New Direction
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## GREEN CAPITALISM

# HOW TO PROTECT THE ENVIRONMENT BY DEFINING PRIVATE PROPERTY RIGHTS

HANNES H. GISSURARSON

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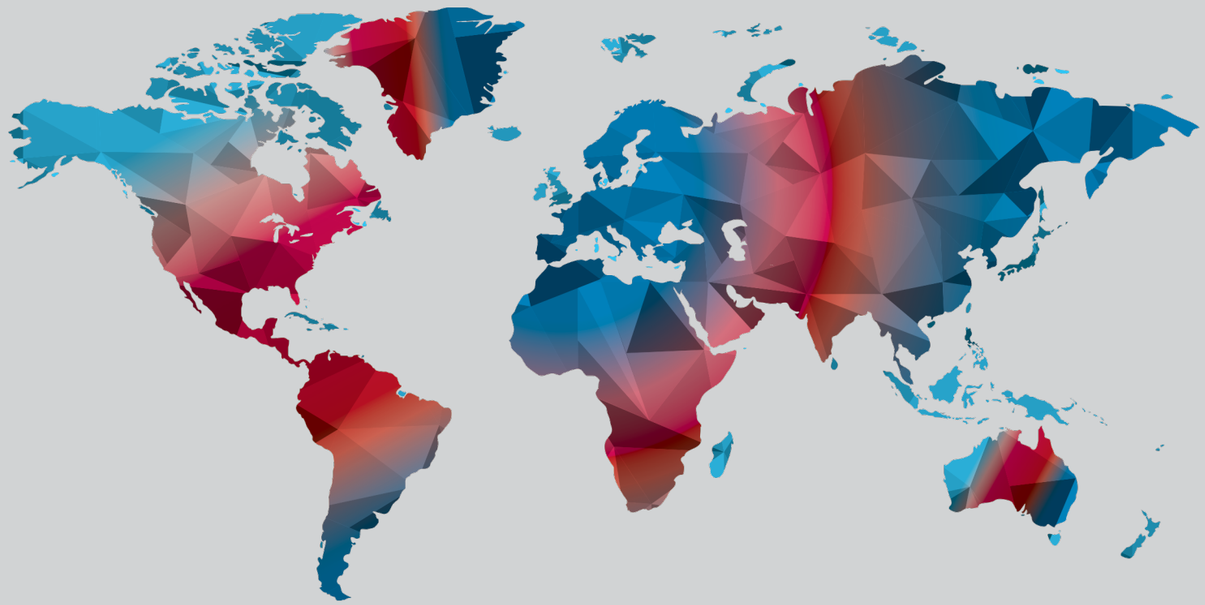
# New Direction



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1

# INTRODUCTION

Every day we are told by newscasters, teachers in classrooms and scholars at conferences that our environment is being destroyed by unbridled capitalism and that we need some kind of central economic planning to save it. We are told that we also as consumers have to reduce significantly our needs that are now being so efficiently satisfied for warm houses, fast cars, electrical appliances and various industrial products. Is this so? It was in the autumn of 1980 when I first seriously began to think about all these claims. Then a university student in my twenties, I had been invited to a conference at Thingvellir, the old parliamentary site of Iceland, about what Iceland would look like in the year 2000. From the podium one speaker after another observed that the problem of overfishing could not be solved by capitalism. Overfishing was a particularly serious problem for the Icelanders, a nation of hardy fishermen supporting themselves mainly by harvesting fish in the fertile fishing grounds off the island and exporting it to Europe and North America.

I had been studying works by the Austrian economists, Ludwig von Mises and Friedrich A. Hayek, staunch supporters of the free market order (although they disliked the term capitalism invented by socialist critics).[1] They basically taught that the best remedy for freedom was more freedom. If a flaw was identified in capitalism, then on closer analysis it usually turned out to be derived either from misguided government intervention, such as protecting monopolies or limiting competition, or from the lack of recognised rules that would enable individuals to resolve their problems by mutual agreement. The question which, therefore, crossed my mind while listening to the speakers at the conference worrying about overfishing was: could the problem not be solved by defining property rights either to the fish stocks roaming around in the Icelandic waters or to particular fishing grounds in them?

When I innocently asked this question at the conference, I was met with laughter and derision and mocked in a newspaper a few days later.[2] The idea was regarded as absurd. But in the next couple of years when I started reading more about natural resource economics and also observing the development of the Icelandic fisheries, I saw that this idea was not only feasible but that it was already being implemented in Iceland. So-called individual quotas had been allocated in pelagic fisheries for herring and capelin and were being made transferable. In the more economically more important demersal fisheries for cod, saithe, haddock, redfish and halibut, individual transferable quotas were first allocated in 1984, and a comprehensive system of individual transferable quotas, ITQs as they are called, was introduced in the Icelandic fisheries in 1990. The ITQs were use rights held by the owners of fishing boats: each owner had a right (which he could sell to other fishermen) to harvest over the season a given proportion of the total allowable catch set on the advice of marine biologists by the Fisheries Directorate. These use rights could be interpreted to be emergent private property rights to the fish stocks roaming around in the Icelandic waters.

My more general interest in environmental issues was awakened by the problem of overfishing and its solution in Iceland (and New Zealand, which at the other side of the globe developed a similar system).[3] Could some environmental problems not be solved by defining property rights to them, enabling individuals to resolve these problems without much, if any, government intervention? It had long been recognised, for example, that land is utilised more carefully and properly when privately owned, whereas attempts in Russia and China to create collective ownership to it in the 20th century ended in disasters.[4] Most livestock is also privately owned. The methods of fencing and branding are used to define the owners. For example, with barbed wire private property rights, land became more feasible than before in the American West.[5] But what about other natural resources, such as rivers with salmon or mountain pastures with sheep? Or about endangered species, 'charismatic megafauna' like whales, elephants and rhinos? When such environmental problems are analysed, fascinating practical and moral issues arise on technical and political feasibility and initial allocation. Some of them have been dealt with in detail by economists Ronald Coase, Harold Demsetz and Paul Samuelson to mention a few, others by philosophers, such as John Locke, Jean-Jacques Rousseau and Henry George.

It was therefore with pleasure that I accepted the invitation of Naweed Khan of the Brussels think-tank New Direction to write a report on 'green capitalism', or how the mechanisms of the free market can be used to solve or at least reduce environmental problems, such as depletion of natural resources, pollution and possible extinction of valuable species. My argument in this report is that we certainly, not least in our own interest, should strive to take care of nature and protect the environment. Such an approach could be called 'wise use environmentalism' in contrast to 'ecofundamentalism', which puts nature above man and replaces conservation with preservation at any cost.[6] In making my argument, I draw on my own research about the Icelandic fish stocks, on the 'free market environmentalism', which is often associated with the Property and Environment Research Center (PERC) in Bozeman, Montana, and on a series of papers on the environment published by the Institute of Economic Affairs (IEA) in London. In particular I have benefited from the writings of, and discussions with, Terry Anderson, Gary Libecap, and Bruce Yandle at PERC and Roger Bate and Julian Morris, formerly at IEA. I also have been influenced by books on some of these issues by Bjørn Lomborg, Matthew Ridley, Rognvaldur Hannesson and Johan Norberg.

This report is divided into four main parts. In the first part I discuss the common claim that our environment is being destroyed and recall dire predictions about the future, trying to explain their emotional roots. In the second part I describe the main tenets of 'wise use environmentalism' and the economic and political case for private property rights. In the third part I analyse solutions that have been developed in Iceland to the problem of common-pool or non-exclusive resources, such as mountain pastures, salmon rivers and, most importantly, offshore fisheries.[7] In the fourth part I turn to exotic wildlife, whales, elephants, and rhinos and argue that the best way to conserve these valuable species is by defining some kind of use rights to them, akin to private property rights, and to allow trade in their products. Finally, I offer some recommendations on the basis of the report.

Rio de Janeiro, 29 December 2017.
*Hannes H. Gissurarson.*

1 Ludwig von Mises, *Socialism* (London: Jonathan Cape, 1969); Friedrich A. Hayek, *The Road to Serfdom* (London: Routledge & Kegan Paul, 1944), and *The Constitution of Liberty* (London: Routledge & Kegan Paul, 1960).

2 Arni Bergmann, Thadan hafa their ljosid [Thence They Have the Light], *Thjodviljinn* 14 November 1980.

3 Philip J. Major, The Evolution of ITQs in New Zealand, eds. Ragnar Arnason and Hannes H. Gissurarson, *Individual Transferable Quotas in Theory and Practice* (Reykjavik: University of Iceland Press, 1999), pp. 81–102.

4 Robert Conquest, *Harvest of Sorrow: Soviet collectivization and the terror-famine* (London: Hutchinson, 1987); Frank H. Dikötter, *Mao's Great Famine* (London: Bloomsbury, 2010).

5 Terry Anderson and Peter J. Hill, *The Not So Wild, Wild West* (Palo Alto CA: Stanford University Press, 2004).

6 Rognvaldur Hannesson, *Ecofundamentalism: A Critique of Extreme Environmentalism* (Lanham : Lexington Books, 2014).

7 I there draw on my book, *The Icelandic Fisheries: Sustainable and Profitable* (Reykjavik: University of Iceland Press, 2015).

2

# THE NOT-SO-SILENT SPRING

While wise use environmentalism teaches that people, in their own interest, should strive to take care of nature and protect the environment, ecofundamentalism puts nature above man and replaces conservation with preservation that, it seems, is pursued at any cost. Arguably, the modern ecofundamentalist movement began in 1962 with a veritable clarion call from marine biologist Rachel Carson. Her book, *Silent Spring*, was a powerful, well-written indictment of insecticides, mainly DDT, which had been developed in the Second World War against malaria, typhus and yellow fever, transmitted by mosquitos.[8] After the war, DDT was not only being used to fight malaria in developing countries, but it was also being used as a pesticide in agriculture, especially in the United States. Carson eloquently argued that DDT and other pesticides were used indiscriminately without any knowledge of their dangerous side effects. One of the worst of these side effects, she said, was that birds died or became sterile. 'Over increasingly large areas of the United States, spring now comes unheralded by the return of the birds, and the early mornings are strangely silent where once they were filled with the beauty of bird song.'[9] Even the national symbol, the eagle, was in danger, according to Carson. When DDT was sprayed over fields in order to kill insects, it inevitably spread elsewhere, harming animals and plants. Carson pointed out that the chemical entered the human body in food, especially animal fat: 'As matters stand now, we are in little better position than the guests of the Borgias.'[10] The Borgias in Italy were, of course, notorious for poisoning their guests.

Carson suggested that DDT might cause genetic defects and even trigger cancer (be, in other words, a carcinogen). Pesticides such as DDT upset the natural balance of nature, she said. 'As crude a weapon as the cave man's club, the chemical barrage has been hurled against the fabric of life – a fabric on the one hand delicate and destructible, on the other miraculously tough and resilient, and capable of striking back in unexpected ways.'[11] Carson also pointed out that some insects developed resistance to pesticides and that they might multiply faster than other insects. *Silent Spring*, with its singular combination of an inspirational, almost poetic text and a recognised basis in biology, became a bestseller in the United States. Some scientists criticised the author for exaggerating the danger of insecticides, while others agreed with her. Public opinion was, however, strongly on her side: who could be in favour of toxins? Who did not want birds to sing? In 1972 the use of DDT as a pesticide in agriculture was banned in the United States. Soon other countries followed the example of the United States, and in 2004, the Stockholm Convention on Persistent Organic Pollutants announced an international ban on DDT in agriculture, while the chemical was still allowed in a few places in the fight against malaria.

Carson was not a fully-fledged ecofundamentalist. She could be regarded to some extent as a wise use environmentalist. Her book served the useful purpose of drawing attention to the harm that people certainly could inflict on the environment. But unfortunately those scientists who criticised Carson for exaggerating the danger of DDT were right. It is true that DDT can cause temporary sterility of birds in areas where the chemical is excessively used. But fertility returns when the use is stopped. The possible harm from DDT is, therefore, in no way final or irreversible. The main point is however that DDT, in moderate doses, does not cause any harm to human beings. The DDT expert Kenneth Mellanby used to eat a pinch of DDT at every lecture he gave on the chemical over a period of 40 years.[12]

8 Rachel Carson, *Silent Spring* (Boston: Houghton Mifflin, 2002 [1962], 40th anniversary edition).

9 Ibid., p. 103.

10 Ibid., p. 184.

11 Ibid., p. 297.

12 Richard Tren and Roger Bate, *Malaria and the DDT Story* (London: Institute of Economic Affairs, 2001), p. 46. In this chapter, I am greatly indebted to their account.

13 A. G. Smith, How Toxic Is DDT? *The Lancet*, Vol. 356, No. 9226 (22 July 2000), pp. 267–268.

14 Bjørn Lomborg, *The Skeptical Environmentalist* (Cambridge: Cambridge University Press, 2001), p. 247.

DDT is the most effective chemical man has developed to kill mosquitos which infect human beings with malaria. In the last quarter of the 20th century malaria may have cost the lives of fifty million people, mostly children in poor countries. In the 1970s, under the influence of Rachel Carson, many countries banned DDT even though it is harmless for human beings. (If used excessively in agriculture, it may cause temporary infertility of birds.) A new disease, zika, is also threatening people in tropical and subtropical countries.

DDT is a toxin, but it has not been shown to be a carcinogen despite many attempts to prove the contrary.[13] Scientists certainly have been able to identify some carcinogens: smoking increases the risk of lung cancer and exposure to tropical sun the risk of skin cancer, for example. But toxins are much less of a risk factor than, for example, coffee and other common consumption goods. A relatively small amount of toxins are found in the human body and their harmful effects seem negligible. Danish statistician Bjørn Lomborg points out that if all toxins were banned, then they presumably would disappear from the human diet. But the ban would be very costly, because toxins can be very useful for their designed purposes. For example, such a ban on toxics would require the cultivation of much larger areas of land than at present. The ban would also paradoxically increase the number of deaths from cancer, because the price of fruits and vegetables would rise, and these two kinds of food reduce the risk of cancer significantly.[14]

Whereas DDT does not seem in any way to cause cancer, it certainly prevents malaria, one of the worst infectious diseases known to mankind. Indeed, the Swiss chemist responsible for developing DDT, Paul Hermann Müller, was awarded the 1948 Nobel Prize in Chemistry for saving the lives of millions of people during the war. The danger of malaria is strongest in tropical wetlands where mosquitos transmitting the disease thrive. DDT, a colourless and odourless chemical, is actually highly effective against malaria as it kills the mosquitos. It was, therefore, widely used in developing countries in the 1950s and 1960s. In Sri Lanka, for example, DDT spraying began in 1946, and within 10 years its use cut down the incidence of malaria from three million to 7,300, and it eliminated

Danish statistician Bjørn Lomborg, using mostly official figures from UN agencies and various governments, showed that many dire predictions by ecofundamentalists about an impending environmental disaster had turned out to be baseless. Photo: Emil Jupin, Lomborg homepage.

all malaria deaths. By 1964 the number of malaria cases reduced to just 29. In India the number of cases was brought down from 75 million in 1951 to around 50,000 in 1961.[15] The enormous success of DDT caused, however, some complacency and over-reliance on the chemical, as authorities neglected to drain wetlands, erect physical barriers against mosquitos (such as screens and nets) and use anti-malarial agents. In Sri Lanka spraying was stopped in 1964, as the authorities believed they had eradicated the disease. The consequence, sadly, was that five years later the number of malaria cases had increased to half a million.

In the 1970s, most countries followed the lead of the United States and banned use of DDT. Some Western countries even made it a precondition for aid to developing countries that they banned DDT. The consequences were horrible. It is estimated that between one and three million people died of malaria each year, mostly children. These people would have survived if DDT had been allowed. DDT is much cheaper and easier to use than other ways of fighting malaria, such as nets and drugs. The chemical is nowadays not sprayed over fields and forests, but on walls inside houses where it poses no danger to people, animals or plants. It is true that some mosquitos have developed resistance to DDT, but the chemical, nevertheless, repels them so that they tend not to enter houses where DDT has been sprayed on the walls inside.[16] When the World Health Organisation (WHO), after a heated debate in 2006, decided to recommend the use of DDT in the fight against malaria, the disease had needlessly claimed the lives of almost 50 million people in the preceding quarter of a century. Under pressure from preservationist environmental organisations, WHO cancelled its recommendation in 2009, but did not take measures actively against the use of DDT.[17]

There is little doubt that Rachel Carson had a point. DDT was used excessively in American agriculture in the 1950s, with some harmful effects, especially on birdlife. But the reaction against it was exaggerated.[18] It became an article of faith that DDT was bad and should be banned. Meanwhile people continued to die of malaria. In 2016 there were an estimated 216 million cases of malaria in 91 countries, an increase of five million cases from 2015. Malaria deaths reached 445,000 in 2016.[19] In recent years a new disease has also appeared, Zika, mostly in Brazil and other South American countries, also transmitted, it seems, by mosquitos. The story of DDT illustrates what is wrong with ecofundamentalism: it seeks to preserve nature at the cost of human beings. Wise use environmentalism would prescribe the use of DDT in times and places where it would be appropriate. The birds of North America can continue singing, while potential malaria victims in the tropics should also be heard.

15 Tren and Bate: *Malaria and the DDT Story*, pp. 36–37.

16 Donald R. Roberts and Richard Tren, *The Excellent Powder: DDT's Political and Scientific History* (Indianapolis IN: Dog Ear Publishing, 2010).

17 Malaria, Politics, and DDT, *Wall Street Journal* 26 May 2009.

18 Roger Meiners, Pierre Desrochers and Andrew Morriss (eds.), *Silent Spring at 50: The False Crises of Rachel Carson* (Washington DC: Cato Institute, 2012).

19 Malaria Fact Sheet, WHO (November 2017), http://www.who.int/mediacentre/factsheets/fs094/en/





3

# DIRE PREDICTIONS

In the wake of Rachel Carson's *Silent Spring*, several books appeared by environmentalists much more radical than she was, warning of the harmful impact of humans on the environment, even of a coming catastrophe. The loudest – and shrillest – ecofundamentalist was Stanford Professor Paul Ehrlich in his 1968 book, *Population Bomb*. He began the book with a sweeping statement: 'The battle to feed all of humanity is over. In the 1970s hundreds of millions of people will starve to death in spite of any crash programs embarked upon now. At this late date nothing can prevent a substantial increase in the world death rate.'[20] Ehrlich asserted that there were simply too many people on earth and that humanity could only mitigate, and not prevent the famines, epidemics and social unrest that was coming. On a somewhat more sober note, in 1970 Scottish ecologist Sir Frank Fraser Darling published his Reith Lectures, broadcast a year earlier, *Wilderness and Plenty*. He praised Carson and agreed with her that DDT and other pesticides were having harmful effects on the environment. It was true, he said, that DDT had enabled mankind to eradicate malaria in many countries, but this had, in turn, led to a rise in population beyond the increase in food production, creating an increase in squalor and stress to the human situation. Frank insisted that population increase and environmental pollution were the world's biggest problems.[21]

In 1972 *A Blueprint for Survival*, written mostly by an eccentric millionaire, Edward Goldsmith, was published as a special edition of *The Ecologist* and became a bestseller in the UK. Goldsmith and his co-authors were convinced that the earth could not sustain its ever-growing population that seemed to have ever-growing needs. They also agreed with Carson on DDT and predicted the depletion of most of the earth's minerals. Industrialisation had, they said, disturbed the balance of nature. People had flocked from the countryside to the cities where alcoholism, delinquency, mental disease and other symptoms of social disorder were on the rise. In their view there was a relationship between crime and density of population. They thought that nothing could prevent famines in the next 15 to 20 years, but that long-term solutions to the predicament of mankind included special taxes on the use of energy, raw materials and luxuries; a total ban on toxins; a public commitment to build no more roads; and the provision of free contraceptives, sterilisation and abortion. They advocated dividing up nations into smaller units, citing Aristotle's dictum that cities should be small enough that everybody could know one another by name.[22]

A perhaps more serious book about an impending environmental disaster was the 1974 *Limits to Growth*, written by MIT Professor Dennis H. Meadows and other members of the so-called 'Club of Rome'. The authors presented their work as the result of computer simulations they had made on how exponential economic and population growth interacted with a finite supply of resources. The basic idea is simple. It is based on the difference between linear and exponential growth. Linear growth is predictable and easy to understand. It can be shown by a straight line. An example of linear growth is a child who grows by 2 centimetres a year or a thrifty woman who puts aside $1,000 every month. After five years the child has grown 10 centimetres and $60,000 has been added to the personal safety box of the collector. Exponential growth is of a different kind. Assume that the thrifty woman does not put her savings in a personal safety box; instead she deposits it in a bank that offers her a 4% rate of interest. Then her savings will double in worth in 18 years. If the bank offers her a 5% rate of interest, then her savings will double in 14 years, and if the interest rate is 10%, then it will double in 10 years.

20 Paul R. Ehrlich, *The Population Bomb* (New York: Sierra Club/Ballantine Books, 1968).

21 Frank Fraser Darling, *Wilderness And Plenty: the Reith Lectures 1969* (London: British Broadcasting Corporation, 1970).

22 Edward Goldsmith et al., *The Ecologist: A Blueprint for Survival* (London: The Ecologist, January 1972).

Exponential growth is at first very slow but it grows rapidly and is, therefore, not immediately obvious and foreseeable to most observers. The authors of *Limits to Growth* recall an old Persian fable. A courtier known for his cleverness gave his master a beautiful chessboard as a present. When the emperor asked to reciprocate by giving him something, the courtier modestly asked for a grain of rice on the first square, two grains for the second, four grains for the third, eight for the third, and so on. The number of grains was in other words to double each time it came to the next square of the 64 squares. The Emperor gladly accepted this exchange and sent for rice in his barn. For the fifth square he needed 16 grains, for the tenth 512 and for the fifteenth 16,348 grains. For the 21st square he needed to give the courtier more than a million grains of rice, and for the 40th square, one billion grains had to be moved from the barn. The immense supplies of the emperor were exhausted long before he came to the 64th square.

The point is that an entity subjected to exponential growth can suddenly become very big. The authors of the *Limits to Growth* illustrated this with a French riddle for children. A water lily is growing in a pond. It doubles in size every day. If the lily were allowed freely to grow, it would cover the pond completely in 30 days, choking off other forms of life there. For a long time the lily seems small. People decide not to worry about it until it would cover half of the pond. The riddle is, on what day will that be? On the 29th day, of course. There is only one day left to try and save the pond.[23]

In the tale told by the authors of *Limits to Growth*, and based on their computer simulations, the consuming population was the water lily and the earth was the pond. After 30 years, at the turn of the century, the authors predicted that the earth would have seven billion inhabitants, who would all need food and manufactured goods, meaning that the production of food and such goods would have to increase exponentially. This would lead to pollution, which would also grow exponentially. Even if mankind would cease to use DDT, for example, the toxin would still exist at high levels in the environment. One of the main worries would be the depletion of nonrenewable natural resources. The authors tried to estimate an upper and a lower limit to their use and to calculate an average. According to them, aluminium would be exhausted in 2003, lead in 1993, gold in 1981, natural gas in 1994, petroleum in 1992, copper in 1993, mercury in 1985, molybdenum in 2006, silver in 1985, zinc in 1990, tin in 1987 and tungsten in 2000.[24] The authors admitted, of course, that if new reserves of these resources were discovered, then their lifetime would be extended.

