Exercises: Chapter 11

Have a go at adapting and reshaping structures to find a solution to the problem outlined below.

Sustainability and biodiversity

How can we most effectively reduce the strain on biodiversity and sustainability?

In Chapter 4 we generated our own ideas on the problem of sustainability and biodiversity. Our concern has been to find the connections between our ideas and the structure this creates, through which we organise our thinking. Once we have revealed this, we can then begin to adapt and reshape it to find the solution. Now, using the structure you have created, take one of the four strategies in Chapter 11 to adapt it to find a solution (see. p. 3 for a reminder of these).

If you're not happy with the ideas you've generated and the structure you've created, read the following material and take structures from these. I've included those that I've made, but only to help you if you find it difficult to see the structures in the passages below (see file 'Chapter 11 – Structures'). Then take a structure and use one of the four strategies to adapt it to find a solution.

Notes

Population

The United Nations estimates that the world's population will grow by 2.9 billion over the next 33 years and then by a further 3 billion by the end of the century. According to the UN much of humanity is young and fertile. The median age of Nigeria is 18, and under 20 across all Africa's 54 countries; the fertility rate of the 500m women in Africa is 4.4 births. In India half the population is under 25 and Latin America's average age is 29. In 2007 Mali's population growth rate was nearly 3% pa with an annual birth rate of around 50 per 1000 and a death rate of only around 17 per 1000. The fertility rate was over seven children per woman. This means the doubling of the population every 25 years.

In contrast, European countries are experiencing declining birth rates and ageing populations – Italy, the home of the Catholic Church, has the lowest fertility rate in the world at just 1.2. There are 60 other countries that have fertility rates below replacement levels.

So, why is it that the poorest nations in the world have the highest fertility rates? Why do the poorest families have the largest families? There appear to be a number of reasons for this, social, cultural, religious and economic. In most developing countries there is a high child mortality rate. In Burkina Faso it stands at 8.9% and in Haiti at 6.9% compared with developed countries, like Australia, where it is only 0.4%. Parents compensate for this by having larger families as they did in nineteenth century Britain during the Industrial Revolution.

However, despite the importance of this, the key factor appears to be the limited access to education for women. With the benefits of education women are more likely to use contraception, marry later and have fewer children. Without the influence of education to overcome them, religious and social norms limit access to family planning, while families choose not to use contraceptives. In Burkina Faso only a third of the population can read and write and the average

family has five to six children. In Australia 99% of the population can read and write and the average family size is 1.77 children.

Although we would need more to establish a causal connection here, it's clear that education has encouraged more to challenge the traditional gender expectations. A woman's role is more often seen as just a wife and mother, so children marry earlier. In developing countries one in three girls marry before they are 18, which typically brings an end to their education and, as a result, limits their life chances.

No doubt one reason for such traditional gender expectations is that these tend to be agrarian societies, in which farming is labour intensive. The cheaper and more convenient alternative to hiring extra labour is to have more children to provide more farm hands. The cost of raising children is lower than it is in modern societies, where children need to be educated for 20 years to do productive work. What's more, in many societies there are no government pensions or social security benefit; therefore parents depend on children to care for them in old age. As this suggests, unlike developed economies, in these societies there are fewer competing social ties, so the family remains the strongest and people are encouraged to have children.

Biodiversity/ Sustainability

A major UN biodiversity study concluded recently that the rate of decline of the world's biodiversity, which threatens to erode our ability to provide food, water and security for billions of people, should be considered on the same scale as the threat posed by climate change. The study has a number of alarming findings: the exploitable fisheries in the world's most populous region – Asia-Pacific – are expected to decline to zero by 2048; the availability of freshwater in the Americas has halved since the 1950s; and 42% of land species in Europe have declined in the past decade. The situation cannot be maintained for long – years possibly, but not decades. In particular, bird populations across the French countryside have fallen by a third over the last decade and a half. France's National Museum of Natural History described the wipeout as on 'a level approaching an ecological catastrophe'. Researchers believe the principal culprit is the intensive use of pesticides, especially on wheat and corn crops, which destroys the insects on which the birds depend for food.

