FIGURES

TABLES

ACKNOWLEDGEMENTS

The authors would first like to extend very grateful appreciation to all the families who offered to take part in this book by describing their lives and to the people who researched and wrote some of these. Special thanks are given to Sarah Nabyl-Caillou for all her work on the ecological footprint calculations, and to Nilesh Bakshi for his help in dealing with domestic appliances.

CONTRIBUTORS

Fabricio Chicca is a senior lecturer in the School of Architecture, Victoria University of Wellington, New Zealand.

Silvio Marco Costantini is a software engineer at NP6 in Bordeaux, France.

Emilio Garcia is an architect and urban designer. Since 2013 he has been working as a lecturer in sustainability at the School of Architecture and Planning in the University of Auckland, New Zealand.

Ludwig Geisenberger is retired from teaching physics and chemistry in Germany.

Hannu I. Heikkinen is professor of cultural anthropology at the University of Oulu in Finland.

Tri Harso Karyono is a professor of architecture, specialising in sustainability, at Tanri Abeng University, Jakarta, Indonesia.

Yukiko Kuboshima is a PhD candidate in the School of Architecture, Victoria University of Wellington, New Zealand.

Adele Leah is a British qualified architect and a senior lecturer in the School of Architecture at Victoria University of Wellington, New Zealand.

Jacqueline McIntosh is an active researcher in sustainable housing and a senior lecturer in the School of Architecture, Victoria University of Wellington, New Zealand.

Abbie McKoy is a placemaking and community development professional, currently working on the city centre revitalisation project at Porirua City Council.

Sarah Nabyl-Calliou is a graduate student in engineering and architecture at ENPTE (Ecole Nationale des Travaux Publics de l'Etat) and ENSAL (Ecole Nationale Supérieure d'Architecture de Lyon), Lyon, France.

Jestin Nordin teaches architecture subjects and studios at the School of Housing, Building, and Planning, University Sains Malaysia, Penang, Malaysia.

Stefan Opfermann is an inspector for an ecological certification organisation in Germany.

Ana Paula Pagotto is a speech therapist graduated by the Escola Paulista de Medicina and postgraduated in Communication and Marketing by the IBMEC Brazil.

Dashakti Reddy is a humanitarian aid worker, focusing on women's protection and empowerment and has worked in Liberia, South Sudan and Iraq.

Han Thuc Tran is a postdoctoral researcher at the University of Oulu, Finland.

Brenda and Robert Vale are professorial research fellows in the School of Architecture, Victoria University of Wellington, New Zealand.List of IllustrationsTables

1

INTRODUCTION

Fabricio Chicca, Brenda Vale and Robert Vale

What this book is about

For the first time in human history, the majority of the human population lives in urban rather than rural areas (United Nations, 2015). This book asks whether or not we should be worried about this.

To investigate our impact on the environment, we present stories of how people live their daily lives in 23 different places from the 6 inhabited continents. The individuals in these stories have been given fictitious names to preserve their anonymity. Only those who have written up the stories have been named. Table 1.1 shows the locations of the stories and whether they are broadly rural or urban.

Overall, 15 of the locations could be described as urban in character and the remaining 8 as rural.

Definition of urban areas

There is a big difference between living in a very large city and in a small town, although both are urban in character. Not every country defines an urban area in the same way. In the US census, an urban area has in excess of 50,000 people and an urban cluster has from 2,500 to 50,000 people, with everything else being considered rural (US Census Bureau, 2016). In contrast, the 2011 census in India had four urban categories (statutory towns, census towns, urban agglomerations and urban outgrowths). A town is categorised as a settlement with a minimum population of 5,000 people, a density of not less than 400 people per square kilometre and at least 75 per cent of the male population of working age not engaged in agriculture (Census India, 2011). This can be compared with the 6,400 people per square kilometre of Sáo Paulo (Cox, 2012), showing how varied a definition of "urban" can be. When it comes to whether a place is urban or rural, it is more a matter of

TABLE 1.1 Locations of the stories

Continent	*Country*	*Place*	*City*	*Town*	*Rural/village*
Africa	Morocco	Marrakesh	√		
	Mozambique	Inhassoro			√
	South Africa	Johannesburg	√		
	South Sudan	Juba*	√		
Asia	India	Khajuraho			√
	Indonesia	Kendeng Mountains			√
	Japan	Nagoya	√		
	Malaysia	Penang	√		
	Mongolia	Ulaanbaatur	√		
	Myanmar	Lake Inle			√
Europe	Finland	Oulu	√		
	Germany	Eschenlohe			√
	United Kingdom	Newton-le-Willows		√	
North America	Canada	Toronto	√		
	Cuba	Havana	√		
	United States	St. Tammany Parish			√
	United States	Celebration		√	
Oceania	Australia	Sydney	√		
	New Zealand	Near Stratford			√
	Tonga	Nuku'alofa	√		
South America	Argentina	Tucumán	√		
	Brazil	Dourados			√
	Brazil	São Paulo	√		

*There are two stories from Juba

common sense than an agreed definition: if it is dominated by buildings it is urban, whereas if fields and trees dominate it is rural. This is the basis of the definitions in Table 1.1 for the stories in this book.