The conclusions reached by the authors of the *Limits to Growth* were clear:

> If the present growth trends in world population, industrialization, pollution, food production, and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next one hundred years. The most probable result will be a rather sudden and uncontrollable decline in both population and industrial capacity.[25]

Mankind had to alter these growth trends and to 'establish a condition of ecological and economic stability'. This could be done in such a way that the basic material needs of each person would be satisfied and that he or she would have an equal opportunity to realise his or her individual potential. But capital growth would have to stop soon and people would have drastically to reduce their consumption of goods that they now took for granted.

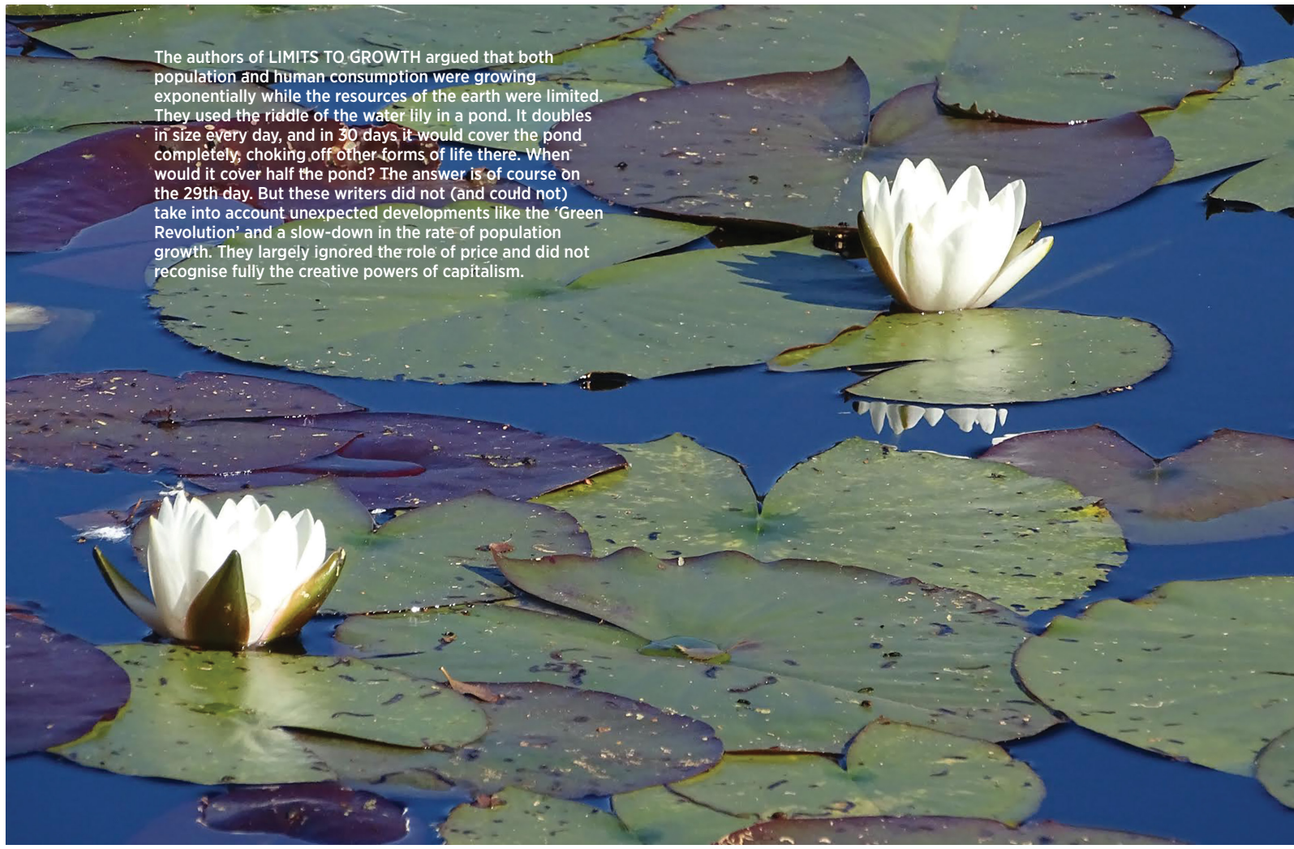
When the *Limits to Growth* came out, critics pointed out that dire predictions about impending disasters as a result of human over-consumption were not new. In 1865 British economist William Stanley Jevons had argued in a book on the *Coal Question* that this useful energy resource was about to be exhausted, and, as a consequence, Great Britain would lose its dominant position in the world.[26] But he had underestimated both existing coal reserves and the potential of new energy resources, such as petroleum and hydroelectric power. Long before Jevons the British clergyman Thomas Malthus had presented the same basic argument as did Ehrlich, Darling, Goldsmith and the authors of *Limits to Growth*. It was that some things grew exponentially and others linearly.

23 Donella Meadows et al., *The Limits to Growth* (New York: Universe Books, 1972), p. 29.

24 Ibid., pp. 56 and 58.

25 Ibid., p. 23.

26 William Stanley Jevons, *The Coal Question* (London: Macmillan, 1865). Available online, http://www.econlib.org/library/YPDBooks/Jevons/jvnCQ.html



The authors of LIMITS TO GROWTH argued that both population and human consumption were growing exponentially while the resources of the earth were limited. They used the riddle of the water lily in a pond. It doubles in size every day, and in 30 days it would cover the pond completely, choking off other forms of life there. When would it cover half the pond? The answer is of course on the 29th day. But these writers did not (and could not) take into account unexpected developments like the 'Green Revolution' and a slow-down in the rate of population growth. They largely ignored the role of price and did not recognise fully the creative powers of capitalism.

Population grew exponentially, Malthus argued, in the absence of diseases, famines and other catastrophes. This growing population needed various goods, mostly food, but their production could not grow exponentially, only linearly in the best of times. When the exponential growth trend surpassed the linear growth trend, famines would inevitably occur. The British clergyman did not really suggest any remedies except celibacy and moderation.[27] While his argument might have seemed plausible at the beginning of the 19th century when he presented it, history took a different turn. Population growth was not always exponential, and increases in food production were not always linear. Both trends could and would fluctuate up and down.

It is true that the world population increased rapidly after 1950, but this was mostly because mortality went down as a result of the availability of more food and medicine and easier access to clean water. People did not suddenly start breeding like rabbits: instead they stopped dying like flies.[28] The growth rate has since fallen in many places of the world, even if the world population is still growing. In the *Limits of Growth* it was predicted that the world population would reach seven billion in 30 years in 2002, but this did not happen until 2011, almost a decade later. Meanwhile food production increased dramatically, not least because of the 'Green Revolution', when Norman Borlaug and other scientists managed to develop seeds of wheat, maize and rice that could produce much larger harvests than traditional seeds. In the last three decades of the 20th century, world food production nearly doubled. It is significantly higher per capita than it was in the late 1960s or early 1970s, when Ehrlich and Goldsmith warned of imminent famines. The daily consumption of calories per capita increased by 15% on average in the world in 1966 and by more than 25% in the developing countries. World food prices fell by more than two-thirds from 1957 to early 2001 despite growing

27 Thmas Malthus, *An Essay on the Principles of Population* (London: J. Johnson, 1798). Available online, http://oll.libertyfund.org/titles/malthus-an-essay-on-the-principle-of-population-1798-1st-ed

28 Lomborg, *The Skeptical Environmentalist,* p. 46.

demand.[29] These prices have risen again after the 2008–2009 financial crisis, but not to past levels.[30]

Ecofundamentalists did not see that newcomers were more than just additional mouths to feed: they also had willing hands for work. Ecofundamentalists were not only wide off the mark about population growth and food production, but also about raw materials. Even if, according to the authors of *Limits to Growth*, aluminium would be exhausted in 2003, lead in 1993, gold in 1981, natural gas in 1994, petroleum in 1992, copper in 1993, mercury in 1985, molybdenum in 2006, silver in 1985, zinc in 1990, tin in 1987 and tungsten in 2000, there is at present, in 2017, no shortage of any of these minerals. It is sometimes said in defence of the authors of *Limits to Growth* that they were not making predictions, but listing possibilities.[31] It is true that in their book they also calculated the lifetime of raw materials if presently known reserves would increase five times. But it is difficult to interpret their message in the book in any other way than that they were warning against the imminent depletion of these resources.

Be that as it may, the authors of *Limits to Growth* certainly asserted that prices of raw materials would greatly rise because of their shortage.[32] But this did not happen in the 30 years after the publication of their book. Thereby hangs a tale. In *Science* magazine in 1980, economist Julian Simon criticised dire predictions about a population explosion and an imminent depletion of raw materials.[33] A year later Ehrlich, with some co-authors, published an answer in *Science*, criticising the magazine and its referees for having published Simon's piece: they should have rejected it.[34] Simon announced that he was ready to make a bet with Ehrlich about the price of each and every raw material that Ehrlich regarded as near depletion. These prices would be falling in coming years, Simon predicted, not rising. Ehrlich accepted the bet and chose the period for it, the coming 10 years, and the raw materials, chrome, copper, nickel, tin and tungsten. The 10 years passed by, world population increasing by 800 million, more than ever before. But the total prices of the five raw materials that Ehrlich had chosen had fallen (adjusted for inflation), and the individual price of each of them had also fallen. In the autumn of 1990, Ehrlich had to admit that Simon had won the bet. It would not have mattered if Ehrlich had chosen some other raw materials, such as petroleum, sugar or cotton. Their prices had gone down too.[35] Once again, ecofundamentalists were proved wrong.

29 Ibid., p. 61.

30 World food prices enter 'danger territory' to reach record high, *Guardian* 5 January 2011.

31 Jørgen Stig Nørgård, John Peet and Kristin Vala Ragnarsdottir, The History of the Limits to Growth, *Solutions*, Vol. 2, No. 1 (26 February 2010), pp. 59–63.

32 *Limits to Growth*, p. 66.

33 Julian Simon, Resources, Population, Environment: An Oversupply of False Bad News, *Science*, Vol. 208, No. 4451 (1980), pp. 1431–1437.

34 J. P. Holdren, P. R. Ehrlich, A. H. Ehrlich and J. Harte, Bad News: Is it True? *Science*, Vol. 210, No. 4476 (1980), pp. 1296–1301.

35 John Tierney, Betting on the Planet, *New York Times* 2 December 1990; Lomborg: *The Skeptical Environmentalist*, 137. bls.





4

# NOBLE SAVAGES?

Ecofundamentalists look upon modern industrial society as a nest of social unrest, where crime is on the rise, as Edward Goldsmith asserted in *A Blueprint for Survival*. This is far from being the truth. Indeed violence was much more common before the Industrial Revolution than after it. A fundamental feature of pre-modern life was the lack of security, whereas in recent times the murder rate has gone down significantly in the West. In the 13th century 20 people were murdered for each 100,000 of the population. Now it is around two. At the end of the 19th century, the murder rate in Sweden was two for each 100,000. Now it is about 1.1. In the same period in Italy, the murder rate has fallen from five to 0.8 (discounting the two world wars).[36] The greatest change has been in the United States, where the murder rate was for a long time much higher than in Europe – around 10 murders among every 100,000 people. Now it has fallen to 4.9. The level of other violent crimes in the United States has also gone down.[37] There are many possible explanations for the reduction of violent crimes in the United States, including increased policing and two demographic facts: of the group that is most likely to commit such crimes, young males, a higher proportion is in prison, while this group also forms a lower proportion of the total population because of the fall in the population growth rate.[38] It is also significant that in two of the most densely populated places in the world, Singapore and Japan, murders are rare. The murder rate in both countries is 0.3, one of the lowest in the world.[39]

Given how consistently wrong ecofundamentalists have been about population growth and economic and social trends, such as the production of food, the utilisation of raw materials and the level of crime, it may seem surprising how seriously they have been taken. Their books have been bestsellers and some of them are professors at prestigious universities, whereas their critics are often marginal in the scientific community. Indeed some critics of ecofundamentalism have suffered abuse or even physical attacks, for example Bjørn Lomborg.[40] But on what scientific authority could Paul Ehrlich of Stanford University say in 1968 that in the 1970s hundreds of millions of people would starve to death? And how could he find himself entitled in 1990 to criticise *Science* for publishing a note by Julian Simon on environmental issues? Despite the total refutation by experience of his theories, Ehrlich has received one accolade after another, for example the coveted and lucrative MacArthur Prize fellowship for 'geniuses'. And on what scientific authority could Dennis Meadows of MIT warn in 1972 that the world would be running out of petroleum in 1992, copper in 1993 and natural gas in 1994?

One reason for the success of ecofundamentalism is of course that it is more newsworthy if the world is about to collapse than if it may go on. It is no news if a dog bites a man; it is news if a man bites a dog. But another and more important reason is that ecofundamentalism may ultimately not rest on arguments or evidence, but rather on a strong feeling that man somehow is lost. It gains its strength from nostalgia for a mythical serene, peaceful past where man lived in harmony with nature, without all

36 For historical figures, Lomborg, *The Skeptical Environmentalist,* pp. 84–85. For present figures, Homicide Counts and Rates (2000–2015), United Nations Office on Drugs and Crime.

37 *Crime in the United States by Volume and Rate per 100,000 inhabitants, 1989–2009* (Washington DC: Federal Bureau of Investigation, 2009).

38 Cf. Steven Levitt, Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six that Do Not, *Journal of Economic Perspectives*, Vol. 18, No. 1 (2004), pp. 163–190. Levitt only mentions two of these explanations, the increases in the numbers of policemen and of prisoners. Two other explanations that he offers may seem controversial: less drug abuse and the legalisation of abortion after 1970 (with the result that some of those who would have become criminals after 1990 were not born).

39 The figures are 0.25 for Singapore (2015) and 0.31 for Japan (2014). Homicide Counts and Rates (2000–2015), United Nations Office on Drugs and Crime.

40 Ecofundamentalists in the ranks of Danish academics brought a formal complaint against Lomborg before the Danish Committee on Scientific Conduct. The Committee ruled that Lomborg had misrepresented the facts and was guilty of scientific misconduct. This ruling was annulled by the Danish Ministry of Science, Technology and Innovation. The case against Lomborg was mostly groundless (even if occasional slips, errors or mistakes crept into his book like all books), Arthur Rörsch, Thomas Frello, Ray Soper, and Adriaan de Lange, On the Opposition Against the Book The Skeptical Environmentalist, *Journal of Information Ethics*, Vol. 4, No. 1 (2005), pp. 16–28.


Swedish historian Johan Norberg gives a talk in Iceland in 2017 about his book PROGRESS. He argues that economic growth is essential for solving environmental problems. Photo: RNH.

the struggles of modernity. This nostalgia manifests itself most clearly in the myth of the noble savage. Returning from America after his 1492 trip, the seafarer Christopher Columbus told his royal patrons in Spain that Caribbeans 'love their neighbours as themselves, and they have the sweetest talk in the world and are gentle and always laughing'. This tale of an Arcadian idyll soon spread in Europe and was taken up by French philosopher Michel de Montaigne, who claimed that he had received information about Brazilian Indians from a man who had stayed many years with them. 'They spend the whole day dancing; the younger men go off hunting with bow and arrow. Meanwhile some of the women-folk are occupied in warming up their drink: that is their main task.' These Indians, Montaigne said, did not feel any need for conquest. 'They are still in that blessed state of desiring nothing beyond what is ordained by their natural necessities: for them anything further is merely superfluous.'[41]

Needless to say these accounts of American savages were pure fantasies. The real life of wild people in the woods, or on the plains, was poor, nasty, brutish and short. But the real purpose of these fairy tales was to subject Western civilisation to criticism. This was done most memorably and effectively by French philosopher Jean-Jacques Rousseau, who argued that civilisation had been more of a loss than a gain. In a state of nature, man had been free, not suffering from unsatisfied desires or depending on anyone else:

> The first man who, having enclosed a piece of ground, bethought himself of saying This is mine, and found people simple enough to believe him, was the real founder of civil society. From how many crimes, wars and murders, from how many horrors and misfortunes might not anyone have saved mankind, by pulling up the stakes, or filling up the ditch, and crying to his fellows, 'Beware of listening to this impostor; you are undone if you once forget that the fruits of the earth belong to us all, and the earth itself to nobody'.[42]

It is fair to say that Rousseau is with Thomas Malthus, but in a different way, one of the founding fathers of ecofundamentalism. Rousseau eloquently expressed his longings for a simpler, more harmonious world, whereas Malthus provided arguments for the non-sustainability of the present.

When ecofundamentalists romanticise about noble savages in the Americas before the arrival of Europeans, they ignore the vast harm that the pre-Columbian Indians inflicted on the environment. The Americas were not half-empty in 1492: it is estimated that more than 50 million people then lived on the two continents. The Indians in North America repeatedly burned forests to facilitate their hunts of bison, moose, elk and deer. According to one study deforestation in the Americas was probably greater before the Columbian encounter than it was for several centuries thereafter. Moreover, for Indians hunting was a survival game, not a sport. One of their favourite devices was 'the jump', which meant stampeding herds of animals over a cliff so that the fall would kill them. Bison and antelope traps killed so many animals that it took the herds decades to recover. It is likely that the Indians earlier also had hunted to extinction the woolly mammoth, saber-toothed tiger, giant sloth, giant beaver, camel, horse, two-toed horse and dire wolf. The same applies to tribal peoples of other continents: the aborigines in Australia, the 'prime people' in Madagascar and the Maoris seem to have hunted many animals to extinction. Even those pre-Columbian Indians who had developed agriculture did not practise sustainable farming. Soil erosion, for example, was widespread in the Americas.

Ecofundamentalists often refer to the speech of the famous North American Indian Chief Seattle in 1854, made after negotiations between Indians and white settlers. Former United States Vice President Al Gore cites Chief Seattle, for example, in his *Earth in Balance*.[43] Indeed in the speech Chief Seattle was eloquent:

> We are part of the earth and the earth is part of us. The fragrant flowers are our sisters. The deer, the horse, the great eagle, these are our brothers... The rivers are our brothers, they carry our canoes, and feed our children... The earth does not belong to us; we belong to the earth. All things are connected, like the blood which unites one family. Mankind did not weave the web of life. We are but one strand within it. Whatever we do to the earth, we do to ourselves.

Although Chief Seattle certainly made a speech on this occasion, there is a problem with this edition. It is that it is a fabrication. It was originally written by scriptwriter Ted Perry for a television documentary in 1972. The author has repeatedly tried to set the record straight, but to no avail. Nobody wants to listen to him, and ecofundamentalists keep on quoting 'Chief Seattle'.[44] It is because in the speech their own sentiments and feelings are eloquently expressed, not because the Indians of the 19th century necessarily shared those sentiments and feelings with them.

The history of the mythical noble savage is fraught with hoaxes. A big one was Margaret Mead's 1928 book *Coming of Age in Samoa*.[45] She announced to her sympathetic readers that she had discovered innocent and noble islanders in Samoa, who made love rather than war and hardly ever committed murder or rape. Her book became a classic in anthropology and may have contributed to the sexual revolution of the 1960s. But it turned out that Mead had ignored ample evidence contradicting her thesis. Murder and rape were common in Samoa, and the islanders adhered to a strict code of sexual conduct. Mead had not surveyed the field, but had stayed at the home of a missionary, where her informants had visited her and told her ludicrous stories, probably to amuse themselves in testing her gullibility. When confronted with real evidence, Mead refused to make any alterations to later editions of the book, which continued to sell well. The anthropologist Derek Freeman who exposed her found himself under bitter attacks by his peers.[46]

Another renowned anthropologist, Napoleon A. Chagnon, was met with disbelief and derision by his academic peers after he published accounts of the last Amazon tribe to live free from interference of any government, the Yanomamö. These Indians turned out to be extremely violent and brutish. Chagnon's well-written and heartfelt book about his fieldwork and the strange reaction to it by his fellow anthropologists

Dr. Matt Ridley, British zoologist and best-selling writer on environmental issues, gives a talk in Iceland 2012 about his book THE RATIONAL OPTIMIST. He argues that the creative powers of a free civilisation should not be underestimated.

41 For Columbus and Montaigne, Martin Wheelan, *Wild in Woods: The Myth of the Noble Eco-Savage* (London: Institute of Economic Affairs, 1999), pp. 2 and 3. I am much indebted to this monograph for this chapter.

42 Jean-Jacques Rousseau, *A Discourse on Inequality,* ed. Maurice Cranston (Middlesex, Harmondsworth: Penguin, 1994 [1755]), Part II, p. 109.

43 Al Gore, *Earth in Balance: Ecology and the Human Spirit* (New York: Plume, 1993), p. 259.

44 William S. Abruzzi, The Myth of Chief Seattle, *Human Ecology Review,* Vol. 7, No. 1 (2000), pp. 72–74.

45 Margaret Mead, *Coming of Age in Samoa: a Study of Adolescence and Sex in Primitive Societies* (New York: William Morrow & Company, 1928).

46 Derek Freeman, *Margaret Mead and Samoa: The Making and Unmaking of an Anthropological Myth* (Cambridge MA: Harvard University Press, 1983).

Professor (Emeritus) Rognvaldur Hannesson of the Norwegian School of Business Administration in Bergen argues for 'wise use environmentalism' and rejects extreme environmentalism in his book, ECOFUNDAMENTALISM.

bears the telling name *Noble Savages: My Life Among Two Dangerous Tribes – the Yanomamö and the Anthropologists*.[47]

In 1971, however, ecofundamentalists found a tribe to their liking: the Tasaday, who allegedly lived in stone-age conditions in a remote part of Mindanao in the Philippines. 'They are non-aggressive, they have no religious rituals, they have neither art nor written language, they have no words for weapons, hostility or war,' a reporter gushed. The corrupt Marcos government strictly limited access to the Tasaday, but as it was falling in 1986, a Swiss journalist, Oswald Iten, managed to get into the area supposedly inhabited by the tribe. He found that the Tasaday were quite modern. The whole story had been a fabrication. The local people admitted that they had been offered money to get their clothes off, dress in leaves only, go into caves and play 'stone-age' people.[48] Nevertheless, there are anthropologists who still angrily protest against the revelations about the hoax. 'Imagine a tribe which believed that all human beings were essentially pristine and that all civilised behaviour, even something as rudimentary as cooking food, was a smear on an unsmirched, primal innocence,' journalist Thomas Sutcliffe ironically commented. 'Far-fetched, perhaps, but such a tribe exists – they are called anthropologists.'[49]

Another hoax is tragicomic. In 1989 the rock star Sting joined Chief Raoni of the Amazon tribe of Kayapo Indians in a campaign against a hydroelectric dam which would have flooded large areas of rainforest and displaced tribal peoples. The project was being funded by the World Bank. Sting and Chief Raoni ran a successful campaign in the media, upon which the World Bank withdrew its funding and the project was abandoned. Sting established the Rainforest Foundation to save the Amazon Rainforest and pleaded with the government to establish a large reserve for the Kayapo Indians. When this had been accomplished, Sting announced that this would put an end to rampant logging in the area. This was not what happened. The Kayapo Indians continued the practice in which they had engaged before of selling timber to logging companies on a massive scale. They also sold mining rights in the areas they controlled. However, most of the money derived from all this seemed to go solely to the chiefs and their families, not to the Indians themselves, who stayed desperately poor. 'I was very naive,' Sting later admitted.[50]

47 Napoleon A. Chagnon, *Noble Savages: My Life Among Two Dangerous Tribes—the Yanomamö and the Anthropologists* (New York: Simon & Schuster, 2013).

48 Oswald Iten, The 'Tasaday' and the Press, Thomas N. Headland (ed.), *The Tasaday Controversy: Assessing the Evidence* (Washington, DC: American Anthropological Association, 1992), pp. 40–58.