In addition to the use of chemicals, habitat loss, as forests have been converted to croplands and wetlands to shrimp farms, has had a devastating cost to pollinating insects and oxygen-producing plants. Over 130m hectares of rainforests have been lost since the 1990s and dozens of species are lost every day. And the rate of decline is accelerating. In the Americas, which has 40% of the remaining diversity, the population is consuming resources at twice the rate of the global average.

Biodiversity and the ecosystem services it supports are the foundation of life on Earth. Biologist Paul Ehrlich warned that civilisation collapse is a 'near certainty' in the next few decades due to the destruction of the natural world. The authors of the UN report urge an end to subsidies for agriculture and energy that encourage unsustainable production. Mark Rounsevell, co-chair of the European assessment in the report, argued 'We are responsible for all of the decline of biodiversity. We need to decouple economic growth from degradation of nature. We need to measure wealth beyond economic indicators.'

Food production

There is enough food produced to feed everyone, yet almost one billion people go hungry every year and 2.3m children die from malnutrition. So the problem appears to be the unequal distribution

of resources. Rich countries, which constitute around a quarter of the world's population, consume about half of the world's agricultural products, largely because they convert more crops into meat. This, as most people realise, is an uneconomical use of the food that is grown on the planet. It takes two kilos of grain to produce one kilo of chicken, four kilos to produce a kilo of pork and seven kilos to produce a kilo of beef.

In 1997 a Cornell study revealed that 800m people could be fed with the grain used to fatten up US livestock. The majority of corn and soy grown in the world is now set aside for cattle, pigs and chickens. More than one billion people have to survive on less than $1 a day, while farmers receive a $2 subsidy a day on every cow in the EU.

The alternative of grazing animals is, unfortunately, stupendously wasteful. Around twice the world's surface is used for grazing as it is used for the growing of crops. However, animals fed entirely on pasture produce just one gram of the 81 grams of protein consumed per person per day. For example, in the UK sheep supply about 1% of the nation's diet in terms of calories, yet they occupy 4m hectares of the uplands, which is more or less equivalent to all the land under crops in the UK.

All of this contributes to the catastrophic decline in natural habitat and to the decline in the diversity and abundance of wild life. It also has a significant impact on global warming. There are estimated to be 3.7bn ruminants in the world, mostly sheep, cattle, goats and a smaller number of buffaloes. This represents a 50% increase in half a century. Livestock produces methane gas, the single biggest human related source of greenhouse gases, which is 30 times more potent than carbon dioxide in warming the planet. Moreover, CO_2 emissions increase as forests are cleared for cattle farms. The return of forests, wetlands and savannahs is likely to absorb far more carbon than even the most sophisticated forms of grazing.

Climate change

According to a recent report by the European Academies' Science Advisory Council, global floods and extreme rainfall events have increased by more than 50% this decade. They are now occurring at a rate four times higher than in 1980. Storms, droughts and heat waves have increased by more than a third and are now being recorded twice as frequently as in 1980. The report also shows that events resulting in climate-related loss and damage have risen by 92% since 2010.

Of course, these four sections of notes are not a comprehensive account of all the factors that contribute to the problem, but we probably have enough to work with to come up with solutions.

The problem

Now that you have your structure, work through the four strategies.

To remind you, they are:

1. Change the structure:
   - **1.1** Split it up
   - **1.2** Rearrange it
   - **1.3** Reinterpret it
2. Approach it from a different direction:

2.1 Turn it upside down
2.2 Inside out
2.3 Back to front
3 Start from a different point
4 Create a new structure
4.1 Combine structures
4.2 Change the basic concept

Suggestions/Answers:

Strategy 1: Change the structure

This involves changing the structure by splitting it up, rearranging it or reinterpreting it.

Split it up

The problem I have presented is large and complex, so, perhaps, the most obvious strategy that is likely to produce a solution is to split it up into smaller problems each of which might offer more obvious solutions. This problem is made up of three smaller problems: how to control population growth; how to use resources more efficiently, in a more sustainable way; and how to encourage consumption that is less demanding on resources.