The Indian definition implies that you are urbanised if you are no longer engaged in agricultural activities. This change from rural to urban employment is happening in the name of urbanisation, but should we be worried about this natural outcome of the industrialisation of agriculture? Pelletier et al., (2011) show that modern systems for providing food rely largely on inputs of non-renewable energy, from the farm to retailing. As people move to the city, fossil fuel energy has replaced the human and animal energy formerly used. Antonini and Argilès-Bosch (2017) suggest that the energy consumption of farming will rise even further with increasing mechanisation. Given climate change, putting more fossil fuel energy into farming is untenable. It is also untenable because oil is a finite resource. Whatever economists might argue, we cannot continue to extract oil from the earth forever.

As we shall see later in this book, this continuing and increasing use of oil to feed us should be a cause for concern, given that food is the major component of all personal ecological footprints. Ecological footprints, or EFs, are a way of measuring the environmental impact of a person, an activity, a product or a country based on the area of land that would be needed to meet the demand in a sustainable manner (Wackernagel and Rees, 1996). The EF, which is measured in "global hectares" (gha), is defined in greater detail later in this chapter.

Urban living

Living in cities appears to consume more resources overall than living in rural areas, even in the developed world. In 2001, the EF of a citizen of the city of Cardiff was 5.6 gha/person while that of someone living in rural Gwynedd was 5.25 gha/person (Garcia and Vale, 2017: table 8.3). Hubacek et al., (2009) compared the 2001 average EF for China of 1.8 gha/person with that of Beijing, which was 4.99 gha/person.

If we live in cities, especially at high densities, we cover less land with buildings and roads, leaving more land for growing crops. However, these crops have to be processed into a form in which they can be brought into the cities to be sold and used, so energy is put into transforming, packaging and transporting them. All the wastes generated in the city have to be shipped out and disposed of somewhere. In the past, systems were worked out to deal with these problems. In ancient Athens, sewage and storm water were collected in a basin outside the city and directed in brick-lined conduits to fields and orchards as fertiliser to produce the food that the people of Athens could eat to produce the sewage, and so on *ad infinitum* (Antoniou et al., 2014: 100). Such systems work where populations are reasonably small. In the fifth century BCE, Athens was certainly not a village; it had a maximum population of 140,000, with around 40,000 male citizens and 40,000 slaves (Educational Resources, n.d.). In eighteenth-century London, the city was still small enough that human sewage could be collected and stored at Dung Wharf for shipping downriver to market gardens along the River Thames, the barges returning with food (Parks and Gardens UK, n.d.). By 1760, the population of London had risen to 760,000 (Old Bailey Proceedings, 2015). Like ancient Athens, this is a small city to modern eyes. This explains why in modern agriculture natural fertilisers have been replaced with chemical fertilisers, which take energy to manufacture and which use finite resources rather than recycled wastes. If (or is it when?) these finite resources run out, the food will run out too.

By 2016, there were 512 cities across the world with a million or more inhabitants (UN ECOSOQ, 2017: 9). Many of the stories in this book are of people who live in cities. One purpose of looking at all these stories is to understand whether it is possible to live in a city and still have a low environmental impact.

Why we live in cities

Why do we live in cities, and why is living in cities on the increase? Essentially, cities are about trade (Mortazavi, 2010: 126), emerging as marketplaces for the products of the surrounding agricultural areas (Jacobs, 1969: 38). For the majority of history, people walked from the surrounding countryside to the nearest settlement with a market where they could trade their produce. Trade was originally to do with swapping what you could grow for what you could not, leading to wealth. It is this lure of an easy path to riches that makes living in cities, where, according to the traditional story of Dick Whittington, the streets are paved with gold, so attractive.