49 Thomas Sutcliffe, Primal Scream, *The Independent* 21 March 1989.

50 Bitter Sting learns laws of the jungle, *The West Australian* 3 May 1993. Later Sting and Chief Raoni had a public reconciliation in Brazil, Sting reencontra Raoni, *O Globo* 22 November 2009.





5

# A DIGRESSION ON RAINFORESTS

Even if the Atlantic Rainforest of Brazil only extends to a fraction of what it was before the settlement from Europe, it has maintained its biodiversity. Photo: Maria Ogrzewalska.

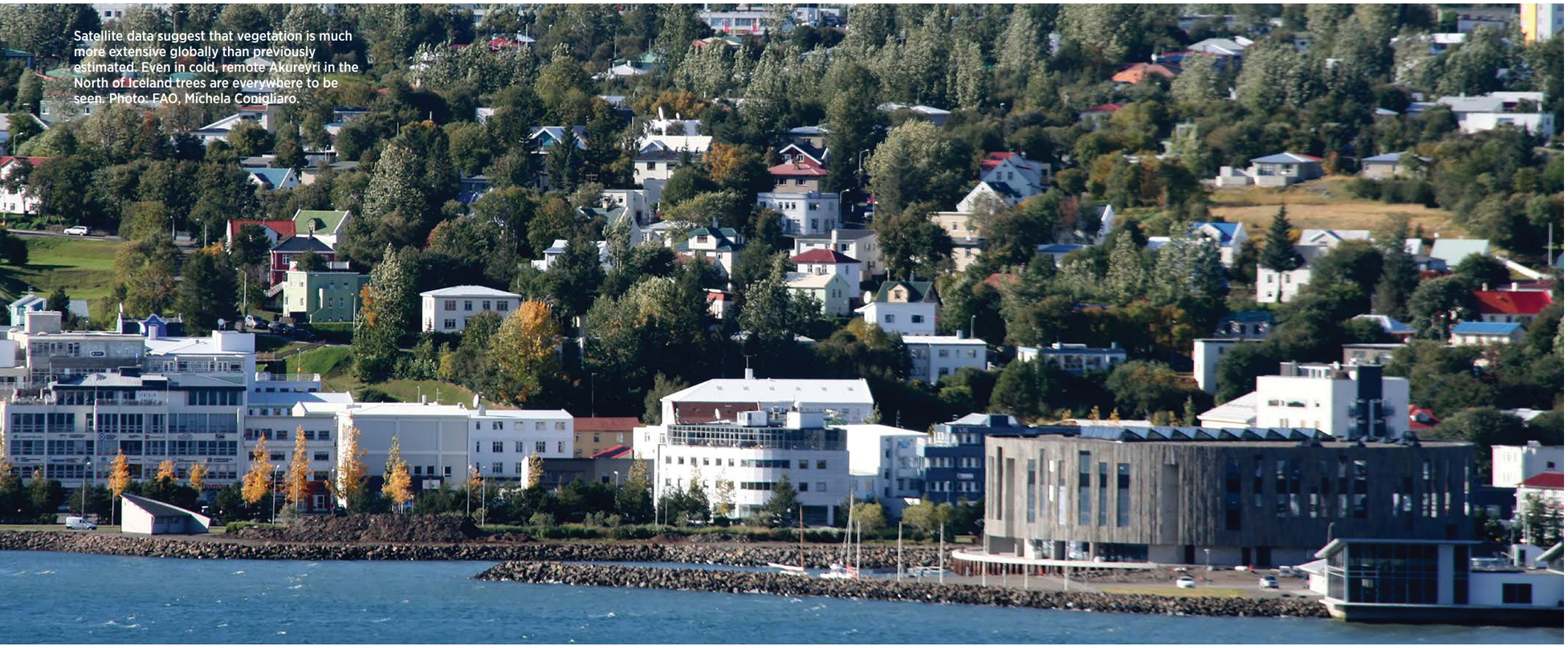
Sting was interested in forests. So was German philosopher Karl Marx. Indeed he became a communist because of forests. As a young man, having recently finished a doctorate in philosophy, Marx was in 1842 hired as the editor of *Rheinische Zeitung*, a liberal newspaper in the Rhineland. Soon he started to write about a recent controversy: In the past, poor people had traditionally been able to go into the forests and to collect fallen branches of trees, using them as firewood. Now wood was becoming scarce as a result of industrialisation, and a law was passed prohibiting this. The owners of the woodland were now the only ones who could collect dead wood. Marx protested fiercely against the new law. The forest owners should be regarded as the real thieves, not the poor people continuing a tradition: "Just as it is not fitting for the rich to lay claim to alms distributed in the street, so also in regard to these alms of nature." Marx argued instead for recognising the customary rights of the poor.[51]

Leaving Sting and Marx aside, which goods do forests produce? And who should have the right to them? In Europe, the answers in most places have been fairly straightforward in practice: Those who own the woodland, also own the forests growing on them, and they log trees, selling the wood as fuel, construction material, and for several other purposes. In addition to commercial goods, forests also provide many indirect benefits to others than the registered owners of woodland. They are areas of recreation, sheltering a lot of wildlife, and they help to prevent soil erosion and flooding. Europe has seen a lot of deforestation: The continent has lost 50–70% of its original forests, especially in the early Middle Ages. But Europe, as well as North America, has also seen some reforestation: It is obviously in the interest of woodland owners to maintain and improve upon this renewable resource. It should be pointed out that the very concept of a forest is not always clear, as the jungle softly blends into bushland, prairies and plains, and these wilderness areas in the South are, in turn, different from cultivated forests in the North. Arguably the very concept of a 'tropical rainforest' is a relatively recent social construct, expressing the ideas or even fantasies of Western intellectuals.[52]

Be that as it may, it seems that in 1961–1994—the period in which books like *Silent Spring*, *Blueprint for*

51 Karl Marx, Debatten über das Holzdiebstahlsgesetz, *Rheinische Zeitung*, 25, 27 and 30 October and 1 and 3 November 1842, *Werke*, Vol. 1 (Berlin: Dietz, 1956), pp. 109–147.

52 Philip Stott, *Tropical Rain Forest: A Political Ecology of Hegemonic Myth Making* (London: Institute of Economic Affairs, 1999).



Satellite data suggest that vegetation is much more extensive globally than previously estimated. Even in cold, remote Akureyri in the North of Iceland trees are everywhere to be seen. Photo: FAO, Michela Conigliaro.

*Survival*, *Wilderness and Plenty* and *Limits to Growth* came out—the total area in the world covered by forests had only been reduced by 0.4%.[53] Whereas temperate forests have actually expanded since then, tropical forests have not: In 2000–2010, it is estimated that there was a net forest loss of 7 million hectares per year in tropical countries, and a corresponding net gain in agricultural land of 6 million hectares.[54] Indeed, tropical rainforests have become a chief concern of ecofundamentalists. They claim that they are the 'lungs of the earth' and that they are crucial for maintaining biodiversity.

The danger to forests seems exaggerated, however. Deforestation in Europe stopped, and turned into reforestation, as a result of increased productivity of agricultural land combined with a reduction in the rate of population increase, thus removing calls for land clearance. The same trends are likely to produce similar effects in tropical countries. Indeed, forests are growing back rapidly in some countries.[55] Moreover, and for different reasons, the world seems to be experiencing 'global greening'. Data from satellites suggest that in 1982–2011 there was a 14% increase in green vegetation on the earth's surface, where more than half of this greening could be attributed to an increase in the level of carbon dioxide in the atmosphere.[56] Again, more recent data from satellites suggest that forests in drylands are much more extensive than previously reported. A group of scientists report their findings from 2015: "Our estimate is 40 to 47% higher than previous estimates, corresponding to 467 million hectares of forest that have never been reported before. This increases current estimates of global forest cover by at least 9%."[57]

Not only is the present danger to forests apparently exaggerated: The arguments for closing them off also seem implausible. It is not correct that rainforests perform the same function for the earth as lungs do for a human body. On the contrary: The lungs extract oxygen from the air and release carbon dioxide as a waste product, whereas by means of photosynthesis plants use sunlight, with the help of carbon dioxide and water, to produce oxygen. But when plants die and decompose, the same amount of oxygen is consumed as had previously been produced. Indeed, even if all plants, both on land and at sea, were killed off, the process would consume less than 1% of the atmosphere's total oxygen.[58]

It is true that rainforests, as well as other forms of vegetation, perform a useful function by producing oxygen. It is also true that greater biodiversity can be found in rainforests than in other areas of the world. But why should biodiversity in itself be important? Some species are purely parasitical, while others are dangerous vectors of diseases, such as the mosquito spreading malaria and zika. Given the choice, probably many people would be relieved if such species would become extinct. Clearly, also, biodiversity cannot be increased *ad infinitum*. There are limits to it as to all the other stuff of which the world is made. Nevertheless, most people would agree that many species of plants and animals are worth preserving. In some way or another, they enhance our quality of life and our enjoyment of nature. Furthermore, genetic diversity is necessary for the crops man cultivates. The question is however whether biodiversity has to be maintained by closing off vast, indeed immense, areas, for example the entire Amazon basin, thus prohibiting poor people in the South from developing their economies in the same way as affluent people in the North have done over centuries. Probably biodiversity can be maintained by closing off much smaller areas, which could be turned into national parks. For example, the Atlantic Rainforest in Brazil now only covers a fraction of what it did some centuries ago, but biologists have not been able to identify any extinct species.[59]

Admittedly, tropical rainforests (most of which are located in Brazil) are not exploited efficiently. In many of them indiscriminate and illegal logging takes place. But this is because the legal and social framework in many tropical countries, not least Brazil, is not sufficiently strong: Usually, there are no private property rights to the rainforests, and there are too many temptations by poor people living in them or close to them, to overexploit them. The most sensible way forward would seem to be the definition of private property rights on the basis of possession: Those who are now exploiting the resources, whether they would be indigenous tribes or squatters and sporadic settlers, should be given the rights. But if the argument were plausible—which it hardly is—that extensive land clearance in tropical rainforests would create irreparable worldwide damage, both in terms of oxygen production and the maintenance of biodiversity, then certainly those who would be barred from exploiting the woodland, for example by international treatises, should be compensated. It would not seem fair for affluent people in the North to expect poor people in the South to bear all the costs of producing oxygen or preserving biodiversity, not only for themselves but for the whole world.

53 Lomborg, *The Skeptical Environmentalist,* p. 111.

54 *2016: State of the World's Forests* (Rome: FAO, 2016), p. x.

55 Elisabeth Rosenthal, New Jungles Prompt a Debate on Rain Forests, *New York Times* 29 January 2009.

56 Zaichun Zhu et al., Greening of the Earth and Its Drivers, *Nature Climate Change,* Vol. 6 (2016), pp. 791–795.

57 Jean-François Bastin et al., The Extent of Forest in Dryland Biomes, *Science,* Vol. 356, No. 6338 (2017), pp. 635–638.

58 Wallace S. Broecker, Man's Oxygen Reserves, *Science,* Vol. 168, No. 3939 (1970), pp. 1537–1538. Cf. Lomborg, *The Skeptical Environmentalist,* p. 115.

59 Lomborg, *The Skeptical Environmentalist,* p. 255.

6

# WISE USE ENVIRONMENTALISM

The main flaw in the case ecofundamentalists usually present for a coming disaster is that of ignoring elementary economic principles. When the authors of *Limits to Growth* were extrapolating existing trends, for example, they neglected the key notion of price, although they certainly mentioned it. Neither demand nor supply is fixed and unchangeable, not even of non-renewable resources. There is really no such thing as 'known reserves' of any material. The reserves depend on price. If the price of a material goes up, then people start searching for additional reserves, or they use already known substitutes or design new substitutes. Technology also plays a role in determining reserves. (And since technology is really the discovery of cheaper ways of doing things, it is intimately related to the notion of price.) Assume for the sake of argument, that all the world's petroleum is used to drive cars, but suddenly a new car motor is built that consumes only half of the petroleum older types used to achieve the same result. From an economic point of view, this means that the petroleum reserves of the world have doubled in size, although there has been no change in quantity.

A real-life example of how difficult it is to extrapolate trends in our present situation is the demand for paper. After the Internet was introduced in the 1990s, paper was used much less than before to produce books or journals or to conclude trade with written notes or receipts. Another real-life example is the demand for copper. Now telephone connections use fibre optic cables, not copper wire, and this has reduced mankind's dependence on copper. 'About a hundred years ago there were concerns that ash trees, good for making skis, would become scarce in Norway, and ash trees were duly planted for future ski making,' Rognvaldur Hannesson ironically observes. 'To little avail. Nowadays skis are made of synthetic material. Last time a world record was set on wooden skis was in 1970.'[60] Another way in which technology is relevant to non-renewable resources is that it provides ways of recycling them, which has the effect of making them, in a sense, partly renewable.

Free market economists stress that a free economy is not static, but dynamic. Change takes place in it, but of course not always for the better. Nevertheless, the free market system is one of incessant mutual adjustments between individuals and firms, production and consumption, export and import, saving and investment. These adjustments are made possible by the transmission of knowledge through prices. The free market system is also a discovery process: people succeed or fail and the results are transmitted through the price system. Economists recognise the pivotal role entrepreneurs and capitalists play in the economy, entrepreneurs by experimenting, capitalists by allocating capital to new endeavours. The dynamic nature of the economy is one reason why it may be misguided to try and extrapolate existing trends, as Malthus did in the 19th century and ecofundamentalists in the 20th century. The population growth rate, for example, may seem to be exponential for a while, even for decades, and then it can change. The same applies to increases in the production of consumer goods. Its rate may seem exponential in one period and linear in another one. Economists are also trained to try and discover unintended consequences of human action. Instead of preaching or moralising, they look at results.

Unlike ecofundamentalists, free market economists welcome economic growth.[61] It is a misconception that such growth consists only in an ever-larger number of smelly factories and noisy airplanes and in ever-worsening congestion on ever-lengthening highways, combined with mounds of useless and even frivolous consumer goods, scrapyards and dump sites. Economic growth consists mainly in finding ways of doing things cheaper and, thus, saving effort. Two examples from my own country, Iceland, may be helpful. In the 13th century the production of a book was immensely expensive. Calves had to be slaughtered to produce the vellum on which the manuscripts were written; berries had to be collected to make ink; scribes had to be provided with food and shelter for long periods. Probably a copy of a book like *The Saga of Burnt Njal*, commonly considered the best of the Icelandic sagas, would have cost at least $10,000 in present day money to produce.[62] Now it takes much less than an hour for an ordinary person to work for a paper copy, and online copies are even cheaper.[63] The other example is that of the leading Icelandic conservative liberal in the early 20th century, Prime Minister Jon Thorlaksson. Living in the north of Iceland and attending Reykjavik Grammar School from 1891 to 1897, it took him three days and nights to ride on a horse to Reykjavik, with a few inevitable stops on the way.[64] Now it takes three hours to drive in a car from the farm of Thorlaksson's father to Reykjavik: people are saving two days and 21 hours that they can use to pursue other aims.

Congestion on highways is an example of harmful effects of economic behaviour, just like pollution. The drivers impose costs on one another. Free market economists suggest that the problem should be solved by defining private property rights to roads and charging for their use. Photo: Creative Commons.

The prosperity which is produced by economic growth is not a pile of coins or a heap of merchandise. It is best described as the set of opportunities that society offers to its members. The wealthier a society is, the easier it is for individuals who are poor, but healthy and strong, to pull themselves out of poverty. Such a society also has the means to provide for those who are not healthy and strong and who, therefore, are not able to avail themselves of some of the opportunities on offer. Indeed there is a strong link between wealth and health. A century ago people died of diseases that are easily treatable today. Some diseases are also prohibitively expensive to treat except in wealthy societies.[65] Another point worth remembering is that if people want to stay poor in a rich society, then nobody can, or should, hinder them in doing so. Again, those who want to spend three days riding on a horse from the north of Iceland to Reykjavik can still do so. Free market environmentalists emphasise that prosperity is crucial for solving environmental problems. Then people can afford the technology that enables them to reduce smell from factories and noise from airplanes and other side effects of progress.

Another point about economic growth is important in discussions about environmental issues. Economic growth is a great conciliator. If people feel that they have too small a piece of the national cake, then they have two ways of enlarging it: reducing the pieces of others or working for a bigger cake so that their piece grows bigger at the same time as the pieces of others also grow bigger. The first alternative is likely to cause much more conflict than the second one. What really matters is not the division of any given cake (which may shrink in the process), but the smooth operation of the whole bakery.

60 Hannesson, *Ecofundamentalism,* p. 33.

61 A good introduction is Terry Anderson and Donald R. Leal, *Free Market Environmentalism* (San Francisco: Pacific Research Institute for Public Policy and Westview Press, 1991).

62 Apparently, a famous Icelandic manuscript, Flateyjarbok, required 113 calves. Sigurdur Nordal, Time and Vellum, *Annual Bulletin of the Modern Humanities Research Association,* Vol. 24 (1952), pp. 15–26.

63 In September 2017, on amazon.com *The Sagas of the Icelanders* (London: Penguin, 2005) costs $17.41 in paperback and $9.73 on Kindle.

64 Hannes H. Gissurarson, *Jon Thorlaksson forsaetisradherra* [Prime Minister Jon Thorlaksson] (Reykjavik: Almenna bokafelagid, 1992).

65 Johan Norberg, *Progress* (London: Oneworld Publications, 2016), Ch. 2 and 3.

Arguably though ecofundamentalism is too easy a target. A more fruitful way of illustrating what free market environmentalism is about may be to contrast it with the Pigovian tradition in economics, which certainly recognises the function of prices. But it calls for a strong state which would correct 'market failures' where prices are not set correctly, such as in cases of harmful effects on the environment of human activity. The difference in the two approaches is best brought out by a famous example from Arthur C. Pigou, given in his *Economics of Welfare*, which is also relevant to the issue of congestion on highways, briefly mentioned above.[66] Pigou envisaged two roads, A and B, of different quality between the same two cities. Road A was paved and easy to drive, but quite narrow, while the much poorer road B was so wide that it could accommodate all the traffic between the two cities (solely commercial). Pigou then showed that truck drivers would allocate the traffic between the two roads in such a way that the average income from driving on them would be equal. They would choose road A up to the level when the congestion on it would be so great that it would pay to switch over to road B. Ideally, however, as Pigou pointed out, they should allocate the traffic in such a way that the marginal income from driving on the two roads would be equal. Then those driving on road A would fully enjoy its better quality instead of having to waste their time on waiting there in long lines. The problem was that on road A, the rent that could have been derived from its better quality was dissipated in congestion. The reason was that for the use of road A, there was no charge reflecting its better quality.

Pigou proposed that the government should charge a toll for the use of road A, reflecting its better quality (which in his scheme was the difference between the private and the social marginal cost of using the two roads). The tale of two roads was one of several examples that Pigou employed to support his contention that market forces often fail to produce optimal results because resources are not correctly priced. In such cases government could and should step in and correct the 'market failures'; thus, it would increase welfare. What is particularly illuminating about Pigou's road example is that the inefficiency or market failure was not immediately obvious as it would have been in the case, say, of a factory emitting unwanted smoke over a residential neighbourhood. The harm that the truck drivers inflicted upon one another on the two roads was brought out by economic analysis, and Pigou's proposed solution seemed to benefit everyone: instead of having either to bear the cost of congestion on road A or to drive on the much worse road B, an individual truck driver would simply have to pay government for the use of road A, an amount equal to his previous loss in wasted time.

No sooner had Pigou published his book, however, than Chicago economist Frank H. Knight pointed out a deficiency in his analysis. Pigou had overlooked the possibility that road A was privately owned. If it was, then its owner would presumably charge the right amount for its use, namely the difference between the incomes from driving on it and the next best alternative, which in this case was road B. The roads did not appear out of the blue like manna in the biblical tale. While road B might have come into being gradually as a beaten path, road A, by definition, was built. It was not a natural resource, like a fishing ground or a plot of land. If the government had built the road without charging for its use, then the situation that Pigou described was an example not of a market failure, but rather of a government failure. If an individual firm had built the road, on the other hand, then of course it would want to get back its initial outlays with interest and possibly also with a profit.[67] Pigou did not respond directly to Knight, but quietly removed the example from later editions of his book.

The discussion of the road example well illustrates the difference between two research programmes in economics. Pigou and his school of thought – whose approach is essentially that of modern welfare economics – look for imperfections in the workings of the marketplace, which could and should, they think, be corrected by judicious government intervention, especially taxes as substitutes for market prices. The other school of thought, which would include free market environmentalism, is sceptical of such government intervention, not least because of the great mass of data which it would be necessary to acquire and to process in order to make decisions on appropriate government measures to correct market failures. When faced with problems like the overexploitation of a resource, economists of that school search for institutions or sets of rules under which individuals can sort out their differences and limit their utilisation of the resource in question by reciprocal actions or mutually satisfactory transactions.[68]

Free market environmentalism or wise use environmentalism has developed over the last few decades as a response to the increased concern over environmental problems shared by all well-meaning people. Any sane person with no axe to grind would want to avoid pollution and stop overexploitation of resources. But free market economists reject the almost religious approach by ecofundamentalists, who seem to think in absolutes (such as banning DDT totally) and tend to disregard costs completely. Instead free market economists analyse environmental problems as failures to take sufficient account of harmful effects of human activity, as Pigou pointed out in his example of congestion. These failures are usually because the costs and benefits have not been priced correctly. Why do farmers spray DDT over their fields with the consequence that birdlife suffers? It is not necessarily because they are malevolent, but rather because the cost to people who like to watch and listen to birds has not been taken into account. Why are magnificent animals like whales, elephants and rhinos hunted almost to extinction? It is because the long-term value to society, including to hunters, of keeping them does not enter fully into the calculations of the hunters. Why does a factory dump its waste into a hitherto pristine lake? It is not because the factory managers are necessarily scoundrels, but because the cost to people enjoying the lake has not been taken into account. The factory managers regard their activity as costless, whereas it has a cost.

Environmental protection, however, does not only need correct prices. It also needs someone to administer them. This is the reason private property rights are important. Returning to the example of the factory dumping waste into a lake, it seems similar to a case when someone tries to empty a garbage can in a neighbour's backyard. That person is asking for trouble because the neighbour will likely not only protest, but also probably call the police or sue, or both. The reason why a factory might be able to pollute a lake by dumping waste into it is precisely that the lake, unlike the backyard, is not owned by anyone and that, therefore, there is no one who protects it. Environmental protection requires protectors. Stewardship presupposes stewards. If private property rights are defined to natural resources, then they are taken into stewardship. This is the great insight provided by Knight's response to Pigou's analysis.

If three of the main planks in the programme of free market environmentalism are, first, a critique of the ecofundamentalist approach; second, the pursuit of ways to price resources and the side effects from their utilisation correctly; and third, the idea of creating, or rather appointing, individual protectors of natural resources, a fourth plank would be the argument that bureaucrats would not be likely to be as efficient in protecting the environment as entrepreneurs and private owners or capitalists. These bureaucrats may be intelligent, well-meaning and well-informed, but they do not have the right incentives wisely to protect the environment. Everybody's business becomes nobody's business. The best example is of course Russia and other countries in Central and Eastern Europe, which suffered enormous environmental damage during communist rule.[69] Bureaucracies or regulatory agencies in Western democracies may function better than that, but the evidence shows that bureaucrats are often preoccupied with avoiding risk rather than with eliminating waste,[70] and that regulatory agencies are prone to be taken over by the very people that they are expected to monitor.[71] In the corridors of power, special interests are heard like shouts, and the public interest as a whisper.

66 Arthur C. Pigou, *The Economics of Welfare* (London: Macmillan and Company, 1920).

67 Frank H. Knight, Some Fallacies in the Interpretation of Social Cost, *Quarterly Journal of Economics,* Vol. 38, No. 4 (1924), pp. 582–606.