1.1 Controlling population growth

It would appear the obvious way to control population growth is to weaken the need to have large families. One of the most effective ways of doing this is to give women more opportunities to do more with their lives. To do this, governments would need to improve women's rights and access to education. This appears to be a key factor in reducing the size of families and fertility rates. Evidence suggests that with more opportunity to do other things women are more likely to postpone having a family and to have smaller families, particularly when this is backed by government policy to encourage smaller families with birth control policies, clinics, free contraceptives, advice and education. Some of the fastest rates of fertility decline has been in African countries, like Rwanda, Ethiopia and Malawi, where these policies have been adopted.

To persuade governments, international organisations use the argument of the 'demographic dividend'. When fertility falls the proportion of children decreases sharply, while the share of older adults initially remains quite low. Consequently the share of the working age population increases considerably, giving the country the opportunity to develop its economy. Although only temporary, some countries, like China, have benefited from the opportunity with a demographic dividend of between 10% and 30% of their economic growth. But it does depend on governments creating enough jobs to employ the additional numbers of working age people. It would also need governments to help farmers with grants to improve the efficiency of their farming with new methods and technology to make it less labour intensive so that they are not so reliant on large families as a source of cheap labour.

1.2 Using resources more efficiently, in a more sustainable way

The number of pollinators has been falling dramatically in recent years, which is blamed, at least partly, on the widespread use of pesticides. Bees and other insects are vital for food production as they pollinate three-quarters of all crops. So one obvious solution would be to ban such pesticides and encourage farmers to explore alternative approaches to crop protection.

In 2013 the EU banned the use of neonicotinoids on flowering crops that attract bees, such as oil seed rape. But in February 2018, EU risk assessors reported that the high risk to both honeybees and wild bees resulted from any outdoor use, because the pesticides contaminate soil and water. This leads to the pesticides appearing in wildflowers or succeeding crops. Another study of honey samples revealed global contamination by neonicotinoids. In response to this and after a petition signed by over 5 million people was presented by the campaigning group Avaaz, the EU agreed to ban bee-harming pesticides.

1.3 Encouraging consumption that is less demanding on resources

Although unrealistic, at least in the short term, the obvious way to achieve this is to end all animal farming. It would help reverse the catastrophic decline in natural habitat and the decline in diversity and abundance of wild life.

Moreover, carbon emissions increase as forests are cleared for cattle farms. The return of forests, wetlands and savannahs would probably absorb far more carbon than even the most sophisticated forms of grazing. Indeed, it is claimed that eating less meat is a more effective way of cutting CO_2 emissions than even giving up cars. What's more, livestock produces methane gas, the single biggest human related source of greenhouse gases, which is 30 times more potent than carbon dioxide in warming the planet.

There are 3.6 billion ruminants in the world – a rise of over 50% in half a century. Livestock methane can be addressed by reducing the demand for meat that is coming particularly from developing countries as the per capita income rises and consumers want to emulate the lifestyle of those in the west. Reducing the demand for meat can be done either by incentives or disincentives, or a combination of both. The obvious disincentive is to introduce a tax on meat, while making alternative sources of food much cheaper.

Strategy 2: Approach it from a different direction

This involves turning the structure upside down, inside out or back to front.

Turn it upside down

One solution might be to turn the problem upside down. This means that we reverse the relation between ideas. Rather than devising ways of increasing biodiversity, the solution might lie in emptying large parts of the Earth of its human population. If large areas of the Earth's surface were mostly free of humans, wild plants and animals could live there unimpeded as they did for so many years before the appearance of man. Similarly, we could leave half of the oceans without human intervention – a third of our food comes from the sea, so they have to be able to regenerate without over fishing.

One way of doing this would be carefully managed urbanisation, which in essence means housing large numbers of people on a small patch of land. This may not even have to be imposed as it is happening anyway as more and more people move to cities. However, it would have to be better managed than it is at the moment with city sprawl spreading with unregulated building and poor sanitary conditions. It would present the opportunity to develop genuinely green cities with decarbonised transport, energy generation, recycling schemes and gardens, where communities can grow more of their own food. We would also have to make sure that we can promote biodiversity on the land they leave behind and produce the food that is necessary to feed the growing urban population.