Even before nineteenth-century industrialisation, the lives of those in urban areas were very different from those of their rural contemporaries. People in cities went to work to earn money to buy the food grown by the rural population. This distance between doing things for yourself and earning the money to buy the same things leads to a disassociation. If you grow something, you know the time and effort required to produce it. If you grow a potato, you have dug and planted and hoed and harvested it yourself. If you buy a potato, all that effort is hidden and you only value the potato in terms of what it costs you. This could lead to bought goods being less appreciated, producing what has been called the "throwaway consumer society" (Vince, 2012). If you have spent several weeks of spare time knitting a sweater, you are unlikely to throw it out until it becomes really unwearable, because you know what went into making it.

As Table 1.1 shows, the majority of the stories in this book are set in urban rather than rural locations. However, whether urban or rural, for most people the daily pattern of living is very similar. You get up, go to work and come home at the end of the day. The work day for children is spent in school. If you are poor, you may not be able to afford to send your children to school, or you may need them to work to help raise the family income. This book, through comparing daily life for 24 families with different levels of wealth and expectations, tries to work out the environmental impact of these typical days to see what the big environmental impacts in these daily patterns are, and how these impacts might be able to be reduced.

Urbanisation and food

We all need food. In Ancient Greece, as urbanisation spread, food supply became a big social concern. In c600 BCE, the city of Corinth forbade its citizens to leave their land because this would have put food production and other resources—leather and wool, for example—at risk (Gutkind, 1969: 472). Cities allowed a certain division of labour, so those not engaged in agriculture could become traders and producers of other goods (Gutkind, 1969: 467). This division of labour increased during the time of the Roman Empire, probably the first civilisation with a strong concept of urbanisation, using the booty from its conquests to create an extensive built environment, including a road network, which further advanced trade and other economic activities (Kay, 2014: chapter 9). Before Rome became a populous city, it was relatively hard to find a citizen who did not have an underlying relationship with the countryside. Many people used to work in the countryside for part of the year, or even daily, and this provided pressure to constrain the city and keep it moderately small due to the need to be close to its food supply (Montillo, 1956: 25). People could walk out to the fields to help with food production at critical times, like the harvest. Once urbanisation was spread throughout the Empire and the cities grew in size, trade became essential to maintain the increasingly indirect relationship between consumption and production. The urban citizen became a consumer instead of an agricultural producer. Because the people in Rome lost the sense of the effort involved in the production of foodstuffs, they could easily consume more food than necessary, providing they could earn the money to pay for it. Wealthy urban Romans enjoyed the tongues of flamingos and honey-roasted dormice rolled in poppy seeds (Allan, 2005: 70). Even "soldiers serving on Hadrian's Wall … list their foods as … spice, goat's milk, salt, young pig, ham, corn, venison and flour … vintage wine, Celtic beer, ordinary wine, fish sauce and pork fat …" (Renfrew, 2004: 7).

With urbanisation, the connection between people and the production of food has been lost. Rees and Moore (2013: 11) suggest that cities are now human feedlots. A feedlot is where livestock are brought to be fattened—it contains one species in a small space, the food all has to be brought in and all the wastes have to be disposed of, just like a modern city.

Why worry about living in cities?

Although people living in cities might forget how dependent they are on land to grow their food and timber, wool and cotton, this does not yet explain why we should be worried about living in cities, since the earth has plenty of land. If the entire world population stood side by side, each person occupying 1 square metre of land, it would cover an area slightly smaller than the small state of Delaware in the United States (Snapzu, n.d.). The problem is that we all consume much more land than we would if we were just standing on our own square metre. This is where the EF comes in, as it measures human impact in terms of the amount of land needed to supply each person with all the resources they consume in their daily living.

The concept of the EF

In their 1996 book *Our Ecological Footprint*, Mathis Wackernagel and William Rees proposed a new interpretation of the old idea that land was the key factor in the sustained development of a society. They proposed that human impact could be visualised as the impression of a person's footprint on the eco-systems that support us all. In the case of the EF, that impression represents the resources removed from the eco-system to supply what each person takes to live their life. What the EF aims to capture is the impact of all the processes that go to make up a product or service that each person consumes. The calculation assumes that the land has to provide everything, on the basis that in a world where all the finite resources have been consumed, this will be the reality. In the case of copper, for example, the calculation would include all the energy that goes into extracting and making it, and whether the energy is renewable (in which case, determining how much energy can be produced from a hectare of land) or fossil fuel-based (in which case, determining how much land is needed to absorb the carbon dioxide emitted from burning the fuel). To this is added the land degraded by the mining process, as well as the land required for the energy that goes into transporting the product to where it is used, and also into retailing it; the products that go to make up the chemicals used to extract the copper; and an allowance for the energy needed to recycle the copper when the product comes to the end of its useful life. Thus a simple visualisation of human impact—the EF—becomes highly complex when it comes to calculating the impact of materials that we expect to use.