68 Ronald H. Coase, The Problem of Social Cost, *Journal of Law and Economics*, Vol. 3, No. 1 (1960), pp. 1–44.

69 One example is, Vladil Lysenko, *A Crime Against the World: Memoirs of a Russian Sea Captain* (London: Victor Gollancz, 1983).

70 Gordon Tullock, *The Politics of Bureaucracy* (Washington DC: Public Affairs Press, 1965).

71 Harold Demsetz, Why Regulate Utilities? *Journal of Law and Economics,* Vol. 11, No. 1 (1968); George J. Stigler, The Theory of Economic Regulation, *Bell Journal of Economic Management Science,* Vol. 2, No. 3 (1971), pp. 3–21.

7

# GOOD FENCES MAKE GOOD NEIGHBOURS

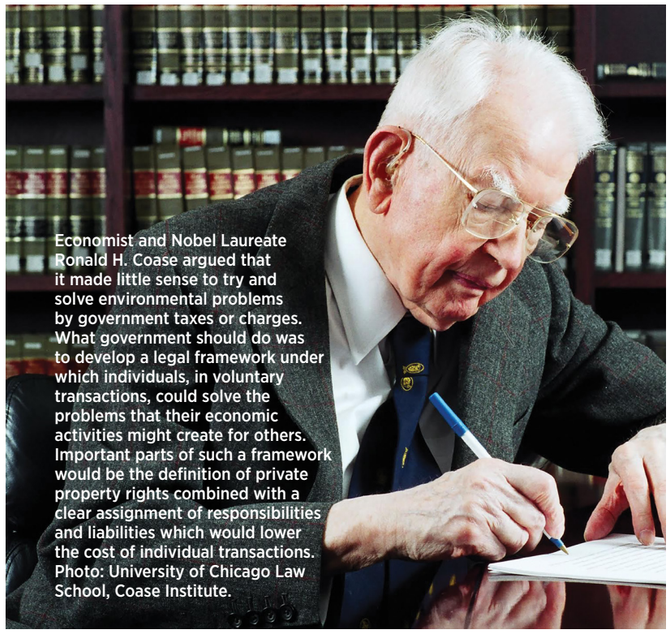
Ecofundamentalists present their case as if they can speak in the name of nature. Wise use environmentalists reject this idea, quoting Frank H. Knight: 'I mistrust reformers. When a man or group asks for power to do good, my impulse is to say, "oh, yeah, who ever wanted power for any other reason? And what have they done when they got it?" So I instinctively want to cancel the last three words, leaving simply "I want power"; that is easy to believe. And a further confession: I am reluctant to believe in doing good with power anyhow.'[72] For wise use environmentalists, the question is about different individuals pursuing different aims. It should not be constructed as a question about one group using power to impose its will on another group in the name of an ideal. If some ecofundamentalists want to ban whaling or ivory trade, for example, then there is a conflict between two groups of human beings, not between human beings and nature. One group wants to hunt and eat whales, while another group wants them to be left alone to roam around in the seven seas, feeding on plankton and fish that otherwise would be harvested. One group wants to carve ornaments out of ivory, while another group wants to see elephants being preserved, seemingly at the cost of the people sharing a habitat with them.

Wise use environmentalists would not assign priority to any of these groups, but rather try to reconcile their aims so that no one group would force its view upon other groups. They also stress that the aims of the different groups need not be totally incompatible. If only so many whales are hunted and eaten that there is plenty of them left to roam around, then there should not be a conflict. If only so much ivory is removed from dead elephants that there are plenty of elephants left in the African bushland, then there should not be a conflict. There may be more groups involved in these cases, but they are all groups of human beings. The lodestar should be reciprocity, a judicious weighing of interests. A conflict would only rise if one group tries to impose its view on another group – and thus harming it – without apparent good reason. For example, if ecofundamentalists try to ban whaling when it is within sustainable limits simply because they do not want the other group to hunt and eat whales (like other animals are hunted and eaten, such as reindeer), or if they would try to ban ivory trade simply because they cannot accept that the other group culls elephants (like other animals are culled, such as bison).

It is one of the most important tasks of economics and of political philosophy to find ways of reconciling different aims and pursuits so that people need not use power against one another. In complex, modern society people interact in many ways, and sometimes their activities have harmful effects on others. Ronald H. Coase gave the example of straying cattle that destroy crops on neighbouring lands. He argued that the harmful effects are felt in both directions: If the cattle-raiser is liable for the damage, then he will erect a fence at his cost. If the farmer is liable for it, then he will erect the fence. Either way, given that liability is clearly defined, the result would be economically efficient because all cost would have been taken into account. Coase went into detail about this, but the conclusion to be drawn from his analysis is that it is essential that private responsibilities and liabilities, in other words private property rights, are clearly defined so that people can in voluntary transactions negotiate ways of dealing with harmful effects of business activities.

Another case Coase discussed was that of a confectioner who ran some machinery in connection with his business. A doctor later came to occupy neighbouring premises. After a few years he built a consulting room right against the confectioner's kitchen. It emerged that the noise from the machinery made it difficult for the doctor to use his new consulting room. Now who

72 Frank H. Knight, The Role of Principles in Economics and Politics (Presidential Address to the American Economic Association 1950), *American Economic Review,* Vol. 41, No. 1 (March, 1951), p. 29.



Economist and Nobel Laureate Ronald H. Coase argued that it made little sense to try and solve environmental problems by government taxes or charges. What government should do was to develop a legal framework under which individuals, in voluntary transactions, could solve the problems that their economic activities might create for others. Important parts of such a framework would be the definition of private property rights combined with a clear assignment of responsibilities and liabilities which would lower the cost of individual transactions. Photo: University of Chicago Law School, Coase Institute.

was harming whom? The confectioner by operating the machinery or the doctor by building a consulting room near the confectioner's premises? The answer depends on the circumstances, not least the history of the case and the reasonable expectations about the future that the various interacting parties would have formed. If the confectioner had been operating his machinery for a long time, and then the doctor built a consulting room near his premises and demanded that the confectioner stopped his activities that had harmful effects on him, then it would seem that the doctor was causing the nuisance rather than the confectioner. To mention a more general case, a person who is sensitive to noise should not move from the countryside to a big city, or at least not to a busy street in the city. Coase observed that gradually in England's common law system a framework of judgements on such issues defined rights and liabilities and, thus, facilitated negotiations between the two sides.[73]

Free market economists argue that the problem of harmful effects of economic activities would often be more efficiently solved in voluntary transactions, presupposing some private property rights, than by taxation, as Arthur C. Pigou envisaged. Sometimes, they add, it might be too costly to develop private property rights, and then people might be better off by simply not doing anything about the problem. Consider an Icelandic example, which is similar to those that Coase discussed. When Icelandic fishermen harvest herring, they usually bring it to villages on the coast where it is smelted into fishmeal. But there is a strong odour coming from the fishmeal smelter that some at least would regard as pollution. This smell, prevalent in Icelandic fishing villages in early 20th century, was actually called 'money smell' because herring smelting created jobs and brought in money. Suppose, however, that a group of people in an Icelandic fishing village start to complain about the smell. Economists in the Pigovian tradition would respond that the problem was that the fishmeal smelter did not take the harmful effects of its activity into account. These effects had to be priced. Government, therefore, should impose on the fishmeal smelter a pollution tax equivalent to the presumed harmful effects that the smelter caused.

Perhaps the matter is not so simple. How would such a 'smell tax' be calculated? The nuisance is not distributed evenly among the villagers for at least two reasons: some people are less sensitive to smell than others, and some people live farther away from the smelter than others. The smell also depends on weather. In windy weather (common on the Icelandic coast) it disappears fairly quickly. Should the smelter pay no tax in windy seasons when the smell is weak and sporadic? And why should the government receive tax revenue out of a nuisance suffered, or at least felt, by the villagers? The Pigovian solution does not seem to be that the tax revenue would be used to compensate the villagers for the nuisance; and if it were, then there would be the difficult task of deciding how much each of them should get. It is true that if owners of the fishmeal smelter have to pay a tax equivalent to the harmful effects of their herring smelting, then they may feel compelled to undertake some reforms in their factory to reduce the tax, for example by installing some machinery to control the emission of gases or by extending the chimneys higher up. But harmful effects of herring smelting have not been eliminated. The cost has simply been transferred from the villagers to the fishmeal smelter owners who pay it either as a tax or as an additional cost of production in the form of new machinery or higher chimneys.

Economists pursuing the same research programme as Coase would suggest that the reason why those villagers who were sensitive to the smell had not negotiated some deal with the fishmeal smelter owners was that it would not have been worth while

73 This point is also persuasively made by Bruno Leoni, *Freedom and the Law* (Princeton NJ: D. Van Nostrand, 1961).

American economist Harold Demsetz, Professor (Emeritus) at UCLA, argues that private property rights typically arise in response to new effects (harmful or beneficial) of economic activities. Here he and his wife Rita are awaiting their dinner at the 2005 regional meeting in Iceland of the Mont Pelerin Society. Iceland is a food exporter, and the starter was smoked eel, while the main course was reindeer steak. Photo: Saevar Gudmundsson.

to do so in the circumstances prevailing in Icelandic fishing villages in early 20th century. The number of interacting parties would have been too large, and the extent of the nuisance would have been unclear. In the circumstances it would have been wiser simply to leave the problem alone. It would have cost too much to correct it. Therefore, rights to odourless air (which would have been some kinds of property right) had not been introduced. After all the activity of the fishmeal smelter also had beneficial effects: it created jobs. The smell was 'money smell'. Perhaps people with a strong sense of smell should not have settled in the village in the first place. Perhaps the owners of the fishmeal smelter would have moved it to another location if the 'smell tax' had become exorbitant in their view. Coase emphasised that the problem of harmful effects (or 'externalities' as some other economists call them) had to be analysed as a whole, considering the interests of all those involved. Incidentally the smell that used to hover over people in Icelandic fishing villages is one of the problems modern technology has solved. At the same time as people in developed, affluent countries like Iceland have less tolerance for odour released from factories, new machinery and higher chimneys have become cheaper. It is, of course, in the interest of owners of fishmeal smelters to keep their neighbours and staff reasonably content. The 'money smell' in Icelandic fishing villages has disappeared, but not the money.

American economist Harold Demsetz, developing Coase's insights, argues that private property rights typically emerge in response to new and harmful (or beneficial) effects of economic activities involving new scarcities. They enable resolutions of conflicts arising from such changes. As a prime example Demsetz used anthropological evidence about the development of private property rights in land among Indians in the Quebec region. Initially they were hunters without any private property rights in the land they inhabited, and they used to hunt beaver just for their own private use as meat and fur. Then European merchants and settlers arrived and started to buy fur from them. As a consequence the fur price rose and hunting increased. In response the Indians divided up the land. Each group was allotted a certain territory in which it could hunt exclusively. A hunting season was also defined. The rights to hunt on a certain territory were inheritable, and the Indians retaliated against trespassers and took care not to overhunt in their respective territories. A system of private property rights, held by individual groups of Indians, had emerged. Demsetz explains why such territorial rights did not develop among the Indians of the southwestern plains – no fur-bearing animals were to be found there. The animals of the plains were primarily grazing species that wandered over wide tracts of land. It would have been costly and cumbersome for the Indians hunting those animals to try and develop private property rights in this land.[74]

Another more modern example also brings out how private property rights can emerge in order to resolve conflicts arising from new effects of economic activities. It was commercial broadcasting in the United States that started after the First World War. For technical reasons there were limits to the number of radio stations that could operate in a certain area. A station had to be confined to a certain area and transmit over a certain radio frequency if it was not to interfere with similar activities of other stations in its vicinity. American economist Thomas W. Hazlett shows how private property rights did indeed emerge in the United States to resolve this.[75] From 1920 to 1923 the US Secretary of Commerce issued licenses to radio stations on demand. When excess demand developed, the secretary withheld additional licenses. In 1923 a court decided that the Secretary had no authority to do this because he had no legal standard on which to choose between competing applicants. He was allowed, however, to select location, time and frequency of individual stations so as to minimise interference. From 1923 to 1926 the Secretary continued, in practice, to ration scarce broadcasting licenses. Since radio stations retained their licenses when sold, there was a price on licenses, or radio frequencies, indirectly reflected in the price of stations.

The rice paddy is but one of many possibilities of using land. When private property rights to land are developed, not only are incentives for the farmer (and landowner) to work harder created, but also the possibilities of dividing up or merging land and of changing its use. Capitalism is a dynamic process, involving 'creative destruction'. The attempts in the 20th century in Russia and China to enforce collectivisation of agriculture ended with disasters.

However, in 1926 a court decided that the federal government had no authority to define individual rights to the radio spectrum, such as the licenses issued by the Secretary of Commerce. This seemed to create open access to a scarce resource, with chaos as the result. In a court decision in the autumn of 1926, a possible solution emerged. The radio station WGN had been broadcasting at a certain frequency in the Chicago area, where it had established a following among listeners. Another station began broadcasting on an adjacent frequency in September 1926, causing WGN to file a complaint alleging that it was necessary to maintain at least a certain separation of frequencies on stations located within 100 miles of each other because the newcomer was injuring a lawfully acquired business property, namely the good will associated with WGN's established radio frequency. The court decided on the basis of common law that since radio stations had in recent years been bought and sold on the understanding that they would retain their licenses, and since they usually had established some following, or good will, in the locations in which they operated, they were entitled to the exclusive use of the frequencies at which they had been broadcasting. Hence, the court upheld WGN's complaint.

The court decided, in effect, that private property rights could be established in the radio spectrum by homesteading or the first occupancy principle. After the decision several stations moved to file similar claims as WGN. It seemed that broadcasting rights would be established as private property rights in a peaceful spontaneous process. At this moment, however, Congress intervened, with the endorsement of the Secretary of Commerce, Herbert Hoover, the later President. Congress passed a bill making the radio spectrum public property and giving a federal commission the authority to issue non-transferable broadcasting licenses. The bill's author, Senator Clarence C. Dill, spoke with great clarity on the matter. 'Uncle Sam should not only police this 'new beat'; he should see to it that no one uses it who does not promise to be good and well-behaved.' The major broadcasters supported the bill, because licenses were initially more or less issued in accordance with established practice. They had lobbied for the denial of licenses for newcomers and for

74 Harold Demsetz, Toward a Theory of Property Rights, *American Economic Review,* Vol. 57, No. 2 (1967), pp. 347–59.

75 Thomas W. Hazlett, The Rationality of U.S. Regulation of the Broadcast Spectrum, *Journal of Law and Economics,* Vol. 33, No. 1 (1990), pp. 133–75.

not extending the broadcast band, as was technically possible.

Hazlett suggests that the 1927 broadcasting law was the product of an informal alliance between the larger broadcasters who wanted further limits on entry than those that would have been brought about by well-functioning market forces and the politicians who wanted to have at least some control over the new medium of communication.

Hazlett's story holds two lessons. First, there was a feasible solution to the problem of interference in the radio spectrum; it was a solution in terms of private property rights that could be exclusive, divisible, transferable and permanent. Some economists in the 1950s and 1960s, noting the inefficiency of broadcasting regulation in the US, advocated creating a free market in broadcasting licenses by auctioning them off. But this would have been unnecessary if the law had been allowed to develop in the direction that it was taking in the autumn of 1926.

Second, it was not sufficient to analyse the behaviour of participants in the market process under existing technical constraints: the part played by politicians should not be neglected. There is not only the 'demand' side of property rights; there is also the 'supply' side. Politicians did not confine themselves to setting rules enabling people to resolve the conflict by trade. They wanted control over broadcasting. In the US broadcasting is regulated by the government; a station receives a non-transferable license to broadcast in a certain area and over a certain radio frequency. In many other countries, at least until recently, the government even retains a monopoly on broadcasting.

In a condition of scarcity, which is the human condition, conflicts are likely to arise about uses of resources, especially about the harmful effects of business activities, as Demsetz emphasises. Private property rights serve to reduce such conflicts: good fences make good neighbours. Such rights also can be supported by political and social arguments. By enabling people to reduce harmful effects of economic activities to a tolerable minimum (or internalise externalities, as some economists put it), they create better general conditions for peace in society. They bring about, in other words, the spontaneous coordination of economic activities and the mutual adjustment of individuals, which is one of the clearest signs of a civilised society. Private property rights also direct aggressive instincts into channels acceptable and indeed beneficial to others. It has been observed that man is seldom so innocently employed as in making money; and that it is better that a man should tyrannise over his bank account than over his fellow citizens.[76] The transfer of natural resources into the hands of individuals creates an increased sense of responsibility; the resources are taken into custody, as it were; their owners become their custodians; and if they are inefficient in utilising them, they will sooner or later lose them: a fool and his resource are soon parted. Property enables people to take the future into account – to take the long-term view. It has been said that one of the greatest problems in Russia is that there was never a tradition of private property rights in natural resources, even before the communist era.[77] It has also been observed that in less developed countries, much of the capital is 'invisible': it cannot be properly registered or transferred. Improvements on it will not always directly benefit its holders; therefore, such capital does not grow at the same rate as capital in more developed countries.[78]

It is true that in a system of private property rights, some people will be vastly richer than others. Rarely mentioned, however, are the (undoubtedly unintended) benefits of rich people: they reduce the cost of the free market's experimental process by consuming goods that are very expensive in the beginning and become much cheaper in the process, such as the car, the television set, the video recorder and the personal computer. People of independent means provide some resistance to the potential tyranny of petty officials. They can take off the time and command the resources to fight them before the courts and in the media. It is also more than likely that a group of 100,000 capitalists will provide more risk capital than 10 investment funds controlled by political appointees. While rich people certainly create some resentment, in a strong and vibrant economy with much upward social mobility, such people also create hope and encouragement. Most importantly, what explains the creativity, and ultimately the ever-improving living standards in capitalist countries, is the ability of people to experiment with, innovate on, combine or divide, buy or sell their property. Not only do good fences make good neighbours: they also make productive neighbours.

76 The authors quoted are of course Dr. Samuel Johnson and John Maynard Keynes.

77 Richard Pipes, *Property and Freedom* (New York: Vintage Books, 1999).

78 Hernando de Soto, *The Mystery of Capital* (New York: Basic Books, 2000).

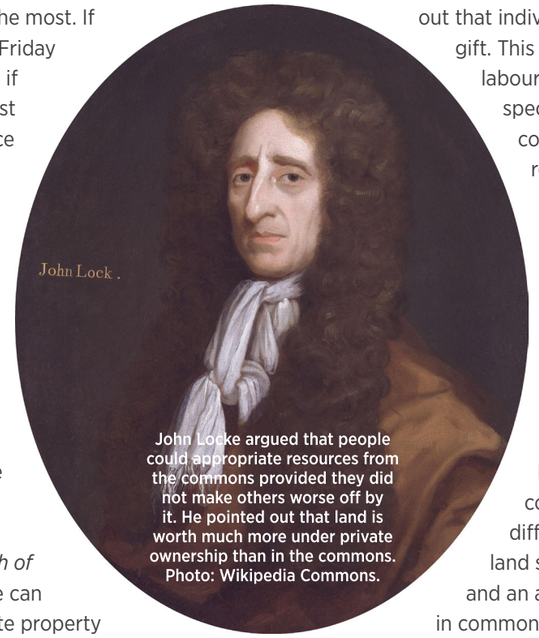




8

# LAND AND THE GEORGIST ILLUSION

One of the most important steps man has taken is from being a hunter and gatherer to being a cultivator of land. This was made possible by private property rights in land. But a key element in property rights is that they are rights of exclusion. Many people can see the argument for free trade: goods are sold by those who best know how to produce them and are bought by those who value them the most. If Robinson Crusoe and Man Friday have different abilities, and if each of the two produce just that which they can produce more of (or do better) than the other one, and if they subsequently freely trade their respective products, then it is obvious that both will gain and that the total 'national product' on their island will increased. An explanation for wealth being created by free trade and the division of labour was of course what Adam Smith offered in *The Wealth of Nations*.[79] But fewer people can see the argument for private property and the rights of some owners to exclude others from the use of natural resources, such as land, forests, mines, wells and animals. If earth was initially given to the whole of mankind, how could some people gain the right to exclude others from plots of land, for example?




John Locke argued that people could appropriate resources from the commons provided they did not make others worse off by it. He pointed out that land is worth much more under private ownership than in the commons. Photo: Wikipedia Commons.

English philosopher John Locke – probably the most influential philosopher the world has seen as he inspired both the 1688 Bloodless Revolution in England and the 1776 American Revolution – provided a plausible answer. He argued that private property rights could develop spontaneously in the state of nature and that civil society was established to protect and define such rights. Locke would not have objected to the idea that earth was initially given to the whole of mankind. (Indeed, he thought it was given to humans by God.) But Locke pointed out that individuals needed to use this gift. This they did by mixing their labour with it, applying their special abilities to it. They could appropriate natural resources, provided that they left enough and as good in common for others.[80] Private property rights fulfilled this proviso because of their productivity. Land was worth much more when privately owned than in a commons.

Locke asked his readers to consider what would be the difference between an acre of land sown with wheat or barley and an acre of the same land lying in commons. A modest estimate would be, he suggested, that nine-tenths of the land's value was because somebody had worked on it.[81] The argument was, in other words, that the appropriation or enclosure of land so much increased its value that those who did not appropriate it were not made worse off (which is a reasonable way to interpret the Lockean proviso that by appropriation enough and as good would be left in common for others).[82] Although others had been

79 Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (Oxford: Oxford University Press, 1976 [1776]). Available online (in another edition) http://oll.libertyfund.org/titles/smith-an-inquiry-into-the-nature-and-causes-of-the-wealth-of-nations-cannan-ed-in-2-vols

80 John Locke, *Two Treatises of Government*, 2nd Treatise, ed. Peter Laslett (Cambridge: Cambridge University Press, 1967 [1689]), §26.

81 Ibid., §40.

82 Robert Nozick: *Anarchy, State, and Utopia* (Oxford: Basil Blackwell, 1974), pp. 176–177.

In late 19th century it was for a while a popular idea to try and tax land in such a way that all 'rent' from it (that part of the income of landowners which came only from the land, and not from human effort) would be seized by government. But the possible government revenue from a tax on rent was wildly exaggerated and it was also almost impossible to distinguish between what came only from natural, unworked land and what was a result of human improvements on the land. Photo: Creative Commons.

deprived of the opportunity to cultivate the already appropriated plots of land, other opportunities had been created for them.

Locke's argument for justice in initial appropriation was libertarian rather than utilitarian. Private property rights were not defended by him because they made people happier or worked for the common good, but because appropriation by one did not violate the rights of others. The reason someone could appropriate land justly was that he did not make any other individuals worse off. If someone were to protest that others were indeed made worse off by a plot of land being removed from the commons, then the response would be that nobody could be emotionally attached to land that he had never even owned or cultivated: If he were offered other opportunities just as good or better than he had lost by somebody else appropriating a particular plot of land, then he had no complaint. Locke's argument was really the classical liberal one that an individual should be free insofar as he did not harm others by his activities. Into that libertarian argument entered the empirical consideration that the increased productivity of private property rights more than compensated in added opportunities for possible lost opportunities because of initial appropriation.

A personal anecdote may illustrate this crucial point. One of my teachers at Oxford, David Miller, was – and perhaps still is – a market socialist. He accepted free trade, but rejected private property in natural resources.[83] Over tea, he once said to me: 'What I am worried about is the man who arrives in a new country and finds that everything already has been appropriated.' I answered: 'But surely someone who arrives in North America in 1950 can be expected to be better off than someone who arrived in 1650?' More or less all natural resources in North America had been appropriated in 1950, but the opportunities that had been created in the process made the immigrant then arriving likely to become much better off than the settler arriving in 1650.