An actual project that has adopted a similar solution is the Queen's Commonwealth Canopy project, which was launched in 2015, when an appeal was made to all 53 Commonwealth nations to contribute areas of indigenous forest to be preserved in perpetuity. Each country was asked to contribute to the canopy by setting up sustainable forest conservation initiatives for future generations. Since then, around 35 Commonwealth countries have dedicated forestry projects or are planting new forests, with another 10 countries in the process of finalising their submissions.

Strategy 3: Start from a different point

Rather than starting at the obvious points in the problem, which address the problems of population growth, how to promote sustainability and biodiversity, and how to use resources more efficiently, we could simple start at a different point. One way of doing this would be to see how the economic system itself could be changed. As we've seen, the emphasis on economic growth and globalised markets encourages cutting back on the forests, overfishing and the disappearance of wetlands, all of which degrades the natural environment, reduces biodiversity and puts in jeopardy our ability to sustain ourselves.

Together this results in a pattern of incentives built into the economic system that encourages inefficient use of resources and subsidies that promote unsustainable agricultural production. One way of tackling the problem, therefore, would be to end subsidies for agriculture and energy that encourage unsustainable production and redesign a pattern of incentives and disincentives to encourage more sustainable agriculture, along with a market that makes sustainable products cheaper and more available.

More controversially, perhaps, evidence suggests that both extreme poverty and extreme wealth damage biodiversity. Both appear to promote patterns of consumption that are unsustainable. Addressing the problem of social and economic inequality, therefore, might be one way of addressing the problem. This would involve making sure that people have enough income, while redistributing some of the income of those who are inordinately rich through progressive taxation. Recent figures show that 42 people hold as much wealth as the 3.7 billion who make up the poorest half of the world's population. Of the global wealth generated in 2017, 82% went to the wealthiest 1%.

Strategy 4: Create a new structure

This involves finding a solution by creating a new structure either by combining structures or by changing the basic concepts of the problem.

Change the basic concepts

In Chapter 11 I suggested one solution might be to re-examine how we define economic growth. Most politicians insist on the importance of promoting economic growth as the key economic measure of progress. But the way we define and measure it almost inevitably ties it to the degradation of nature. So it seems an obvious solution would be to adopt a different definition of this key concept that decouples economic growth from the degradation of the natural environment. This suggests that we need to measure wealth and growth in terms other than economic indicators or at least not exclusively in these terms.

For example, over recent years Iceland, the supermarket chain, have announced that they would stop using palm oil in own-brand products by the end of 2018. Palm oil is used in almost half the products stocked by UK supermarkets and can be found in everything from shampoos to biscuits as well as biofuels. The company announced that growing demand for the oil was devastating tropical rainforests across Southeast Asia.

The production of palm oil is said to have been responsible for about 8% of the world's deforestation between 1990 and 2008. Burning large areas of forests to clear areas where oil palms can be grown has also been blamed for high levels of air pollution in Southeast Asia. In some regions, deforestation has left species that lived in virgin forest without a home. One species affected by palm oil production is the orangutan population. What's more, some palm plantations have been developed without consulting local communities over the use of their land, even causing them to be forcibly displaced. Putting these concerns ahead of exclusively economic effects, Richard Walker, Iceland managing director, said the move would increase costs but they would not be passed onto customers: 'There will be an extra cost but we think it's the right thing to do.'

To do the same when we come to measure progress, would mean, as I suggested above, that we have to define it in terms other than economic indicators or at least not exclusively in these terms. But what might these be – what would be a better measure of progress? Living within the earth's means? Reducing the levels

of poverty and hunger? Reducing the threat of climate change? Or, perhaps, some measure of happiness? In Chapter 11 I cited the example of Bhutan, a country that has, since 1971, rejected GDP as the only way to measure progress. Instead, it measures progress through the formal principles of gross national happiness (GNH) and the spiritual, physical, social and environmental health of its citizens and natural environment.

Some redefinition of this kind that put the sustainable environment and biodiversity at the centre of what we describe as progress would certainly go a long way towards solving the problem. That seems to be exactly what campaigners have been trying to do over the last 10 to 20 years as they sought to ensure that climate change was at the centre of any notion of growth and economic progress.