The EF is easier to visualise when it comes to food. If it takes one potato plant in a mulched raised bed to produce one kilogram of potatoes per year (Pleasant, 2015) and the recommended planting spacings for potato plants are 300 millimetres apart in rows of 750 millimetres apart (Hall, 2016), then in a plot 10 metres ×10 metres, there will be 13 rows with 33 plants in each, so I might expect 429 kilograms of potatoes from that 100 square metres of land. The average person in the United Kingdom eats 429 grams of potatoes each week (Statista, 2017), so our plot of potatoes will feed 19 people in the United Kingdom each year and the footprint of a UK person's annual potato consumption is a piece of land roughly 5 square metres in area. This takes no account of weather, pestilence or other problems that might affect the yield. EFs deal in averages gleaned from existing data, so in a sense, they are always out of date. Potato consumption is falling in the United Kingdom (Statista, 2017), so arguably our plot could feed more people, but then people will be substituting other food for the potatoes they previously ate, and these other foods might need more land than potatoes do. Another problem is that the productivity of the soils will be different within each country. This means that if the footprints of food and other products are to be comparable between countries, we have to take land productivity into account. This is something we shall return to in defining the global hectare, which is the unit used in EFs.

Definition of the EF

The EF is the area of biologically productive land and water an individual, population, or activity requires to produce all the resources it consumes and to absorb the wastes it generates in a sustainable way (Global Footprint Network, 2012). You can measure the EF of a person, a product, a city or a whole country. Wackernagel and Rees (1996: 94–95) give the example of the Netherlands, with an EF of nearly the same area as the whole of France, showing that the Dutch use of resources outstrips the land available within their borders, even given their famed ability to reclaim land from the sea. The French, not unnaturally, want to keep their land for themselves, so where can the Dutch turn to obtain what they want? What the EF does is to reveal which countries are dependent on land beyond their own borders for the resources they consume, often an area of land far larger than the land they occupy.

The problem with this definition is that not all resources can be secured on a sustainable basis. Obviously, you can grow crops, but you cannot grow light bulbs, so the EF is not truly measuring whether a particular lifestyle is sustainable. To overcome this problem, the EF looks at the land needed to produce and recycle the resource as well as the land needed to grow the energy to do this.

The ultimate aim of the EF is to see whether it would be possible to extract all the resources used by people on earth from the land (and water) on a sustainable basis. As the population rises and the area of biologically productive land remains the same, each person's share of all the available land from which they would need to supply all their needs—the "fair earth share"—becomes smaller. The estimate in 2013, with 12 billion hectares of productive land and 7 billion people, was that the fair share was 1.7 hectares per person (Rees and Moore, 2013: 15).

Wackernagel and Rees (1996: 90) state that EF can be used as a way of comparing the impact on the environment of different people and societies. This is how the EF is used in this book. Our stories are not sufficiently detailed to give the complete EF of each person but they can be used to calculate and compare important aspects that each person, in a sense, has under their control, things over which we have a degree of choice. Figure 1.1 sets out how the EF of a citizen of Cardiff in Wales (Collins et al., 2015) breaks down into different categories and shows which ones an individual has some control over (Individual) and those they cannot control (Collective). The part labelled "Grey" is what would be required to have a footprint reasonably close to the fair share, showing how the total (Grey plus White) would have to be reduced if each part were reduced by the same percentage.

The most surprising aspect of Figure 1.1 is that the largest part of the EF is food. As we shall see from the stories, if you are very poor, almost the whole of your EF is the impact of the food you eat, and food also powers your travel. This book only deals with the aspects of the EF that are under the control of the individual. Each story will be analysed to see the impact of food, domestic energy use, household travel, consumer goods and the house, and the results compared.

Bio-capacity

The concept of EF can also be used to determine how many people the earth can support for a given style of life. A higher material quality of life means a greater environmental impact because having more material goods means using more resources to make them. Cities in the past were small because there was a link between the availability of resources, particularly food, and the size of the city. In Ancient Greece, when the population increased, the city had to organise itself to send some of its citizens off to found a new colony. There is no longer room for new colonies. What the EF demonstrates starkly is that the more the human population grows, the fewer are the resources available to be shared between each person.