While Locke is certainly right that a piece of cultivated land is worth much more than a piece of a wilderness, it is also important to ask what will happen to this piece of cultivated land in a dynamic economy, with its 'creative destruction', as Austrian economist Joseph Schumpeter called it.[84] Where private property rights in land are clear and well-defined, they are

83 David Miller, Socialism and the Market, *Political Theory,* Vol. 5, No. 4 (1977), pp. 473–490.

84 Joseph Schumpeter, *Capitalism, Socialism, and Democracy* (New York: Harper & Brothers, 1942), p. 83.

divisible and transferable. When they are divisible, the owner can choose that utilisation which is most profitable. For example, one part of a privately owned plot of land may be suitable for growing wheat and another one for rearing livestock. When these rights are transferable, the plot of land can be divided up or merged with another plot. Through the system of profit and loss, and the interaction of demand and supply, the owner gets information about what to do with his land. If he fails, he loses his property. If he succeeds, he keeps it and perhaps adds to it.

The market process itself is much more important than any initial distribution of assets, as Adam Smith clearly stated:

> The produce of the soil maintains at all times nearly that number of inhabitants which it is capable of maintaining. The rich only select from the heap what is most precious and agreeable. They consume little more than the poor, and in spite of their natural selfishness and rapacity, though they mean only their own conveniency, though the sole end which they propose from the labours of all the thousands whom they employ, be the gratification of their own vain and insatiable desires, they divide with the poor the produce of all their improvements. They are led by an invisible hand to make nearly the same distribution of the necessaries of life, which would have been made, had the earth been divided into equal portions among all its inhabitants, and thus without intending it, without knowing it, advance the interest of the society, and afford means to the multiplication of the species. When Providence divided the earth among a few lordly masters, it neither forgot nor abandoned those who seemed to have been left out in the partition.[85]

It matters much more that private property rights in land, or other natural resources, are well-defined than to whom they are initially allocated, because in voluntary, uncontrolled transactions they will anyway end up in the hands of those who value them the most.

However, some have held that landowners do not create wealth because they are mere rent collectors. This position is based on the idea, articulated by English economist David Ricardo in early 19th century, that land was special because its supply was more or less fixed. Hence, it produced rent, which was created by nature and collected by landowners. Ricardo pointed out that plots of land were of different productivity. Some plots were so unproductive that it did not even pay to cultivate them. Now, an increased population would lead to an increased demand for food. Then the land, which previously was considered too unproductive to cultivate, would be put into use. This would continue up to the point when the produce from the least productive plot would become equal to the subsistence needs of those who lived on it: they would not be charged anything for its utilisation. This is 'the margin of production'. Those living on more fertile plots of land would be charged in proportion to the fertility of the land that they utilised. The difference between the prices charged for using plots of different quality is the land rent, and it goes to the owner of the land. It is in fact the difference between the margin of production and the productive capacity of land.[86]

Ricardo's theory of rent inspired American writer and activist Henry George to present radical ideas on taxation. Living in California in mid-19th century, George noticed that the public did not seem to benefit at all when the price of land rose as a result of gold discoveries. It was only the landowners who benefited, even if they had not contributed anything themselves. (This was the same argument, it should be noted, as Karl Marx presented against the right of woodland owners to exclude others from collecting fallen branches of trees on their land.) In his 1879 book, *Progress and Poverty,* George proposed that government should expropriate all land rent through a 'single tax', equal to the rent of land: the more fertile the land, the higher the tax. According to George, such a single tax had many advantages. First, it only applied to that part of income which landowners had not earned and which they, therefore, did not deserve. Second, such a tax, unlike many other taxes, would not reduce the incentive to work or diminish the total social product. It was applied to cultivated or cultivatable land, which was in fixed or nearly-fixed

85 Adam Smith, *A Theory of Moral Sentiments* (Oxford: Oxford University Press, 1979 [1759]), Part IV, Ch. 1, §10. Available online http://www.econlib.org/library/Smith/smMS4.html

86 David Ricardo, *On the Principles of Political Economy and Taxation* (London: John Murray, 1817). Available online http://www.econlib.org/library/Ricardo/ricP.html

supply. The tax would not, therefore, affect supply, but it would ensure that landowners would not leave their properties unused. The tax would also hinder speculation in land. Third, the single tax could replace most other taxes and even be sufficient for the needs of government.

Georgism, as the demand for a single tax came to be called, may appear plausible on first sight. But it has its problems. First, many farmers or other land users have paid the full price for their plots of land, even if other landowners certainly may have just seen its price rise without any efforts or improvements by themselves. It seems unfair to treat the two groups in the same way.

Second, it is difficult or well nigh impossible to distinguish between the rent from natural, unimproved land on the one hand and the contribution to its value by landowners (for example their foresight and prudence or their reforms of the land) on the other hand. The rent is the price of the land itself, but how can this price be found when each plot of land is different? Farmland close to a big city is for example worth much more than an equally fertile farmland in a remote corner of a country. But how much of the additional price can be attributed to improvements on the plot, to its natural fertility, to its location and to the foresight of the owner (who perhaps successfully bet on a village becoming a city). Georgists seem to assume that the highest value of a plot of land, whether it is located in a city or the countryside, is always a known figure, making its taxation easy to accomplish. But what would be the most profitable utilisation of a plot of land is something which would only be discovered in the market process.

Third, Georgists have to be consistent. If they, in the name of justice, demand expropriation by taxation of all land rent, then they should also demand expropriation of other types of rent. Abilities inherited by and particular to individuals, such as physical beauty, superior intelligence and athletic prowess, enable the individuals possessing them to collect rent in an economic sense: the supply is fixed or nearly fixed, whereas the demand can change. But many would hesitate to try and expropriate the additional income which a few people enjoy as a result of their special and irreproducible gifts, not least because it is even more difficult in that case than in land utilisation to distinguish between inherited abilities on the one hand and what people make of them on the other hand: some people cultivate their abilities, others waste them.[87]

Finally, George overestimated the possible revenue from a single tax. In any developed country, land rent is only a small part of the gross national product (GNP), frequently less than one-tenth of it.[88]

However, George was not all wrong. It seemed unjust to many, for example, how a few powerful noblemen in Great Britain had been able in the 17th and 18th centuries to appropriate vast areas of land through enclosures of the commons. The radical English liberal Herbert Spencer argued in 1851 that private ownership of land clashed with individual freedom, which required every man to have some room for action, but which he could hardly enjoy if the whole of the earth's surface were owned by a handful of men. Many pieces of land had also in the past been appropriated by violence, Spencer observed. The government should nationalise land and lease the plots out to the highest bidders.[89] But forty years later, Spencer had changed his mind: he then pointed out that if the public had any claims against landowners, it would only be for the part of their income derived from unimproved, natural land. The violence which had been used to appropriate land would be like nothing in comparison with the violence which would be necessary to seize land from those who had cultivated it and improved it for generations. Therefore, it was best, or at least most practical, Spencer concluded, to leave land in the hands of present owners.[90] John Stuart Mill agreed with the younger Spencer that the very unequal distribution of land ownership in the United Kingdom seemed unjust. In a paper on property rights in land, he wrote that by imposing special taxes on land, the government would be confiscating 'unearned increment' from land.[91]

The Georgists gained a perhaps unexpected ally in 1962, when American economist Paul Samuelson

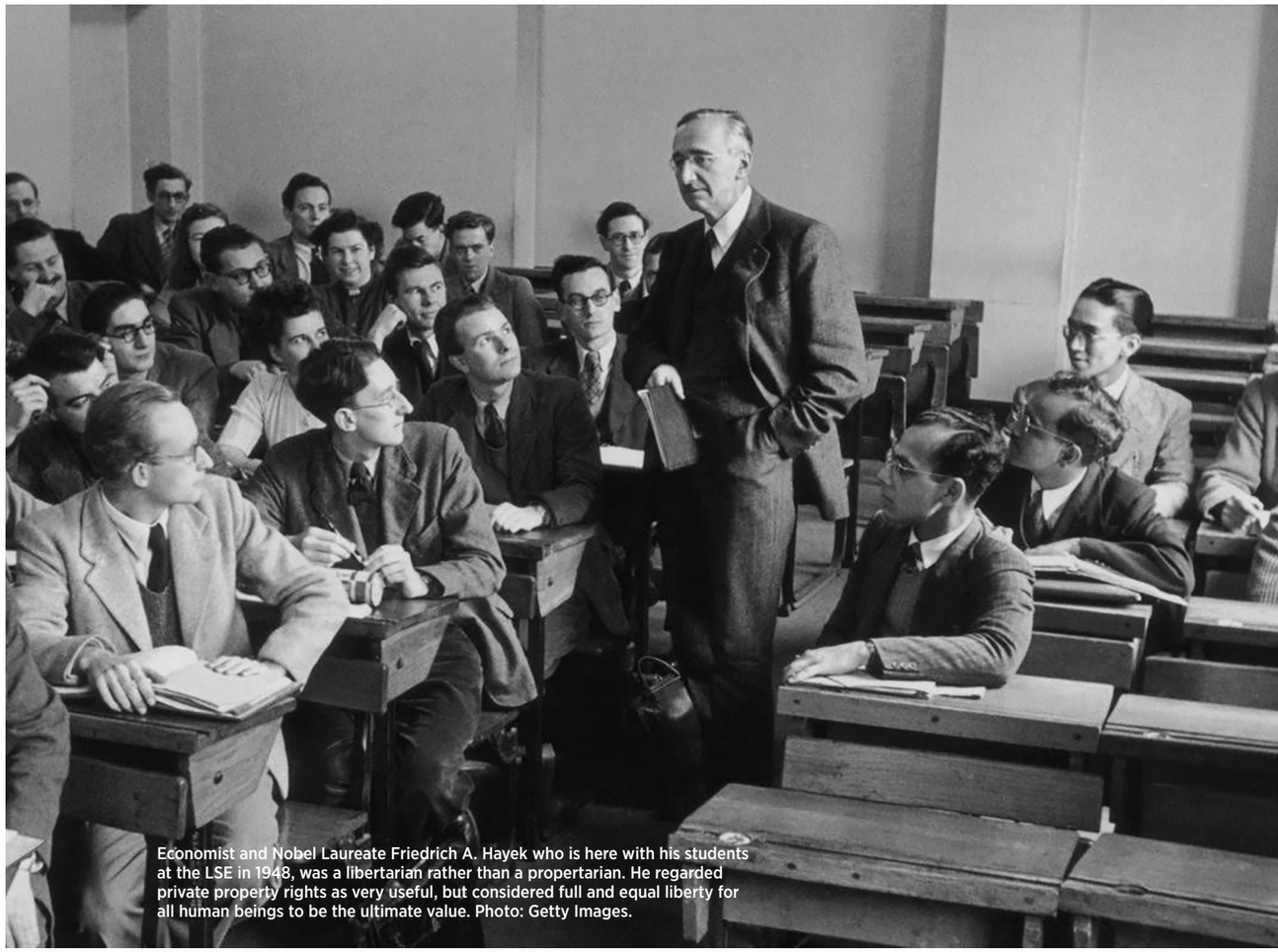
87 However, the influential American philosopher John Rawls claims that since individual abilities are inherited, people do not deserve them or the extra income they are able to collect as a result of possessing them. *Theory of Justice* (Cambridge, MA: Harvard University Press, 1971).

88 David Friedman, *The Machinery of Freedom* (New York: Harper & Row, 1973), pp. xiv and xv.

89 Herbert Spencer, *Social Statics* (London: John Chapman, 1851), Ch. IX. Available online http://oll.libertyfund.org/titles/spencer-social-statics-1851

90 Herbert Spencer, *The Principles of Ethics,* Vol. II, Pt. 4, *The Ethics of Social Life: Justice,* Appendix B: The Land Question (New York: D. Appleton & Co.,1891).

91 John Stuart Mill, The Right of Property in Land, *Examiner* 18 July 1873, pp. 725–8.



Economist and Nobel Laureate Friedrich A. Hayek who is here with his students at the LSE in 1948, was a libertarian rather than a propertarian. He regarded private property rights as very useful, but considered full and equal liberty for all human beings to be the ultimate value. Photo: Getty Images.

wrote a paper (published later) arguing that land enclosure increased efficiency, but that nevertheless landlords were mere rent collectors and not worthy of their full hire. Samuelson envisaged two plots of land, A and B, different in quality and initially held in common by a village, inhabited by six men who worked jointly (contributing equally) on the land and who divided the total product derived from the land up equally amongst themselves. Samuelson then showed that the total product from the land would increase if rent would be collected for the use of the more fertile plot A. If rent was not collected, labour would be allocated between the two plots in such a way that the workers' average income from both of them would be equal, whereas that allocation of labour would be more efficient whereby marginal income would be equal. In other words where land was held in common, there was not a charge for the utilisation of plots reflecting their different quality – in other words when rent was not collected for the land, the more fertile plots would be over-utilised and over-worked. As in the case of the two roads analysed by Pigou and previously discussed, there would be a loss in the form of a benefit foregone. Rent would be dissipated.

Samuelson also demonstrated that rent collection would bring down the wage level of the land workers. What was the reason for this? After the introduction of rent collection, the workers would each receive the marginal income from the land equal to the marginal income from the less fertile plot B, and this was lower than the average income from the two plots which they had each previously received, assuming an inelastic labour force and diminishing returns. While landlords certainly rendered a social service by collecting rent and thus increasing the total product from land, as Samuelson accepted, there was, he suggested, some merit in the old Marxist contention that enclosures of commons

had worsened the conditions of the working class. 'Under the conditions postulated, the rent collected by landlords always represents more than the extra output society thereby achieves', Samuelson wrote, 'so in a certain sense, rent collection subject to no tax represents a subtraction (if not 'exploitation') of labor.'[92]

Thus the rent-collector was not worthy of his full hire, Samuelson concluded. A tax on the rent collected by landlords, which would then be redistributed to land workers seemed, on Samuelson's premises, justified. But Samuelson's whole approach was somewhat odd. In the example he analysed, there was a much simpler way of solving the problem of over-utilisation than a special tax on landlords. It was to define private property rights to the land on the basis of utilisation history (a principle of allocation alternatively called first occupancy or 'grandfathering').[93] The six inhabitants in the village would each be given one-sixth of plot A and one-sixth of plot B, since they utilised the two plots equally. Then it would be brought about spontaneously in the marketplace that the two plots of land would be worked on in accordance with their different quality. The six workers in the village would each derive as much or more income from the land than previously, while the total product would, over time, increase. (If some would not utilise the land as efficiently as others, their plots of land would sooner or later be bought by those others.)

It is also difficult to see wherefrom Samuelson's landlord suddenly arrived to appropriate the land previously owned by the village. Samuelson was of course right that those who owned plots of land in common and who worked on them would probably see their conditions worsen if somebody arrived to take this land away from them, even if the total product from the land would, as a result of this enclosure, increase. But the real conclusion to be derived from his analysis is that it does not only matter that total product is increased by an enclosure. It is also crucial that the enclosure takes place in such a way that particular people are not made worse off from it. The land reform has to be Pareto-optimal, which means that all or at least some gain from it and no-one loses, an important point to which I shall return when discussing the development of private property rights in fisheries.[94]

Perhaps Samuelson also should have paused to compare a common-property village and a private property village. In the common-property village, only one-sixth of the income of each person would be derived from his or her own contribution, which might create a temptation to shirk, and that temptation would be strengthened as the number of co-workers would increase. In the private property village all of the income of each worker would be derived from his or her own contribution. Moreover, the question of innovation arises. In the common-property village, a potential innovator would have to convince the other five villagers of his idea, for example to replace cropland by pastures on some plot of land. In the private property village, each would be free to make experiments with his or her own land.

Georgists, like Marxists, seem not fully to comprehend the important role played both by capitalists, including landowners, and by entrepreneurs in a dynamic market process, in 'creative destruction' where the capitalists provide, divide up and merge various kinds of capital,[95] while the entrepreneurs seek new ways of satisfying human needs.[96] This does not mean that supporters of freedom unquestioningly have to accept all existing private property rights. In some countries redistribution of land unjustly acquired in the past has been successful, for example in Taiwan.[97] Perhaps a distinction could be made between *propertarianism,* which apparently regards property as a moral absolute, and *libertarianism,* which sees liberty as the guiding principle and respects property as a very useful device for defending liberty, but not as the ultimate end of life.[98] It should be recalled that Locke, an ardent defender of private property rights, introduced the proviso that others should not become worse off by the initial appropriation of natural resources.

Perhaps the difference between propertarianism and libertarianism can be illustrated by the story of the spring in the oasis. First, there were 20 springs there, so people could settle there with the expectation of having enough water. But suddenly all springs but one dried up. Can the owner of the sole spring now extract an exorbitant price for his water? Propertarians would answer in the affirmative. The man owns the spring and he is not forcing anyone to buy his water.[99] Libertarians like Anglo-Austrian economist Friedrich A. Hayek and American philosopher Robert Nozick would, however, say no. Hayek would consider the abuse of this temporary monopoly to be coercive, while Nozick would say that the Lockean proviso would in such an extreme circumstance come to apply.[100]

Circumstances like these are, however, rare. Western society is not an oasis in a desert, a city under siege or a lifeboat in rough seas. In the real world private property rights in land work well and act as a safeguard of freedom. The interesting question is how far they can be extended.

92 Paul A. Samuelson, Is the Rent-Collector Worthy of His Full Hire? *Eastern Economic Journal,* Vol. 1, No. 1 (1974), pp. 7–10. Words quoted on p. 7.

93 Samuelson recognised this possibility in a footnote to his paper. He said that he had set the problem as an examination subject in 1962, and one of his students had come up with this answer. "This perhaps illustrates the efficiency merit of 'private property' in the sense of providing exclusive use, without regard to rent pricing," he wrote, p. 8.

94 James M. Buchanan, Positive Economics, Welfare Economics, and Political Economy, *Journal of Law and Economics,* Vol. 2, No. 1 (1959), pp. 124–138.

95 Ronald H. Coase, The Nature of the Firm, *Economica,* New Series, Vol. 4, No. 16 (1937), pp. 386-405.

96 Israel Kirzner, *Competition and Entrepreneurship* (Chicago: University of Chicago Press, 1973).

97 Anthony Y. C. Koo, Economic Consequences of Land Reform in Taiwan, *Asian Survey,* Vol. 6, No. 3 (March 1966), pp. 150–157.

98 Robert Nozick suggested those terms to me in private conversation.

99 Murray Rothbard, *The Ethics of Liberty* (New York: New York University Press, 2015 [1982]), p. 221.

100 Hayek, *The Constitution of Liberty*, p. 21; Nozick, *Anarchy, State, and Utopia*, p. 180.

9

# TWO ICELANDIC CASES: SHEEP AND SALMON

Capitalism is much more resourceful than it usually is given credit for being. It certainly can be much more ingenious than 'blackboard economists', who provide mathematical equations about the economy in their lectures, but seem disengaged from real life. Two economists who both won a Nobel Prize in their field provide telling examples of real-life practices. A textbook case of a public good which government has to produce because its use cannot be confined to those who would pay for it is the service of lighthouses rendered to ships passing by. But Ronald H. Coase investigated the problem and found that in some places the market had in fact solved it by so-called tie-in contracts: ships passing by lighthouses paid for the service rendered there in the fees collected at ports. Since ships used both services, those of lighthouses and of ports, they could be charged for both of them at the same time and in the same bundle.[101] Elinor Ostrom, studying various cases of shared goods, such as forests in Nepal, irrigation systems in Spain, mountain villages in Japan and fisheries in Indonesia, discovered that over time human beings tend to develop sensible rules for the use of common-pool resources. Neighbours set boundaries and assign shares, with each individual taking it in turn to use water or to graze cows on a certain meadow. Common tasks, such as clearing canals or cutting timber, she observed, were done together at the same time. The members of the relevant group monitored themselves, watching out for rule-breakers and fining or eventually excluding them. The schemes were mutual and reciprocal, and many of them had worked well for centuries. Best of all, Ostrom thought, they were not imposed from above.[102]

Two examples from Iceland illustrate that solutions can sometimes be developed spontaneously to the problem of indivisible or non-exclusive goods where people have to cooperate in order to control their use. Iceland was discovered by Nordic Vikings in the 9th century and settled, mainly from Norway, between 874 and 930. While the island is large, only parts of it are inhabitable, typically narrow valleys stretching down to the coast, with rivers running through them, surrounded by highlands, heaths and mountains often capped by glaciers. The settlers soon discovered that the raising of livestock was more feasible than the cultivation of fields. Herds of sheep could graze unattended in mountain pastures in summer, as no wild animals (except foxes) threatened them. Each settler claimed in a valley a plot of land for himself and his family and household. This was private property, a Lockean appropriation of land. But most mountain pastures became the collective property of the valley farming community, the so-called 'hreppur', which oversaw not only grazing in those pastures, but also tax collection, maintenance of the poor and mutual insurance against loss of livestock or houses.

The main reason why mountain pastures were not claimed as private property, like valley farmlands, was that exclusion costs for relatively small plots would have been quite high.[103] Individual plots would have had to be large, as vegetation was scattered and sensitive to climatic changes, so grazing conditions varied from one year to another. Monitoring costs would have been high. While fencing costs would have been prohibitive in the rugged terrain, nature itself often formed natural enclosures with rivers, lakes, steep mountains, wasteland and glaciers, but these enclosures extended over large areas. There were also important economies of scale in driving sheep up to the mountains in early summer and in searching the pastures and driving the flocks down again in the autumn.

The original settlers of Iceland (in 874–930) used mountain pastures jointly in the summer time. They discovered that their communities in each Icelandic valley had to put a limit on how many sheep each farmer could drive up to the mountains in spring, otherwise there would be overgrazing.

Thus, the mountain pastures had to be utilised jointly. But, then, some problems of internal governance had to be solved. First, the most economical unit of utilisation had to be found. The 'hreppur' became the unit of utilisation because it was already in place, and, in most cases, it had natural boundaries. The area of a hreppur typically coincided with a valley surrounded by mountains. Moreover, transaction costs in the 'hreppur' community were low, as people knew one another, the community was stable and reputation was highly valued.

Second, farmers jointly utilising a certain mountain pasture had to enforce their individual property rights in sheep. As it happened, it was easy to enforce such rights. The sheep were simply marked on the ear, each farmer having his own particular mark. This was really an example of branding, one of the two most common ways of establishing private property rights, the other being fencing.

Third, the farmers avoided over-grazing by a system of individual grazing rights. There was an incentive for each farmer to drive more sheep up to the mountain pastures than was optimal because he would think that he would reap the whole benefit of more of his sheep grazing there while sharing the cost with all the other farmers. To avoid such free riders, leaders of each farming community were instructed by law to find the maximum number of sheep that could graze in the pastures without affecting the average weight of the flock. In the words of the old Icelandic law-book in force until 1280, 'Let them find that number, which in their judgement does not give fatter sheep if reduced but also fills the pasture.'[104] Once the total quota, or the total allowable number of animals, had been set, each farmer was given a quota on the basis of the value of his farm. A farmer who exceeded his quota paid for each additional sheep a penalty to his fellow members of the community that was twice the rent to an outsider for using the pasture. There is some evidence that this system of joint utilisation of mountain pastures and individual grazing rights worked quite well at the time and fulfilled its function of restricting access to the optimal level.

Another Icelandic example of an indivisible or non-exclusive good that had to be jointly owned or managed in some way are salmon rivers. The Icelandic settlers quickly discovered that about 80 rivers running down from the mountains through the valleys out to sea had ample supplies of the Atlantic salmon. This is a fish that usually spends the first three or four years in those rivers; then it migrates to sea to feed there for one to three years, returning to spawn in the rivers. According to one of the Icelandic sagas, that of the people of Lake Valley, taking place in the early 900s, the owners of two farms by the salmon river in the valley had accepted an informal agreement that either one of them would be free to fish only in the absence of the other one. One of the two violated the agreement, and when reproached, hurled stones at his neighbours who eventually killed him.[105]

While salmon rivers are typical collective or indivisible goods, they did not really become a scarce natural resource until the 19th century. The Icelandic salmon fishery is mainly regulated by tradition and by laws dating from the 19th century. No harvesting of salmon at sea is allowed. In the freshwater fishery, traditionally, riparian farmers have owned the fishing rights. For each river the riparian farmers are required to form a fishing association operating the river. The fishing season is from late May to the end of September. The daily fishing period is 12 hours, between dawn and sunset, and fishing is always prohibited between 3 am and 7 am. Only fishing by rod and line is allowed. There is a maximum, or total allowable, number of rods for each river, set by the

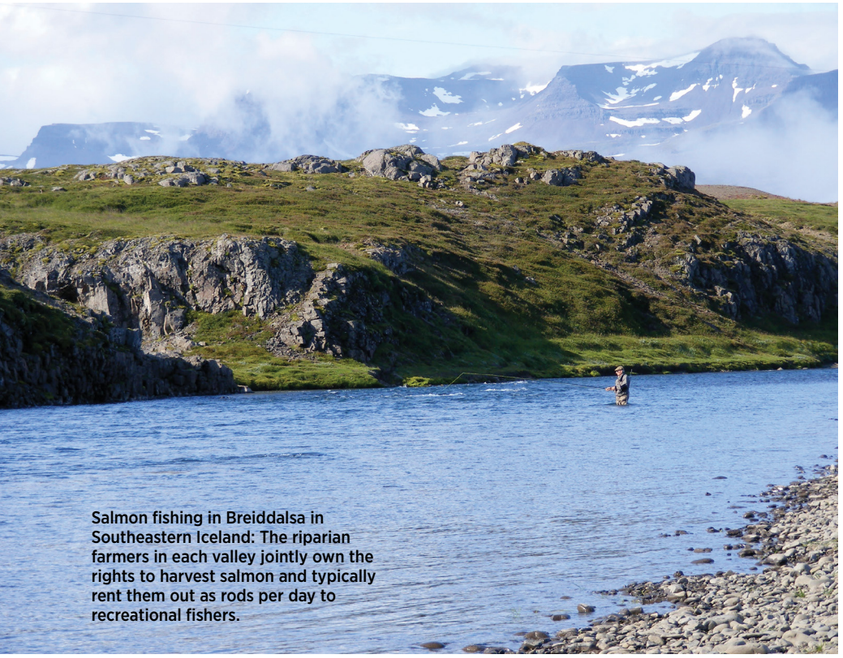
101 Ronald H. Coase, The Lighthouse in Economics, *Journal of Law and Economics*, Vol. 17, No. 2 (1974), pp. 357–376.

102 Here, the succinct summary of Ostrom's work in her *Economist* obituary 30 June 2012 is followed.

103 Thrainn Eggertsson, Analyzing Institutional Successes and Failures: A Millennium of Common Mountain Pastures in Iceland, *International Review of Law and Economics*, Vol. 12, No. 4 (1992), pp. 423–37.

104 Quoted by Eggertsson, Analyzing Institutional Successes and Failures, p. 433.

105 The Saga of the People of Vatnsdal, Ch. 22. *The Sagas of Icelanders*, p. 221.



**Salmon fishing in Breiddalsa in Southeastern Iceland: The riparian farmers in each valley jointly own the rights to harvest salmon and typically rent them out as rods per day to recreational fishers.**

Icelandic Directorate of Freshwater Fisheries. As a rule of thumb, one fish a day for a rod is used to determine the total allowable number of rods; in some rivers there are further restrictions on allowable bait.

Usually the fishing rights in the salmon rivers are leased out by the fishing associations to angling associations. This way the average value of each fish is at least 10 times higher than the price on a fish market. The angling associations, in turn, lease out rods per day to individuals and companies. Salmon fishing has long been a popular, if expensive, pastime in Iceland. In addition to affluent Icelanders who enjoy salmon fishing in summer, a lot of foreign celebrities, millionaires and business leaders come to Iceland each summer for a few days of salmon fishing. Many foreigners find Icelandic nature, with its glaciers and geysers, lakes and waterfalls, barren mountains and green valleys, strangely attractive. The freshwater salmon fishery in Iceland is quite valuable: each fishing season about 36,000 salmons on average are caught, and the total worth of fishing leases for a season is estimated to be 20 million USD.[106] The system works well. The salmon rivers do not seem in any danger of overfishing. Moreover, many fishing associations have tried, with some success, to enhance the salmon stocks in their rivers by hatcheries.

The fishing rights in Icelandic salmon rivers may be regarded as private property rights held by riparian farmers. But they are peculiar in some ways. While they are exclusive and permanent, they are not divisible or wholly transferable. A farmer is not allowed permanently to sell the fishing rights associated with his farm, although the fishing association of which he is a member usually leases them out over the season. So they are only transferable over the fishing season, not in perpetuity. This undoubtedly reflects the political will to maintain traditional farming in the valleys of Iceland. But the fishing rights are further circumscribed, it seems, by regulations on allowable fishing gear and the total allowable number of rods in each river. If the objective is to catch salmon with the minimum cost, then presumably they should be caught in nets at the river's end, not by individual anglers with rods.

There is, however, a good reason why the fishing gear is restricted to rod and line. It is because salmon fishing is essentially recreational. The market for fishing licenses and rods per day is not a market for salmon, but for the experience of enjoying nature while fishing. The quotas in the salmon rivers are essentially effort quotas, expressed in terms of allowable fishing gear, fishing time and fishing season, sometimes even allowable bait. It is well-known that effort quotas in fisheries are less efficient than catch quotas because their holders do not have a sufficient incentive to minimise cost; they tend to try to maximise output. But the output in this case is precisely what is sought: it is to spend a whole day, or even a week, trying to catch as many salmons as one can with a rod. But the main point is that the Icelandic salmon rivers, despite being shared or common goods, seem to be well-managed without much interference from government.

106 *Salmon and Trout Resources* (Reykjavik: Directorate of Fisheries, 2011), p. 4.





10

# FISH STOCKS

The oceans cover seven-tenths of the earth's surface and are yet not settled like land is in most places. One reason is of course that many marine resources seem indivisible and occur on an immense scale, the best example being fish stocks, which are fugitive resources swimming in and out of the territorial waters of individual countries. Another reason is that the fencing or branding that is used on land to operate private property rights seem difficult if not impossible in practice out at sea. The world's offshore fisheries have long served as a prime example of the 'tragedy of the commons', identified by American ecologist Garrett Hardin.[107] In a commons where a resource is shared by many people, each of them will have an incentive to extract as much as possible from it before others do, the result being the over-utilisation of the resource and ultimately its depletion. Some such cases have already been discussed in this report, including unregulated over-grazing of common land,[108] and the solution of that problem, which emerged a thousand years ago in Iceland, is to have quotas held by each farmer that give rights to have a certain number of sheep grazing in the mountain pastures in summer. With the rather primitive technology that traditionally was at the disposal of fishermen, the problem of the commons did not become acute in offshore fisheries until the late 19th and early 20th century. But with the invention of trawls with large nets, sophisticated search equipment, larger ships and sometimes even factory trawlers, harvesting at will from various offshore stocks became relatively easy. It made any negotiated rules on the utilisation of marine resource more difficult because until recently the ocean was regarded as open to all, a *mare liberum*, as Hugo Grotius called it. It was only when individual countries extended their exclusive economic zones out to 200 miles in the 1970s and 1980s (which is now the general principle) that they could start to develop rules about the utilisation of fish stocks and other marine resources.

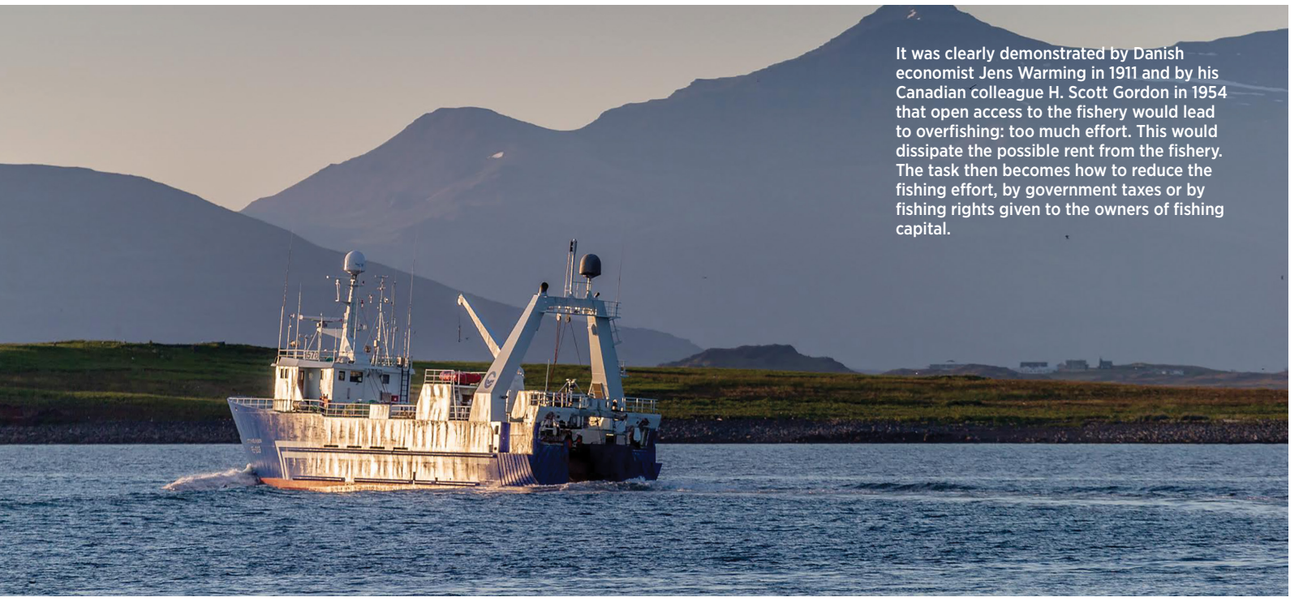
The first economist to subject the fishery to a systematic analysis, Jens Warming of Denmark, argued in 1911 that under the conditions of his day and time, it would not be efficient.[109] He assumed that two offshore fishing grounds, A and B, were of different fertility. Then he demonstrated that other things being even, too many boats would utilise the more fertile fishing ground A in comparison with the less fertile fishing ground B. (To use the language of economists: boats would move from the less to the more fertile fishing ground until average net revenue would be equal on both grounds, whereas they ought to be allocated in such a way that marginal net revenue was equal on both grounds.) The reason was open access: the two fishing grounds were non-exclusive resources. There was no price reflecting their different scarcities and directing individuals to their most efficient utilisation in comparison with economic possibilities on land. The fishermen hence regarded both fishing grounds as free goods. Warming pointed out that rent ought to be derived from a fishing ground, similar to the rent derivable from a plot of land. But unlike land rent, this kind of rent was dissipated in excessive harvesting cost. Fishing effort would expand and new boats would be added to the fleet until there was no more profit to be had from the fishery.

Warming's analysis of the over-utilisation of the more fertile of the two fishing grounds was in principle the same as Pigou's analysis a decade later of congestion on the better of two roads (or for that matter the same as Samuelson's analysis of the over-utilisation of the more productive of two plots of lands). Warming proposed the same solution to the problem as did

107 Garret Hardin, The Tragedy of the Commons, *Science*, Vol. 162, No. 3859 (1968), pp. 1243–8.

108 William Forster Lloyd, *Two Lectures on the Checks to Population* (Oxford: S. Collingwood, 1832), was one of the first to identify the 'tragedy of the commons', indeed using unregulated grazing on common land as an example.

109 Jens Warming, Om 'Grundrente' af Fiskegrunde [On 'Rent' from Fishing Grounds], *Nationaløkonomisk Tidskrift*, Vol. 19 (1911), pp. 499–505. The paper has been translated into English, On Rent of Fishing Grounds, *History of Political Economy,* Vol. 15, No. 3 (1983), pp. 391–6.



It was clearly demonstrated by Danish economist Jens Warming in 1911 and by his Canadian colleague H. Scott Gordon in 1954 that open access to the fishery would lead to overfishing: too much effort. This would dissipate the possible rent from the fishery. The task then becomes how to reduce the fishing effort, by government taxes or by fishing rights given to the owners of fishing capital.

Pigou. It was for government to charge access fees that would reflect the different scarcities of the two fishing grounds: a boat harvesting in the more fertile fishing ground would have to pay more for its access than a boat harvesting in the less fertile one. In essence, Warming's proposal was to define property rights to the two fishing grounds, where the owner would be the government rather than individual fishing firms that would utilise the grounds for a fee. The idea was to restrict access and, thus, to turn the fishing grounds into exclusive resources.

While Warming was right that the explanation for the fishery's inefficiency was open access, his analysis was flawed. First, his suggestion of different access fees to different fishing grounds presupposed more knowledge about these grounds than government could be expected to possess, and easier monitoring of harvesting in these grounds was likely to be the case. Second, while he explained the need, or 'demand' for property rights in the fishery, he did not analyse the 'supply' side, namely the political process that might or might not provide a solution. It was not enough to demonstrate the inefficiency of open-access fisheries on a blackboard. Who would have an interest in moving to a more efficient system? Third, as Ronald H. Coase argued in a different context, the rent dissipation that occurred should really be seen as the problem of harmful effects that the economic activities of individual fishermen had on them as a group. Fish stocks were scarce resources. There would, therefore, be an incentive to rush to the fishing grounds and harvest fish before anyone else came along; there would be an incentive to over-invest in the fishery. Thus, the fishermen would impose costs on one another and create an externality.

A contemporary reader of Warming's pioneering paper could have suggested to him that the proper remedy would have been to try and find rules under which the fishermen would cease to impose costs on one another, or at least reduce these costs to a tolerable minimum. Instead of the government declaring, in effect, the various fishing grounds public property and charging for their utilisation, as Warming proposed, it could have, at least in theory, allowed the fishermen to appropriate the fishing grounds and exclude others from their utilisation. Then the fishermen would have been able to capture the rent that they had previously lost by over-investment. Indeed, on Warming's own premises, the fishing grounds were clearly identifiable, and defining property rights for them would have been relatively easy. However, there are at least two related problems, noted earlier, with creating such territorial rights in fisheries. One of them is that individual fishing grounds may extend over immense areas at sea, far too big to be appropriated by any one firm. The other is that some fish stocks (such as herring in the North Atlantic Ocean and tuna in the Pacific Ocean) are not confined to any identifiable fishing grounds; they are fugitive or migratory in nature, moving from the territorial waters of one country to those of another.

Twenty years later Warming returned to the subject of the fishery, but from a different angle.[110] In Denmark eels are caught in traps laid out at sea close to the coast. Traditionally owners of farms by the coast possessed the rights to lay such eel traps. They did not utilise the resource themselves, but leased the rights out to a community of professional eel fishermen. In the 1920s and early 1930s, this community put pressure on the Danish government to abolish the traditional rights of farm owners by the coast to lay eel traps. Warming's second paper was a warning against such a change in the law. He pointed out that this would be a change for the worse, from restricted to open access. The rent dissipation by over-investment brought about by open access would inevitably occur. It would be an illusion that the eel fishermen would be better off by gaining open access. Instead of having to use a part of their income to pay farmers by the coast for eel trap leases, they would probably use an equal amount for equipment and other kinds of increased effort. Moreover, since the right to lay eel traps was a traditional right possessed by the farmers, government would have to compensate them if it abolished these rights. Alas, the Danish government did not heed Warming's advice; it abolished the rights – an example where the 'supply' side of private property rights failed.

In this later paper Warming pointed out that it was better that farm owners by the coast received rent from the eel fishery than that nobody would receive it, as would have been the case if the farmers' rights to lay eel traps had been abolished. He did not point out, however, that a plausible response to the concern of the eel fishermen would have been to facilitate their buying the rights from the farm owners permanently instead of just leasing them over a fishing season. It would have been a mutually beneficial trade, since presumably the rights would have been worth more to the fishermen than to the farm owners for whom it only provided additional income. Another important point is illustrated by Warming's analysis, although also implied in his earlier paper. It is that some fisheries are territorial in nature so that some kind of fencing and consequently the development of full private property rights in them are feasible. Apart from the Danish eel fishery, the shrimp, lobster and scallop industries in Iceland are other such examples. The products are harvested close to the coast, in local, easily identifiable harvesting grounds that are mostly rather small. There is no theoretical reason why such harvesting grounds could not be privately owned. Fencing (or rather monitoring) costs are not high, and the good is perfectly divisible.

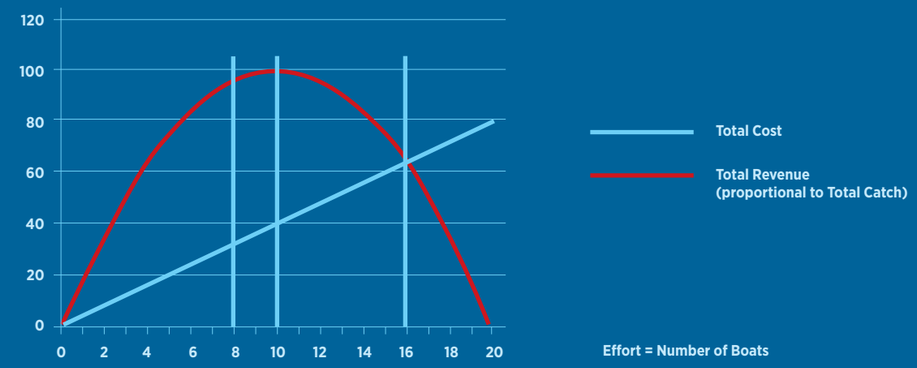
Despite their originality Warming's two papers in 1911 and 1931 did not have any impact. The economics of fisheries was developed by North American economists in the mid 1950s, without any knowledge of or reference to Warming's work. The main principles were set forward by Canadian economist H. Scott Gordon.[111] He said that economists could learn from marine biologists that fish stocks were scarce resources, although it had long seemed as if they were inexhaustible. With increased effort, such as increased number of boats harvesting, the total catch increased at first before reaching the maximum sustainable yield (MSY), and after this it started to decrease. But Gordon stressed that economists were more interested in the maximum economic yield (MEY). This would be the point of greatest total profit, not of greatest total catch. In commercial offshore fisheries the aim would be to maximise the number of dollars earned over the season, not the number of cods harvested over it. Therefore, costs in the fishery had to be considered. The maximum economic yield would be at the point when the difference between total revenue and total costs would be the greatest.

Gordon's analysis of the inherent inefficiency of an open-access fishery was almost identical to that of Warming, which is not surprising as both were applying standard economic theory. There were two fishing grounds of different fertility. The fishermen ought to allocate their effort in such a way that marginal revenue would be equal on both fishing grounds, but instead they allocated it in such a way that average revenue became equal. This meant that the more fertile fishing ground was over-utilised. Rent was dissipated in excessive costs with too many boats chasing the fish and too much effort. While Gordon applied his analysis to demersal fish (such as cod), usually not straying out of reasonably well-defined fishing grounds, it could also be applied to pelagic fish (such as herring), with the difference that there were no clearly demarcated fishing grounds, but rather an

110 Jens Warming, Aalegaardsretten [The Right to Lay Eeltraps], *Nationaløkonomisk Tidskrift*, Vol. 39 (1931), pp. 152–61.

111 H. Scott Gordon, The Economic Theory of a Common Property Resource: The Fishery, *Journal of Political Economy,* Vol. 62, No. 2 (1954), pp. 124–42; see also Anthony Scott, The Fishery: The Objectives of Sole Ownership, *Journal of Political Economy,* Vol. 63, No. 2 (1955), pp. 116–24.

**FIGURE 1** GOAL SHOULD BE 8 BOATS




enormous area over which the fish roamed. Gordon observed that his analysis also applied to other open-access or unowned resources, for example oil wells, hunting of wild animals and pastures.

Gordon's model of overfishing may be by illustrated and explained by Figure 1, showing the interplay between revenue and cost in a single fishery. It is plausibly assumed that the fishery modelled does not control international prices. Therefore, the curve representing total revenue will be of the same shape as the curve representing total catch. Effort is defined as the number of boats. Harvesting costs are assumed to be the same for each boat, so they can be shown as a straight line. In the graph the numbers are set in such a way that the maximum sustainable yield is with a total effort of 10 boats. After that catch and revenue start to go down. The point where the fish stock collapses and there is no more catch to be extracted from it is at 20 boats. It is easy to see that under open access, the total effort will be at the point of 16 boats because there is nothing to hinder the addition of boats to the fishing fleet until no more profit is to be had, and that is when the revenue curve crosses the cost line. Even if the model here is somewhat simplified, it brings out the main elements of open-access fishing.

In my classes at the University of Iceland, I have often thrown this graph on a screen and asked the students what would be the most sensible policy to pursue. How many boats should be harvesting? The answer I almost invariably get is 10 boats, because that is when the total catch is at its maximum point. That is the maximum sustainable yield. I have then had to explain, just as Gordon did in his paper, that commercial offshore fisheries are operated to maximise profit, not catch. In other words we are seeking that point at which the difference between total revenue and total cost, the net profit, is highest. As this graph is drawn, this is at the point of 8 boats. It is there that the tangent of the revenue curve is parallel to the straight line for cost. The graph shows that the over-utilisation of the resource consists in 16 boats harvesting even less total catch then 8 boats could harvest, and that with 16 boats all the possible profit disappears in excessive costs. The possible rent from the fish stock is being dissipated.

Two further observations about this standard model of an open-access fishery should be made. First, there is some danger of biological over-utilisation if the fishermen, for whatever reason, accept lower wages than they would get on land. Then the line of costs would be much lower and could meet the revenue curve at 18 or 19 boats. This would be close to the point where there is no more catch to be extracted from the fish stock and where it would be close to collapsing. In the second place, it can clearly be seen from the graph that great revenue could be expected from the fishery if the fish stock were enclosed and the rent dissipated were captured. It would be equal to all the area between the 1st and the 8th boat below the revenue curve and above the line for cost. But how could the nations of the world stop overfishing and capture the rent that was being dissipated in excessive cost? This was a question to which the Icelanders sought an answer in the 1970s and 1980s.





11

# THE ICELANDIC ITQ SYSTEM

Nowhere are the fisheries as important relatively as in Iceland. The nation is tiny, a population of merely 335,000, whereas the Icelandic fisheries are the 19th largest in the world.[112] In 1975 Iceland extended her exclusive economic zone (EEZ) to 200 miles. This meant that she could begin to manage the fertile fish stocks in Icelandic waters, about half of which had traditionally been harvested by foreign fishing fleets. Between 1945 and 1975, with the introduction of ever more efficient fishing gear and practically no restrictions on entry into the Icelandic fishing grounds, the Icelandic fishing fleet had grown at a much faster rate than the total catch. This was a clear example of economic overfishing – investing excessive capital in the harvesting of fish, or over-capitalisation. There was also biological overfishing – exceeding the maximum sustainable yield (MSY) of a given fish stock. One of the most commercially important species at that time was herring, which roams in large schools over vast areas of the sea near the surface. After a great 'herring boom' in the mid 1960s, the stock collapsed in the late 1960s until a moratorium was declared in 1972. Harvesting of herring resumed in 1975, but on a much reduced scale. Iceland now decided to set a total allowable catch (TAC) in herring over the annual fishing season and to divide this TAC equally between the herring boats in operation. To simplify somewhat, if there were 100 herring boats, then each received a quota of 1% of the TAC in herring; if the TAC for a given fishing season was set at 300,000 tonnes, then each boat was allowed to harvest 3,000 tonnes over that fishing season.