Human beings are a very successful species, at least in terms of numbers. As of August 2017, the human population was over 7.5 billion (Worldometers, 2017). In the 1950s, the world population was below 3 billion and we could all have lived the lifestyle of 1950s Europe, while in 2012, we could all live like people in Cuba (Vale and Vale, 2013: 320). As the population rises in a finite world, there are fewer

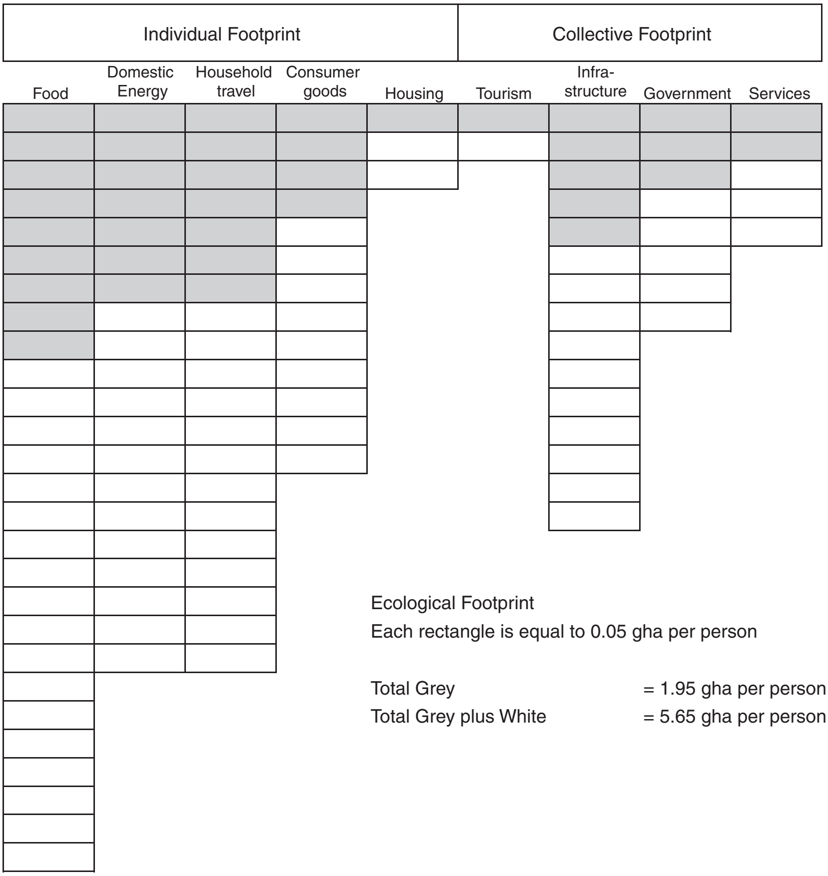

FIGURE 1.1 Breakdown of the ecological footprint of a citizen of Cardiff, United Kingdom.

resources to go around. The United Nations is predicting that in 2050 the global population will be between 9.4 and 10.2 billion, and that by 2100 it will have risen to between 9.6 and 13.2 billion (UN DESA, 2017: 12). What the EF tells us is that this is going to be a big problem.

The reason we can live much more resource-intensive lifestyles than those that would result from living sustainably off the land, and relying only on solar energy, is that most people make use of the stored resource of fossil fuels laid down during the age of the dinosaurs. This has led to problems in terms of climate change and the need to curb carbon emissions. The use of this "buried treasure" of oil, gas and coal means that there is no need to make use of renewable resources, and if we did have to use them, they might not be sufficient to support our current wants. The date when humanity's demand in a given year for ecological resources and services exceeds what the Earth can regenerate in that year is known as Earth Overshoot Day (Earth Overshoot Day, 2017). In 2015, demand outstripped supply in mid-August

(WWF, 2016). In 2017, it happened on 2 August (Frangoul, 2017). These ecological resources and services are known as bio-capacity. In 2013, only 55 countries lived within their bio-capacity, while 136 did not (GFN, 2017). Countries that exceed their bio-capacity have to trade for the necessary ecological resources and services.

In the past, local cultures and traditions arose because the ecological resources and services available locally were different. Modern economic globalisation has arisen from the fact that the ideologies of the free market and trade are now commonplace throughout the world (Anon, 2002). People with different backgrounds and cultures in different parts of the world can now compare their apparent living standards with others. Unsurprisingly, as people start to do this, some standards are perceived as better. The assumption is that the best way to achieve these standards is to adopt the work and consumption patterns found in the wealthier regions, which helps the wealthier regions become even wealthier through expanding the markets for the products they make. This conceptual structure, which surreptitiously invites people to join this modern way of living while repudiating their old traditions, may have the same importance that Adam Smith had for the industrial revolution and the rise of capitalism. What the EF reveals is that this may not be possible if the world is to survive into the long-term future. The future requires a reduction in resource-intensive ways of living, not their spread.