In essence this was an enclosure of the herring stock, previously a commons. Owners of fishing vessels in the herring fishery did not resist this enclosure for three main reasons. First, their memory of the collapse of the stock in the late 1960s was still fresh. Second, the herring boats were all of roughly the same size with a similar catch history. Initial allocation of individual quotas was, therefore, non-controversial; owners of boats each received the same individual vessel catch quota, a share in the percentage in the TAC. Third, there were no special local interests: the fleet chased the herring all over Iceland's territorial waters and even out of it. Soon the boat owners realised their gain in being able to transfer quotas between themselves. Consequently in 1979 individual herring quotas were made transferable. A system of ITQs was now in place in the herring fishery, arguably one of the first of such systems in the world. (Interestingly in the Lake Winnipeg fisheries, originally developed by Icelandic immigrants to Manitoba in the late 19th century, individual quotas have been issued since 1972, being made transferable in 1986.)[113] The other important pelagic species of fish in Icelandic waters is capelin, harvested in much the same way as herring. In 1980 individual vessel catch quotas were introduced in the capelin fishery, and in 1986 they were made transferable.

However, the demersal species of fish in Icelandic waters, first and foremost cod, but also redfish, halibut and other species, are commercially more important. Relatively territorial in nature (as Warming and Gordon had presupposed in their analysis of an open-access fishery), cod and other demersal species are found in feeding grounds near the bottom of the shallow continental shelf around Iceland. It became apparent soon after the extension of Iceland's EEZ in 1975 that the cod stock had been overfished and was rapidly declining. But how was access to be restricted? The demersal fisheries differed from the pelagic ones in two important respects. They were based on local fishing grounds, close to some fishing towns (where fishermen perceived their interests to be different from those of fishermen in other

112 *The State of World Fisheries and Aquaculture 2016* (Rome: FAO, 2016), Table 2, p. 11.

113 Gordon Gislason, From Social Thought to Economic Reality: the First 25 Years of the Lake Winnipeg IQ Management Programme, *The Use of Property Rights in Fisheries Management*. Part II. Proceedings of the FishRights99 Conference, Fremantle, Western Australia, 11–19 November 1999, ed. Ross Shotton (Rome: FAO, 2000), pp. 118–26. Gislason is an Icelandic-Canadian.

In response to the danger of overfishing, in the 1980s the Icelanders developed a system of ITQs, individual transferable quotas, in the fisheries. Each fishing vessel owner received a right to harvest a given proportion of the total allowable catch in a certain fish stock, and those rights were transferable, divisible and permanent, allowing for both stability and flexibility. Unlike the fisheries of many other nations, the Icelandic fisheries are sustainable and profitable.

towns); and the fishing fleet was quite diverse in nature, consisting of large factory trawlers through mid-size multi-purpose vessels down to small boats, even undecked rowboats. Those two facts about the demersal fisheries meant that initial allocation of individual quotas was potentially much more controversial than in the pelagic fisheries.

Indeed from 1977 to 1983, Iceland tried to manage the demersal fisheries by restricting effort directly: by setting a TAC and deciding on a number of allowable fishing days over the season with the aim of reaching this TAC. Predictably, this started a 'Darby' – a competitive rush to harvest as much as possible during the allowable fishing days. Vessel owners in the demersal fisheries invested in ever greater fishing capacity, and the already too large fishing fleet became larger still. Meanwhile the number of allowable fishing days went down dramatically for large trawlers in the cod fishery, such as from 323 in 1977 to 215 in 1981. The system was also difficult to monitor with real total catches usually exceeding TACs by far.

When it became clear in 1983 that the effort restrictions were not working, the Icelandic government, supported by the majority of fishing vessel owners, decided to experiment with individual vessel catch quotas in the demersal fisheries similar to those previously issued in the pelagic fisheries. Resisting this was a strong minority of vessel owners and their crews from towns close to the most fertile fishing grounds in the Western Fjords (who thought that it was in their own interest to prefer restrictions in terms of effort rather than catch) and owners of small boats. From the beginning of 1984 individual vessel catch quotas were issued in the demersal fisheries as percentages in the TAC on the basis of catch history for the previous three years. They soon became transferable, and in 1990 a comprehensive law was passed under which such quotas were issued in all Icelandic fisheries without any time limits at all, and with few and insignificant restrictions on transfers. Expressed in percentages of the TAC, the quotas are called TAC-shares. Expressed in the allowed catch in MT over a given fishing season, they are called Annual Catch Entitlements (or ACEs) – the ACE of a vessel being a simple multiple of the TAC over the season and the vessel's TAC-share. The law began to apply in 1991.

Since then the ITQ system in Iceland has worked tolerably well. Despite the reluctance of owners of fishing capital to divest (both because they hope for stronger existing stocks in the near future and because they want to be ready if new stocks appear inside or outside Icelandic waters), the fishing fleet has been somewhat reduced. However, fishing effort has been reduced much more, especially in the pelagic fisheries. Moreover, fishing firms have become fewer, bigger and more profitable. For example, net profit in demersal fisheries, using annuity approach (inputed cost of capital) and 6% rate of return, went from 0.2 and -1.0 in 1993 and 1994 to 18.0 and 14.0 in 2015 and 2016.[114] The ITQ system in Iceland is quite similar to the system in operation in New Zealand and the Netherlands and in individual fisheries in Canada, Australia and some other countries.[115]

Iceland already had operated fishing quotas for 27 years and a comprehensive system of ITQs for 21 years, when, in preparation for the 2002 review of the Common Fisheries Policy (CFP), the European Commission did a survey of 350 organisations and associations with an interest in fisheries in all the member states of the European Union.[116] In the survey a majority turned out to be against the assignment of ITQs to fishing firms. The objections were partly practical and partly political. The practical objections were that they would not hinder overfishing, were difficult to monitor and were not feasible in multi-species fisheries. To this might be added yet another common objection to ITQs: their inapplicability to international fisheries as some fish stocks are fugitive resources. The political objections to ITQs were that they were difficult to allocate initially, would eventually be concentrated in the hands of a few fishing firms and would be incompatible with values such as equal access and shared resources. In this chapter the practical objections to an ITQ system in fisheries are discussed, in light of the Icelandic experience, whereas the following chapter shall be devoted to the political issues.[117]

The response to the first objection, the inability of ITQs to hinder overfishing, is clear. In Iceland owners of fishing vessels now fully support a cautious setting of TACs in different species. They have become firm conservationists. This is hardly surprising. The advantage of an ITQ system, such as the Icelandic one, is precisely that the private interests of individual fishermen begin to coincide with the public interest. Holding a right to harvest a given share in the TAC in a given fish stock, owners of fishing capital want to maximise the long-term profitability of this fish stock. The change from an open-access system to that of access restricted to holders of ITQs amounts to taking the fish stocks in the Icelandic waters into custody and making the owners of fishing vessels their custodians. ITQs have some of the most important characteristics of private property rights, such as durability, exclusivity, divisibility and transferability, and they serve to a large extent the same economic function as such property rights.[118]

At present TACs in different fish stocks in Icelandic waters are set each year by the Ministry of Fishery for the next fishing season on the recommendations of the Marine Research Institute (MRI), after consulting with interest groups. After the ITQ system became comprehensive in 1991, the advice of the MRI has usually been followed quite closely. It is based on biological rather than economic considerations, with the aim of approaching the maximum sustainable yield (MSY). The advice of the MRI on the MSY in each species has been as good as the available scientific knowledge allows. The stock of cod and some other commercial species hit an historical low point in 2006 and 2007, but they have been growing since then. In 2017 the cod stock was estimated to be stronger than it ever had been since the MRI started its current series of measurements in 1996.[119] It should, however, be noted again that the MSY should not really be the aim from an economic point of view. Instead it should be the maximum profit, the greatest difference between total revenue and total costs, which will practically always mean a lower TAC than if the aim is MSY. It can also be demonstrated that the TACs can be set without having to process all the (sometimes unreliable) biological and economic data, which can in theory be collected about the fish stocks. The TACs should simply be set in such a way that the market value of the ITQs would be maximised.[120]

114 Statistics Iceland, Business Sectors, Fisheries. https://statice.is/

115 On the New Zealand system, Philip Major, The Evolution of ITQs in New Zealand, *Individual Transferable Quotas in Theory and Practice*.

116 C. Nordmann, The Common Fisheries Policy of the European Union and Fishing Rights, *The Use of Property Rights in Fisheries Management*. Part II, pp. 23–25.

117 For a fuller exposition, Hannes H. Gissurarson, *Overfishing. The Icelandic Solution* (London: Institute of Economic Affairs, 2000).

118 Anthony Scott, Fishermen's Property Rights, *Individual Transferable Quotas in Theory and Practice*, pp. 15–30.

119 *Nidurstodur ur stofnmaelingu botnfiska ad haustlagi 2017* [Results of Measurements of Demersal Stocks Autumn 2017], MRI 12 December 2017. https://www.hafogvatn.is/is/midlun/frettir-og-tilkynningar/nidurstodur-ur-stofnmaelingu-botnfiska-ad-haustlagi-2017

120 Ragnar Arnason, Minimum Information Management in Fisheries, *Canadian Journal of Economics*, Vol. 23, No. 3 (1990), pp. 630–53.

The response to the second objection, that ITQs are difficult to monitor, is that at least it does not apply to Iceland. Monitoring is neither difficult nor expensive under the Icelandic ITQ system. The Fisheries Directorate (FD) manages the system mainly by controlling landings. All catch is weighed and its species composition recorded in special weighing stations in the 67 ports of Iceland (and in foreign ports as well). This data is fed into a computer at the FD, which makes it available to holders of individual quotas, who can check their catch status at any time. The FD also records quota transfers. This data is posted daily on the FD's homepage on the Internet. The Icelandic Coast Guard monitors fishing vessels at sea and enforces regional closures when they are deemed necessary by the Ministry of Fisheries. The administrative costs of the ITQ system in Iceland are relatively small.[121]

The response to the third objection, that ITQs are not feasible in multi-species fisheries is also clear. It is true that Icelandic fisheries are much more complex than Gordon's model, illustrated by Figure 1 in the preceding chapter, not least because they are multi-species. This fact does not, however, make their management by means of ITQs impossible. Consider the much-discussed problems of discarding: by-catches and high-grading. They are caused by the fact that, over a fishing season, quotas have to be expressed in tonnes, whereas the values of two such tonnes need not be equal, either because they come from different species of fish or because specimens of one species differ in value. By-catches – throwing away non-targeted species – are not much of a problem in the Icelandic fisheries because quotas in one species are easily transferred to quotas in another species. The TAC-shares in different fish stocks are interchangeable: cod is the common denominator of the system. The term 'cod equivalent' denotes the relative market value of different species of fish calculated by the MRI each year. The by-catch is, therefore, of value to the vessel owner. It is only if the cost of carrying it is higher then its market price that there is an incentive to discard it.

High-grading – throwing away specimens (usually younger and smaller) of the targeted species – is more of a problem. According to one estimate, in Iceland it ranges from 1% to 6% of total catch, depending on types of gear and vessels.[122] It does not, however, seem to be on the increase since the ITQ system became comprehensive in 1991. A possible means of minimising high-grading might be to issue different quotas in the same fish stock and to make them interchangeable: the vessel owner has to regard it as a real cost to discard the less valuable specimens of the species. If this is not feasible and until technology makes it possible to differentiate in *harvesting* rather than in *landing* between specimens of different values, strict surveillance of harvesting by video cameras and observers onboard seems the only feasible solution of this problem.

Turning to migratory species, Iceland has in various ways dealt with fisheries partly or wholly outside her EEZ. Some species of fish harvested by Iceland's fishing fleet straddle her EEZ, like oceanic redfish in the Irminger Sea southwest of Iceland; or they migrate in or out of it, like herring and capelin; or they are wholly outside the EEZ in international waters, like deep-sea shrimp found in the 'Flemish Cap' east of the Canadian EEZ and cod in the 'Loophole' between the EEZs of Russia and Norway. On the oceanic redfish in the Irminger Sea, Iceland negotiates an annual TAC and her share in it within the Northeast Atlantic Fisheries Commission (NEAFC). (The members of NEAFC are Iceland, the Faroese Islands, Norway, Russia and the European Union.) Since 1997 Iceland's share in this TAC has been allocated to individual vessels on the basis of catch history (the three best years of the six years in which this fishery had then been operated, with 5% of the total reserved for those who had started the harvesting, a so-called pioneers' quota). On the Atlanto-Scandian herring, which suddenly reappeared in the Northeast Atlantic Ocean in 1994 after the collapse of the late 1960s, Iceland also negotiates a TAC and her share in it within NEAFC. For the first few years from 1994 to 1997, entry was free each year until Iceland's total share had been reached, but since 1998 Iceland's share has been allocated to individual vessels on the basis of the then established catch history (and also to some extent, of vessel hold capacity).

On capelin mostly found in Icelandic waters, Iceland negotiates with Greenland and Norway an annual TAC and her share in it. Iceland's share is then allocated to individual vessels on the basis of catch history. On the deep-sea shrimp in the Flemish Cap, Iceland has refused to participate in an agreement made by the North Atlantic Fishing Organisation (NAFO) because NAFO tries to control entry by restricting effort and allowable fishing days, while Iceland wants to control entry by restricting catch through an ITQ system. Since 1997 Iceland has, therefore, unilaterally set a TAC for her own vessels on the Flemish Cap and allocated it to individual vessels as ITQs on the basis of catch history. In the cod fishery in the Loophole, where Icelandic vessels operated from 1993 to 1999, Iceland has not implemented any rules of her own. Disputed both by Norway and Russia, harvesting by Icelandic vessels in the Loophole ceased in 1999 under a treaty between those two countries and Iceland.

A theoretically interesting case is that of the mackerel, a pelagic fish like herring and capelin. Before 2008 this species had hardly been found in Icelandic waters. But then it suddenly appeared in large quantities. Previously the mackerel stock had been managed in consultations between the EU, Norway and the Faroe Islands. These parties rejected requests by Iceland to participate in the management scheme, which led to Iceland unilaterally deciding in 2010 on a TAC in Icelandic waters of 23% of the total TAC in mackerel in the North Atlantic advised by scientific bodies. This was against the vehement protests of the EU and Norway, which both threatened sanctions. These parties dismissed the case Iceland made that the mackerel were feeding in the Icelandic waters and that if the Icelanders were to feed it partly, then they should be able to harvest it partly. This dispute has still not been resolved. But it has some similarities to the example discussed by Ronald H. Coase of straying cattle that destroyed crops on neighbouring lands. In this case the EU is letting Icelanders feed the mackerel, while denying them the right of harvesting it. The mackerel quota has been allocated largely according to catch history, but it has not been completely integrated into the ITQ system.

The practical problems of operating quota systems in the framework of many states do not seem to be insurmountable. For example, the CFP of the EU combines the EEZs of the member countries into a common pool, thus making it somewhat similar to international waters. Within this common pool TACs are set in individual fish stocks and the share of each member country in them determined. Since 1972 the Dutch have allocated their share in the TACs of some demersal species in the North Sea as individual quotas made transferable in 1985 and comprehensive in 1994.[123] While an efficient management of international waters may thus be possible, it does not mean that it is likely to be introduced in the near future. Coastal countries on the one hand and countries with fisheries in distant waters on the other hand may, for example, perceive their interests to be quite divergent (just like fishermen in towns close to the most fertile fishing grounds in Iceland thought, in the 1980s, that their interests were different from those in other towns).

The Icelandic experience suggests that the most difficult issues might be neither the setting of TACs nor the monitoring of harvesting: once owners of fishing capital gain an interest in the long-term profitability of the resource, they will support a cautious setting of TACs and engage in monitoring one another. The most difficult issues might be how to reach an agreement between those countries concerned about their relative share in it, how to exclude other countries from harvesting and how to reach an agreement within each country on the allocation of her TAC-shares. It is most likely that such issues can only be settled on historical principles (alternatively called first occupancy or grandfathering) by recognising the interests that individual firms and countries may have gained by engaging in harvesting fish in international waters. The easiest way to introduce ITQs in international waters is to change such interests into well-defined rights and to make those rights transferable between individual firms of different nations. Then fishing firms from different countries will be able to resolve their issues by trade with one another instead of having to put pressure on their governments to wrangle about them.

121 Ragnar Arnason, Rognvaldur Hannesson, and W. Schrank, Costs of Fisheries Management: The Case of Iceland, Norway and Newfoundland. *Marine Policy,* Vol. 24 (2000), pp. 233–43.

122 Ragnar Arnason, On Catch Discarding in Fisheries, *Marine Resource Economics,* Vol. 9, No. 3 (1994), pp. 189–208.

123 W. P. Davidse, The Effects of Transferable Property Rights on the Fleet Capacity and Ownership of Harvesting Rights in the Dutch Demersal North Sea Fisheries, *The Use of Property Rights in Fisheries Management.* Part II, pp. 258–266.

12

# POLITICAL ISSUES IN DEVELOPING ITQs

Two of the political objections to ITQs in the 2002 EU survey on the feasibility of an ITQ system were factually true, but of little relevance. One objection was that the assignment of ITQs to individual fishing firms would lead to concentration of the quotas in a few big fishing towns and in the hands of a few large fishing firms. Fishermen on small boats would slowly, and sadly, disappear; and as quotas were transferred, some fishing villages would lose almost their entire means of livelihood. While ITQs might be efficient from an economic point of view, their regional impact and social consequences were neglected or 'undertheorized'.[124] The Icelandic experience has, however, been somewhat different. For most of the 20th century, there was a continuous migration in Iceland of people from other regions than the southwest to the capital city of Reykjavik and its environs. Regional policy in Iceland traditionally has had the aim to strengthen the economy in other regions in order to halt this migration. This has largely failed. But the ITQ system seems to be accomplishing what numerous regional funds in Iceland never could: to provide people in fishing villages scattered along the coastline with feasible economic opportunities (even if some villages have seen quotas being transferred to other places, as will happen). The heart of the matter is that most of the quotas are held outside the southwest.

It is true that in Iceland there has been a concentration of quotas in the hands of the largest fishing firms. This was only to be expected. Moreover, it would seem desirable. According to Gordon's model of a fishery, under free entry fishing effort will increase until all profit has disappeared (at 16 boats in Figure 1 in Chapter 10). The aim of fisheries' management is to reduce the size of the fleet from 16 to 8 boats (as already emphasised not to 10 boats, because what should be maximised is not catch or revenues but profits). This will almost inevitably, and desirably, mean some concentration: there were too many boats, and the task is to reduce their number. What is crucial in the Icelandic fisheries is that no fishing firm holding quotas is in a dominant position in the economy. Moreover, limits have been set by law on how large a proportion of quotas in different fish stocks and in the total quota each fishing firm may hold: the limit for each firm is 12% of the total quota.

In the aforementioned 2002 EU survey on ITQs, one of the main objections to them was that they were incompatible with community values, such as equal access and shared resources. There is some truth in this. The assignment of ITQs to certain firms in a given fishery means that others are excluded from harvesting there. ITQs are indeed rights of exclusion. But this is precisely their point. Overfishing under a system of free entry occurs because those already harvesting have no means of excluding those entering the fishery. Consider again Gordon's model of a fishery: maximum profit in this fishery will be at a fishing effort of 8 boats. But under free entry fishing effort will increase until no profit is to be made from the fishery, namely at a fishing effort of 16 boats. This is clearly a case of harmful effects of economic behaviour, or an 'externality' in the economic sense: the fishermen impose a cost on one another in the form of over-capitalisation. Access to a resource has to be 'unequal' if the resource is to be efficiently exploited. This is what private property rights in general are about. Similar considerations apply to values such as shared resources.

This objection is, therefore, true, but irrelevant. But underlying it is probably a different consideration. It is that initial allocation of exclusive rights to a resource inevitably means that only some will receive those rights. Why did only vessel owners receive ITQs in Iceland, but not their crews or even the general public? Why were the vessel owners allowed to appropriate this valuable resource, the fish stocks, in Icelandic waters? One obvious answer is that it was they who made the decisions and took the risk. It was they who faced the externality; it was they on whom the cost was inflicted. Their crews did not face any such externality: they simply sold their labour, and their income was presumably determined by competition in the labour market; they could just as well have sold their labour ashore. In this as in other cases of externalities, individuals have to be able to trade with one another in order to eliminate or reduce the externality. The difference is that this externality cannot be readily seen or heard or smelled, like smog, odour or radio interference. It has to be brought out by economic analysis. It consists in profit foregone and in rent dissipated.[125] Also the fishermen do not harm others by their activities: they harm one another.


In Iceland, as would have been the case everywhere, it was necessary to abolish open access to the fisheries. The only way to bring about this enclosure of a commons was to give the fishing rights to those who had been harvesting fish, in proportion to what they had been harvesting. The long-time aim of reducing fishing effort was then achieved in voluntary transactions. People were bought out of the fisheries, not driven out.

It would seem somewhat strange if government stepped in and appropriated the profit foregone in the fisheries instead of allowing those utilising the resource to enjoy it. In this case the situation would improve for government, but not for any of the fishermen. But this is precisely what some Icelandic intellectuals – under the influence of Henry George and Arthur C. Pigou – advocated when the discussion started about how to manage the fish stocks in Icelandic waters after Iceland gained 200 miles of EEZ. In 1975 economist Bjarni B. Jonsson published a paper on the fishery where he analysed it in terms of Pigovian inefficiencies that had to be corrected by a government tax. The problem was, according to him, that there was open access to the fishing grounds so that owners of fishing firms did not in their calculations take into account the real costs of utilising the resource. Hence, there was over-investment in the fishery, resulting in the dissipation of the rent, which could otherwise be derived from the different fertility of different fishing grounds. Government had to force the owners of fishing capital to take real costs into account by imposing a 'resource rent' tax on them. Jónsson explicitly recognised the similarity of his proposal to the Georgist call for a single tax,

124 Gisli Palsson, The Implications of ITQs: Theory and Context, *The Use of Property Rights in Fisheries Management.* Part I, pp. 316–20.

125 James M. Buchanan, Who Cares Whether the Commons are Privatized? *Post-Socialist Political Economy. Selected Essays* (Cheltenham: Edward Elgar, 1997), pp. 160–67.

designed to capture the rent derivable from land.[126] In the ensuing debate some economists, Thorvaldur Gylfason, Markus Moller and others, did not, in effect, move beyond this simple Georgian solution to a Pigovian problem, while some of them indeed proposed a periodic government auction of fishing permits rather than a tax.[127] Needless to say, their ideas were taken up by some politicians. A populist political party was established in 1999 with the chief aim of imposing some kind of a special charge on owners of fishing capital. It was represented in Parliament between 1999 and 2009, receiving 4.2% of the votes in 1999 and 2.2% in 2009.