How is the EF measured?

The unit of measurement for the EF is the global hectare (gha), which represents an averagely productive hectare of the biologically productive land and water a population needs to produce the renewable resources it uses and to absorb the wastes it creates. The renewable resources are crops, animal products, timber and fish. Also taken into account is the land related to the consumption of energy and the loss of land to built-up areas (usually called degraded land). These are all calculated on an annual basis. Obviously, some land is going to be more productive, either because of the climate or the type of soil, or both. The global hectare accounts for these differences by using world average productivity for each type of productive land. An equivalence factor (gha/ha) is used to translate local hectares into global hectares (Schaefer et al., 2006). These equivalence factors apply to all countries but vary from year to year, not least because of changing weather patterns. We shall return to this in Chapter 8 in the discussion of how the EFs in this book were calculated.

Wildlife

People are not the only inhabitants of planet earth. Other creatures also need the resources and services of eco-systems for their own survival. How much land should be left aside for biodiversity, representing the 30 million species other than human beings that live on earth (Wackernagel et al., 1999)? In 1987, almost 4 per cent of the world's land area was protected or managed to conserve species (WCED, 1987: 146). The World Commission on Environment and Development recommended that this protected area needed to be tripled (WCED, 1987: 166). This has led to those engaged in EF accounting setting aside 12 per cent of all productive land and water for other species in their calculations (Wackernagel et al., 1999).

Carbon footprint

Energy is a component of the EF, but with climate change and the need to reduce greenhouse gas (GHG) emissions, carbon footprint (CF) is now often discussed separately from EF. What is crucial is that EF and CF are not measuring the same thing and should never be confused. The CF is a measure of the GHG emissions resulting from using something like a domestic appliance or that are emitted during a service, such as taking a flight. The CF is measured in kg or tonnes of carbon dioxide (CO_2) or CO_2 equivalent. This can then be converted into the gha needed to absorb or sequester this quantity of CO_2 to prevent it going into the atmosphere and adding to global warming. CF renders something hard to visualise—a tonne of invisible gas—into something much easier—an area of land. A problem with this approach is that if we sequester the GHG emissions in plants or trees and if these rot or are burnt, the GHG will return to the atmosphere, so to absorb GHG emissions more land needs to be set aside for the cyclical process of growth and decay.

Top-down and bottom-up

Before we leave this general discussion of EF, it is important to note that it is generally calculated in one of two ways—top-down and bottom-up. National EFs can be calculated from national statistics and allow for imports and exports—how much food a country grows and consumes, how much energy it generates and consumes, and how much energy and resources go into the goods it produces and trades (Wackernagel et al., 1999). This can then be compared with the area of biologically productive land it has available, accounting for the built-up land occupied by human settlement.

The other way to measure EF is a bottom-up process, and this forms the basis of personal EF online calculators (GFN, n.d.; WWF, n.d.). The aim is first to find out what you do, how far you travel, how much energy you use, how much stuff you have and what you eat, and then to calculate the impact of this based on national data. This is the approach taken in this book by asking people how they live and what they do on a daily basis. It is much harder to capture all information using this approach, but the aim with the stories in this book is to calculate all EF impacts on a similar basis so that they can be compared (see Chapter 9) and the impact of how we live can be revealed.

What does the EF teach us?

Given all the problems of collecting the information and calculating an EF, is it really useful? EFs are always out of date as they are based on past data. The real advantage of knowing the EF of a person, or even a product, is that similar things can be compared and lessons learnt about what we might have to do if we are truly serious about not living beyond our means by constantly overshooting the earth's sustainably produced resources.

Three centuries ago, people around the world shared a roughly similar quality of life and had roughly similar environmental impacts. The industrial revolution not only increased the disparity between people in the same area because of increased differences in earnings but also created a major difference between the environmental impacts of people in different parts of the world. Today, a simple way of living, without engaging in consumerism, is generally perceived as backward and old-fashioned. The perception that engaging in the consumerist way of life is the natural progression from the simplicity of the past has had dramatic consequences for the environment. Environmental consciousness has been increasing (Kachur et al., 2010), which has led to attempts to make the modern consumerist lifestyle more sustainable through the environmental labelling of consumer products. These labels are another facet of consumerism, and it is sometimes now considered fashionable to wear, live in or drive something "environmentally friendly". However, labelling a product is not the same as labelling the impact of a whole lifestyle. The EF reveals whether labelling is really sufficient to reduce the impact or whether, to make a difference, we have to face up to the idea of not having the consumer products.

This book sets out to promote discussion about the impact of a whole lifestyle through comparing and measuring the same basic activities in societies with very different environmental impacts, using the EF. People may live in different climates and have different governments but they still tend to live in similar ways. They engage in economic activities to earn money, they raise children, they celebrate, they worship, they even play similar sports, but despite these very similar habits, their environmental impacts are remarkably different.

Through the stories in this book of similar behaviours in different societies, the objective is to explain why some cultures have lower environmental impacts than others. Scenarios will emerge of ways of living with a lower environmental impact. The aim is to make these scenarios more than just numbers, through describing what a low-impact world might look like based on real examples. The stories have deliberately been drawn from low- and high-EF societies and from all urbanised continents.

The book starts with the stories, arranged alphabetically by continent and country. Following the stories from six continents, Chapter 8 deals with how the EFs were calculated. Chapter 9 looks at the results. Chapters 10–14 discuss the aspects of the EF that relate to daily life—food, energy, travel, the dwelling and consumer goods. Chapter 15 ends by discussing what the stories and the EFs tell us about living within the resources and eco-systems services of our only planet, the home of humanity.

References

Allan T (2005) *Life, Myth, and Art in Ancient Rome*, Los Angeles: Getty Publications.
Anon (2002) Time to rethink everything, *New Scientist*, 174(2340), pp. 29–52.

Antonini C and Argilès-Bosch J M (2017) Productivity and environmental costs from intensification of farming. A panel data analysis across EU regions, *Journal of Cleaner Production*, 140(2), pp. 796–803.

Antoniou G P, Lyberatos G, Kantetaki E I, Kaiafa A, Voudouris K and Angelakis A N (2014) History of urban wastewater and stormwater sanitation technologies in Hellas, in Angelakis A N and Rose J B (eds) *Evolution of Sanitation and Wastewater Technologies Through the Centuries*, London: IWA Publishing, pp. 99–146.

Census India (2011) Provisional population totals: urban agglomerations and cities, available at http://censusindia.gov.in/2011-prov-results/paper2/data_files/India2/1.%20Data%20Highlight.pdf, accessed 29 July 2017.

Collins A, Flynn A and Netherwood A (2005) *Reducing Cardiff's Ecological Footprint*, Cardiff: WWF Cymru, Sustainable Development Unit Cardiff Council and The Centre for Business, Relationships, Accountability, Sustainability and Society.

Cox W (2012) Evolving urban form: São Paulo, available at http://www.newgeography.com/content/003054-evolving-urban-form-s%C3%A3o-paulo, accessed 29 July 2017.

Earth Overshoot Day (2017) About Earth Overshoot Day, available at http://www.overshootday.org/about-earth-overshoot-day/, accessed 4 August 2017.

Educational Resources (n.d.) *Two faces of Greece: Athens and Sparta*, available at https://www.pbs.org/empires/thegreeks/educational/lesson1.html, accessed 7 August 2017.

Frangoul A (2017) *It's Earth Overshoot Day: We've used more resources than nature can regenerate in 2017*, available at https://www.cnbc.com/2017/08/02/its-earth-overshoot-day-weve-used-more-resources-than-nature-can-regenerate-in-2017.html, accessed 4 August 2017.

Garcia E J and Vale B (2017) *Unravelling Sustainability and Resilience in the Built Environment*, London: Routledge.

Global Footprint Network (GFN) (n.d.) What is your ecological footprint, available at http://www.footprintcalculator.org/#!/signup, accessed 5 August 2017.

Global Footprint Network (GFN) (2012) *Trends*, available at http://www.footprintnetwork.org/en/index.php/GFN/page/trends, accessed 31 July 2012.

Global Footprint Network (GFN) (2017) Ecological wealth of nations, available at http://www.footprintnetwork.org/content/documents/ecological_footprint_nations/, accessed 4 August 2017.

Gutkind E (1969) *Urban Development in Southern Europe: Italy and Greece*, Toronto: Collier Macmillian.

Hall D (2016) *7 ways to grow potatoes*, available at https://www.rodalesorganiclife.com/garden/7-ways-grow-potatoes, accessed 3 August 2017.

Hubacek K, Guan D, Barrett J and Wiedmann T (2009) Environmental implications of urbanization and lifestyle change in China: Ecological and Water Footprints, *Journal of Cleaner Production* 17(14), pp.1241–1248.

Jacobs J (1969) *The Economy of Cities*, New York: Random House.

Kachur M, Bruck D and Hesedahl J (2010) Acoustical materials for a green world: The sustainable design transformation of the architectural acoustics industry, *The Journal of the Acoustical Society of America*, 127(3), p. 1723.

Kay P (2014) The creation of 'material complexity', in Kay P (ed.) *Rome's Economic Revolution*, Oxford Scholarship Online, DOI:10.1093/acprof: oso/9780199681549.001.0001.

Reisemann S (ed.) (2007) *Sustainable Metals Management: Securing Our Future – Steps Towards a Closed Loop Economy*, Dordrecht: Springer e-book, pp. 97–113.

Montillo P (1956) *Historia Antigua*, Buenos Aires: Buenos Aires Libre.

Mortazavi M (2010) From ancient to modern urbanization: Intermediary function of an urban society, *Journal of Historical Archaeology*, 15(1), 126–137.

Old Bailey Proceedings (2015) *A population history of London*, available at https://www.oldbaileyonline.org/static/Population-history-of-london.jsp#a1715-1760, accessed 27 July 2015.

Parks and Gardens UK (n.d.) *Night soil and other euphemisms…*, available at https://parksandgardensuk.wordpress.com/2015/07/11/night-soil-and-other-euphemisms/, accessed 27 July 2017.

Pelletier N, Audsley E, Brodt S. Garnett T, Henriksson P, Kendall A, Kramer K J, Murphy D, Nemecek T and Troell M (2011) Energy intensity of agriculture and food systems, *Annual Review of Environment and Resources* 36, pp. 223–246.

Pleasant B (2015) A simple way to get high yields of potatoes, available at https://www.growveg.com.au/guides/a-simple-way-to-get-high-yields-of-potatoes/, accessed 3 August 2017.

Rees W E and Moore J (2013) Ecological footprints and urbanization, in Vale R and Vale B (eds) *Living within a Fair Share Ecological Footprint*, London: Routledge, pp. 3–32.

Renfrew J (2004) *Roman Cookery: Recipes and History*, London: English Heritage.

Schaefer F, Luksch U, Steibach N, Cabeça and Hanauer J (2006) *Ecological Footprint and Biocapacity*, Luxembourg: European Communities.

Snapzu (n.d.) *How much room the entire world population would take up if standing side by side*, available at https://snapzu.com/geoleo/how-much-room-the-entire-world-population-would-take-up-if-standing-side-by-side, accessed 3 August 2017.

Statista (2017) *Average purchase per person per week of fresh potatoes in the United Kingdom (UK) from 2006 to 2015 (in grams)*, available at https://www.statista.com/statistics/284391/weekly-household-consumption-of-fresh-potatoes-in-the-united-kingdom-uk/, accessed 3 August 2017.

United Nations (2015) *Urban and Rural Population by Age and Sex, 1980-2015*, New York: United Nations.

United Nations Department of Economic and Social Affairs (UN DESA) (2017) *World Population Prospects: The 2017 Revision*, New York: United Nations.

United Nations Economic and Social Council (2017) Commission on Population and Development, available at https://digitallibrary.un.org/record/858729/files/E_CN.9_2017_5-EN.pdf, accessed 13 December 2017.

United States Census Bureau (2016) Urban and Rural, available at https://www.census.gov/geo/reference/urban-rural.html, accessed 29 July 2017.

Vale B and Vale R (2013) 'I wouldn't start from here…', in Vale R and Vale B (eds) *Living within a Fair Share Ecological Footprint*, London: Routledge, pp. 319–321.

Vince G (2012) *The high cost of our throwaway culture*, available at http://www.bbc.com/future/story/20121129-the-cost-of-our-throwaway-culture, accessed 28 July 2017.

Wackernagel M and Rees W E (1996) *Our Ecological Footprint*, Gabriola Island: New Society Publishing.

Wackernagel M, Onisto L, Bello P, Linares A, Falfan I, Garcia J, Guerrero A and Guerrero M (1999) National natural capital accounting with the ecological footprint concept, *Ecological Economics* 29, pp. 375–390.

World Wildlife Fund (WWF) (n.d.) *How big is your environmental footprint?*, available at http://footprint.wwf.org.uk/, accessed 5 August 2017.

World Wildlife Fund (WWF) (2016) Overshoot Day, available at http://www.worldwildlife.org/pages/overshoot-day, accessed 8 June 2016.

World Commission of Environment and Development (WCED) (1987) *Our Common Future*, Oxford: Oxford University Press.

Worldometers (2017) World population, available at http://www.worldometers.info/, accessed 4 August 2017.