Those free market economists who reject George's single tax on resource rent and Pigou's corrective tax on resource over-utilisation instead see the objective as enabling people to resolve difficulties that arise because of the harmful effects of individual activities. These economists find it misguided to try and solve the problem of over-utilisation by a government tax, charge, fee or toll. By such measures one cost for the individuals is simply replaced by another one. Instead of dissipating rent, the individuals pay the equivalent amount to the government. They are not better off personally (except indirectly through the government, and even that is arguable). In the case of the fishery, some of them will even be worse off. This can easily be demonstrated. In Gordon's model of a fishery, which is shown again here on Figure 2, 16 boats are harvesting a fish stock where 8 boats would be optimal. All economists (indeed all reasonable people) would presumably agree that the task at hand is, in terms of this simple but plausible model, to reduce the number of boats from 16 to 8 and, thus, to eliminate waste.

In Iceland two different methods of achieving this reduction were seriously discussed. The first one, as already mentioned, was that government either imposed a resource rent tax on fishing firms or that it auctioned them off as fishing permits, setting and adjusting their price in such a way that the number of boats would be reduced to the 8 more profitable ones, since the 8 less profitable ones would not be able to pay the tax or the auction price. The second one, supported by Ragnar Arnason (a professor of fisheries economics at the University of Iceland), Professor Thrainn Eggertsson (Iceland's leading expert on institutional economics) and I, was to give transferable, permanent fishing rights, namely the ITQs, on the basis of catch history and free of charge to the owners of the 16 boats, thus enabling them to negotiate themselves out of the undesirable situation.[128] Over time the 8 more efficient boat owners would buy out the 8 less efficient. Presumably both proposals, imposing a government charge on the one hand or giving fishing rights to the boat owners on the basis of catch history (the principle of first occupancy or grandfathering) on the other hand, would have the same final outcome: the reduction of the boats from 16 to 8.

This does not mean that the two proposals were both equally efficient. First, the government charge proposal would not have been Pareto-optimal. Briefly, a social change is Pareto-optimal if all or at least some become better off without anyone becoming worse off.[129] The charge proposal whereby 8 boats would be priced out of the fishery by government would mean that

1. The government would become much better off since it would receive the tax or auction revenue;

2. The 8 more efficient boat owners would be equally well (or badly) off as before since they would simply pay to government what they previously had to bear as excessive harvesting costs;

3. The 8 less efficient boat owners would become worse off since they would be deprived of their previous means of existence.

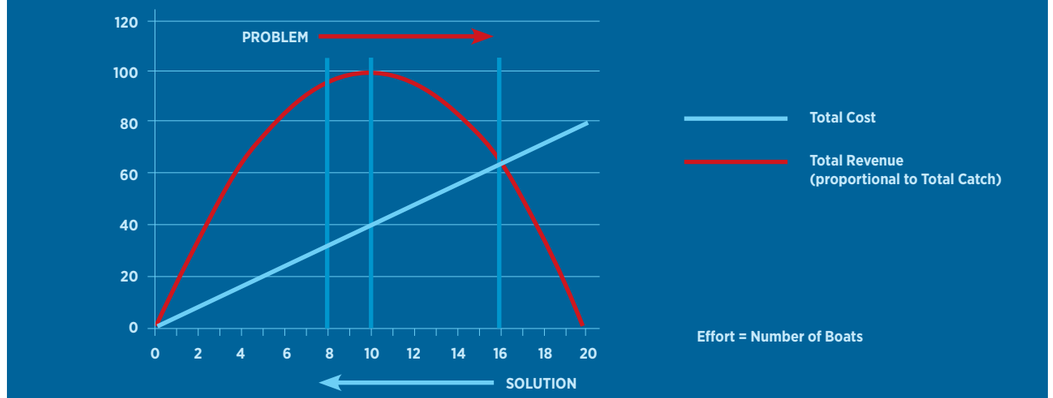
126 Bjarni B. Jonsson, Audlindaskattur, idnthroun og efnahagsleg framtid Islands [A Resource Rent Tax, Industrialisation and the Economic Future of Iceland], *Fjarmalatidindi*, Vol. 22 (1975), pp. 103–122. Earlier, industrialist Kristjan Fridriksson and economist Gunnar Tomasson had suggested such a resource rent tax.

127 Thorvaldur Gylfason, Stjorn fiskveida er ekki einkamal utgerdarmanna [Fisheries Management Does Not Only Concern Owners of Fishing Vessels], eds. Thorkell Helgason and Orn D. Jonsson, *Hagsaeld i hufi* [Prosperity at Stake] (Reykjavik: The University of Iceland Press, 1990), pp. 120–25. Markus K. Moller, Fyrirkomulag veidileyfagjalds [The Method of Charging for Harvesting Rights], *Visbending*, 29 February 1996.

128 Ragnar Arnason, Minimum Information Management in Fisheries, *Canadian Journal of Economics.* Thrainn Eggertsson, The Subtle Art of Major Institutional Reform: Introducing Property Rights in the Iceland Fisheries, eds. G. van Huylenbroeck, W. Verbeke, and L. Lauwers, *Role of Institutions in Rural Policies and Agricultural Markets* (Amsterdam: Elsevier, 2004), pp. 43–59. Hannes H. Gissurarson, The Fish War: A Lesson from Iceland, *Journal of Economic Affairs,* Vol. 3 (1983), pp. 220–223; Hannes H. Gissurarson, *Fiskistofnarnir við Island: Thjodareign eda rikiseign?* [The Fish Stocks in Icelandic Waters: Property of the Nation or of Government] (Reykjavik: Jon Thorlaksson Institute, 1990).

129 James M. Buchanan, Positive Economics, Welfare Economics, and Political Economy, *Journal of Law and Economics.*

**FIGURE 2** GOAL FROM 16 BOATS TO 8




The fishing rights proposal, however, was Pareto-optimal since

1. The government would become slightly better off because of increased efficiency in the fishery;

2. The owners of the 8 remaining boats would become better off, seeing the price of their property go up;

3. The owners of the 8 boats leaving the fishery would not be worse off since they would sell their fishing rights at prices freely negotiated.

In essence the difference between the government charge and the fishing rights proposals was that of *forcing* 8 out of 16 out of business by their inability to pay the set price, and of *buying* them slowly out.

A second economic argument, presented by American economist Ronald N. Johnson, applies to the situation after the desired reduction of the fleet has taken place. It is that the fishing community would not have the same incentive to protect the fish stocks if it had to buy fishing permits annually from the government instead of the boat owners holding permanent fishing rights, thereby regarding themselves as guardians of the resource. The community might lobby for excessive TACs and, in fact, reintroduce economic overfishing.[130]

A third economic argument against the government charge proposal also applies to the situation after the desired reduction of the fleet. It is that the individual boat owners would be more likely to use the rent derivable from the fishery sensibly than would government. This might not seem a plausible argument to those who believe in benevolent despots, but it has force for those who view government with some suspicion. 'To retain respect for sausages and laws, one must not watch them in the making,' it has been said. Capitalists and entrepreneurs would invest the rent captured in what they would regard as profitable, sometimes with success and sometimes not. Whereas politicians and bureaucrats would use the revenue from leasing out fishing permits for their own purposes, to renew their mandates or to keep their jobs. If government would try to expropriate the rent from the fisheries by leasing out fishing permits, then rent dissipation ashore (the wasteful competition for government hand-outs) simply would replace rent dissipation offshore, as Icelandic economist Birgir Th. Runolfsson has pointed out.[131]

This observation suggests a fourth argument against the government charge proposal. On the face of it, Georgism (which is really the basic idea behind the proposal) actually seems more plausible in the fisheries than in agriculture because there is no difficulty in isolating the 'ocean rent': it is simply the total revenue from leasing fishing rights to boat

130 Ronald N. Johnson, Implications of Taxing Quota Value in an Individual Transferable Quota Fishery, *Marine Resource Economics,* Vol. 10, No. 4 (1995), pp. 327–40.

131 Birgir Th. Runolfsson, ITQs in Iceland: Their Nature and Performance, *Individual Transferable Quotas in Theory and Practice*, pp. 103–140.

David Oddsson (left), Leader of the Independence Party and Prime Minister in 1991–2004, defended the ITQ system against those who resented its success. Oddsson did not regard profitability in Iceland's most important economic sector as a problem. Ragnar Arnason (right) is Iceland's only Professor of Fisheries Economics and was influential in developing the system.

owners. The fishing rights are rights of extraction only and, unlike land ownership, involve no possible improvement of the resource. But the case is not so clear-cut. If government is the owner of a resource and the fishermen only its tenants, then there is little incentive, and little possibility also, to explore new ways of utilising the resource, perhaps even improving it by cultivation, fertilisation or by adopting new methods of fencing or branding which cannot be foreseen today. Once again it has to be stressed that the market process is dynamic and that the size and shape of resources keep changing. Natural resources are not a given.[132]

The conclusion must be that even if the government charge proposal eventually would lead to the same desired reduction in fishing effort as the fishing rights proposal, it is much less efficient, especially in the long run. The proponents of a government charge might respond by admitting this, but they could assert that the debate should be about justice rather than efficiency. It is unjust, some of them say, that the initial recipients of fishing rights should profit from their exclusive access to a resource that should be the common property of the Icelandic nation. Why should government hand such a large gift over to a small group of people who find themselves in the fishery, almost coincidentally, when the ITQ system was introduced, they rhetorically ask.[133] They also recall the regular reports in the Icelandic press, at least in the initial stage of the ITQ system, about people who sold their ITQs for enormous sums of money.

The proponents of fishing rights instead of government charges could respond that if anything would be unjust, then it would be that half the fishing community suddenly, by a stroke of pen, would have been hindered in earning its livelihood in its traditional manner. For many it would have rendered the investments of a lifetime, not only in boats and fishing gear, but also in knowledge and skill, worthless in just one day, and needlessly so: the owners of fishing capital were harming one another, not the rest of society. This can be couched also in economic terms. The costs of leaving a fishery are much greater than the costs of not entering it. Therefore, when the fishery had to be enclosed, it was economically efficient to allocate the exclusive fishing rights to those within the fishery – to those who had invested in it, the owners of fishing capital – and not to those outside it.[134] Moreover, it would also be unjust to impose a government charge on the fishing firms long after fishing efforts had been reduced because then most of the initial quotas would have changed hands. Most holders of quotas would have paid the full price for them, including their estimate of the present value of future rent. (This was of course one of the reasons why the mature Spencer rejected the view he had held as a young man that government ought to expropriate all land.)

It is important to realise which right it was that others were deprived of when the fishery in Gordon's model moved from open access to one restricted to quota holders. It has to be recalled once again that new owners of fishing capital, boat owners, would enter until no profit was to be derived more from the fishery. In the model this happens when the number of boats have reached 16. The fishing rights proposal was to give the quotas to all the boat owners on the basis of their catch history and then let them trade them so that gradually the number of boats would go down to 8, the optimal level. But does not the 17th person who wanted to enter the fishery, and found himself unable to do so, have a reason to complain? The answer is no, because by definition the only real right he was deprived of was the right to harvest fish at no profit, the same wage level as he could find in other sectors in the economy. This was a worthless right.

This means that the initial appropriation of fish stocks in Icelandic waters fulfilled the Lockean proviso: that by it enough and as good was left in common for others. Nobody was made worse off by the definition of exclusive use rights, the ITQs, in the Icelandic fisheries. It should be noted that the Lockean proviso and the requirement for Pareto-optimality in social change are two different expressions or applications of the same idea that one man's freedom must not imply or entail another person's loss of freedom – that the activity of one man should not have non-negotiated harmful effects on another man. Moreover, the reports in the press about people who sold their ITQs for a lot of money strengthen, rather than weaken, the case for the system. The crucial point is that those people left the fisheries, and they did so voluntarily. They were bought out, not driven out. The sale of their quotas was a step in the right direction, towards rationalisation of the fisheries.

If critics of the ITQ system would complain that the distribution of property and income in society has to be perceived to be 'just' and not only 'not unjust', then the answer would be that justice, like peace and freedom, has traditionally been considered a negative virtue, consisting in the absence of unjust acts. As Adam Smith put it: 'Mere justice is, upon most occasions, but a negative virtue, and only hinders us from hurting our neighbour.'[135] If justice means the absence of injustice, then the change from an open access fishery to a fishery with exclusive use rights initially allocated to the owners of fishing capital on the basis of their catch history, was just, whereas initial allocation on any other principle would have been unjust. It is perhaps true that the initial recipients of ITQs did not 'deserve' them, strictly speaking. But as Nozick convincingly argued, in a free society the distribution of property and income is not by desert or other abstract notions, but by choice and entitlements: one may be entitled to something that one does not deserve.[136]

Historically the Icelanders knew a 'resource rent tax' that had had disastrous consequences for them. The Danish crown had in 1602 imposed a total trade monopoly on Iceland. Goods had to bought and sold in accordance with price lists composed in Copenhagen. The price that Danish merchants were to pay for fish was much lower than the world market price at the time, whereas the price they had to pay for meat and other agricultural products was higher than the world market prices. This meant that the monopoly trade was effectively a mechanism to redistribute income from Iceland's fisheries to her agriculture. It imposed an indirect tax on the fisheries. Moreover, the crown, in conjunction with the Icelandic landowning class, hindered in other ways the development of the fisheries. Basically everybody had to live and work at one of the 4–6,000 farms which existed in Iceland, by no means a country very suitable for agriculture. Thrainn Eggertsson argues that this was the reason Icelanders starved for centuries even if they lived next to some of the most fertile fishing grounds in the world.[137] Free trade was only introduced in Iceland in 1855, and it was then that Icelanders seriously started to utilise the fish stocks and became affluent.[138]

132 Gordon Tullock suggests many interesting innovations in the fisheries, *The Fisheries … Some Radical Proposals* (Columbia SC: University of South Carolina, Bureau of Business and Economic Research, School of Business Administration, 1962).

133 Thorvaldur Gylfason, *Rettlaeti og hagkvaemni* [Justice and Efficiency] (Reykjavik: Hid islenzka bokmenntafelag, 1993).

134 Harold Demsetz, Ethics and Efficiency in Property Rights Systems, *Time, Uncertainty and Disequilibrium: Explorations of Austrian Themes*, ed. Mario Rizzo (Lexington MA: DC Heath, 1979), pp. 97–116.

135 Smith, *A Theory of Moral Sentiments*, Part II, Ch. 2, §1.

136 Nozick, *Anarchy, State, and Utopia*, Part II.

137 Thrainn Eggertsson, Why Iceland Starved, *Imperfect Institutions: Possibilities and Limits of Reform* (Ann Arbor: University of Michigan Press, 2005), pp. 99–124.

138 Hannes H. Gissurarson, Liberalism in Iceland in the Nineteenth and Twentieth Centuries, *EconJournal Watch*, Vol. 14, No. 2 (2017), pp. 241–73.

Politically the call for a government charge or resource rent seemed naive. The stark unreality of the proposal perhaps illustrates what Coase meant by 'blackboard economics'.[139] Did it really occur to its proponents that one-half of the fishing community would accept meekly to leave the fisheries just because some professors at the University of Iceland, relying on Jens Warming and H. Scott Gordon, were demonstrating on a blackboard that the Icelandic fishing fleet was double in size to what it ought to be from an economic point of view? It should not come as a surprise that the fishing community, and with it many politicians, in practice chose what Arnason, Eggertsson and I proposed, that fishing rights should be allocated to owners of fishing capital on the basis of catch history. It should be emphasised, however, that the real system was not formed by conscious design. It was developed in a process of trial and error where the owners of fishing capital and other interested parties stumbled on measures, found them efficient and received government support for continuing on the same path. The objective of most of the policy measures were not to minimise harvesting cost, but to avert the depletion of the fish stocks. The Icelandic ITQ system was not made; it happened. What we who participated in the discussion to support the fishing rights proposal could offer was only encouragement and perhaps some explanations of a process that was taking place before our eyes. As is well known, the owl of Minerva only takes flight at dusk.[140]

It should also be mentioned that the real system is not at all ideal, from an economic point of view: in response to the agitation organised by Thorvaldur Gylfason and others, the government in 2004 did impose a special charge on the fisheries, called a 'harvesting charge'. It was, however, set at a moderate level until a left-wing government took over after the 2008 bank collapse and raised it considerably. Now it has been reduced again. The 2009–2013 government took another step away from economic optimality when it reintroduced the exemption of some small boats from the system: it created a loophole in the system. Neither of these defects, however, alters the general conclusion that the Icelandic ITQ system is reasonably effective, especially in comparison with fisheries in most other countries, and that it is not unjust. Unfortunately in the 21st century the system has not been developed in the direction that Arnason, Eggertsson and I have suggested, where the fishing community certainly would pay for the services rendered to it by government, but where it would also have more control over these services. This would be a step in the direction of self-management.[141]

Finally, it is a matter of speculation why Iceland is one of the very few countries in the world to have introduced a comprehensive system of ITQs in her fisheries. If ITQs are as efficient as economists argue, and as the Icelandic example indeed seems to show, why have they been adopted in so few fisheries and in so few countries? Three reasons for the early introduction of ITQs in Iceland have already been suggested: that the Icelandic fishing community is relatively homogeneous, that the collapse of the herring stock in the mid-1960s was fresh in the memory of policy makers and that the fishery is a very important sector of the Icelandic economy. Therefore, when the fishing community gradually (and reluctantly) reached an agreement about ITQs, it did not take long for parliament to write that into law. The fact mentioned above that most of the quotas were and still are held by fishing firms outside the Reykjavik area may also have increased political support for the ITQ system. Moreover, in Iceland there has long been negligible unemployment, which means that there was little resistance from those employed in the fishery to the foreseeable reduction in fishing effort brought about by the system; they knew that they could easily move to other sectors of the economy. On the other hand, resentment over the rent captured by owners of fishing capital was probably much more intensive in Iceland because of the relative importance of the fishery than it would be elsewhere. In other countries, for reasons suggested above, I surmise that it would be more difficult to introduce such a system, but that it would be easier to maintain it.

139 Ronald H. Coase, *Essays on Economics and Economists*, Introduction (Chicago: University of Chicago Press, 1994), p. 5.

140 Georg Wilhelm Friedrich Hegel, Vorrede [Foreword], *Grundlinien der Philosophie des Rechts* (Berlin: Nicolai, 1820).

141 Ragnar Arnason and Birgir Th. Runolfsson (eds.), *Advances In Rights Based Fishing: Extending the Role of Property in Fisheries Management* (Reykjavik: Ugla, 2008).





13

# WHALES

The whale is the largest animal on earth. Although it lives in the sea, it is a mammal. The males are 'bulls' and the females are 'cows'. The largest whale, the blue whale, is almost 30 metres long and weighs 190 tonnes and is apparently the largest creature that has ever lived. Whales are divided into two main groups: baleen whales and tooth whales. Because of their immense size, whales are not threatened by any animals other than man. The relationship between whale and man is long and complex. Whales were traditionally hunted for their meat, blubber (fat) and oil, whereas the baleen bones were used for baskets or roofing. The Basques were pioneers in whaling. After they had more or less wiped out the North Atlantic right whale found close to their home base in Southern France and Northern Spain, they ventured as far as Newfoundland, Greenland and Iceland in the 16th and 17th centuries in search of both the right whale and the bowhead whale, which they also brought close to extinction. In the 18th and 19th centuries, Americans started whaling on a large scale, and when the stocks in the North Atlantic became depleted, they moved to the South Atlantic, as did whalers from other nations, including those from the Netherlands and Denmark. The whale oil was much in demand then, and whaling was quite profitable. The commercially most important species of whales were the North Atlantic right whale, the sperm whale, the bowhead whale, the minke whale and the blue and grey whales. Herman Melville's famous novel, *Moby Dick*, takes place mostly in the South Atlantic and describes the pursuit by the skipper Ahab of a white (albino) sperm whale which had bitten off his leg. It is noteworthy that Melville portrays the whale as a cruel monster.

In the 19th century a new technology was adopted in whaling. The harpoon with which the whale was hit was equipped with a grenade tip that exploded inside the whale. This greatly facilitated harvesting all species of whales. In early 20th century it became apparent, however, that many species were overexploited. In 1935 an international convention was accepted which banned the harvesting of the two most endangered species, the right whale and the bowhead whale. The International Whaling Commission (IWC) was founded in 1946 and tried to regulate whaling internationally. The regulations were, however, misconceived. A total quota was set far above what was reasonable, and it was denominated in blue whales: for each blue whale, two fin whales could be harvested, two and a half bowhead whales and six sei whales. As any competent economist could have predicted, the whalers concentrated on hunting blue whales, almost to extinction. Finally in 1965 a moratorium was announced on harvesting the blue whale. The stocks have still not recovered.

In a 1973 article in *Science*, Canadian mathematician Colin W. Clark tried to explain why the IWC had not been able to stop the overexploitation of whales. His explanation was that a renewable resource like the whales might be overexploited, even if privately managed, under three conditions: that its growth rate was low, the cost of hunting or harvesting was low and the discount rate (or time preference) was high. Under these conditions the corporate owner of the resource, seeking profit maximisation, might prefer extermination to conservation, Clark submitted. The discount rate was an indicator of how 'patient' capital was: if one agreed to pay $100,000 after a year for receiving $80,000 now, then the annual discount rate was 20%. If this was the discount rate, whereas the growth rate of the blue whale was only 5%, it was easy to see that it would be tempting for impatient capital to harvest the stocks to extinction. Therefore, Clark concluded, responsible international and local government agencies had to ensure that the total allowable catch in such resources was not set above the maximum sustainable yield.[142] Clark's article was widely cited by environmentalists, especially preservationists.[143]

142 Colin W. Clark, The Economics of Overexploitation, *Science*, Vol. 181, No. 4100 (1973), pp. 630–634.

143 Edward O. Wilson, What is Nature Worth? There's a powerful economic argument for preserving our living natural environment, *San Francisco Chronicle* 5 May 2002.

The Blue Whale, the earth's largest animal, was hunted almost to extinction in early 20th century. But the two whale stocks which are harvested in Icelandic waters are by no means endangered species even if CITES has put them on a list of such species. There are about 40–50 thousand minke whales and 10–20 thousand fin whales in Icelandic waters. It is estimated that whales in Icelandic waters eat 6 million tonnes of food annually, at the same time as the Icelanders harvest about 1 million tonne of fish.

Environmentalists put much pressure on the United States government to stop whaling altogether, and in 1972 Congress accepted a ban on whaling and on trade of whale products within the United States. After much lobbying by environmental organisations, the IWC decided in 1982 to ban all commercial whaling from 1986 onwards. Preservationists had by then become much more influential in the IWC than conservationists, not least because many non-whaling countries, some even landlocked, had joined the commission. Iceland, Norway, Japan and a few other whaling nations voted against the ban. The Icelandic part of the story is worth telling. The Icelandic MRI, Marine Research Institute, had concluded in a report for the Icelandic Minister of Fisheries that there was no scientific justification for the ban: The two stocks which Icelanders harvested, the fin whale – the second largest whale species after the blue whale – and the minke whale were both strong. Iceland did not, however, take out a reservation at the IWC for two reasons: fishing firms were worried about losing their markets in the United States, and Iceland also received a promise by the IWC to conduct scientific investigations into the state of different whale stocks.

In the next few years, preservationists reinforced their campaign against whaling. In 1983 the Convention on International Trade of Endangered Species (CITES) put the fin whale and the minke whale on its list of endangered species. This meant that Icelandic companies could not sell products of those species without special permission. The findings by Icelandic marine biologists that the stocks in Icelandic waters of these two species of whales were robust was disregarded. In the following years whaling nations tried without success to have the IWC ban revoked. After 1986 the only whaling permitted was that of indigenous peoples with their traditional methods and some harvesting of minke whales by Japan and Iceland for scientific purposes. Ecofundamentalists were, however, enraged that Iceland should continue whaling, considering it a mere pretext that it was for scientific purposes. In November 1986 Sea Shepherd activists broke into a whaling station near Reykjavik and damaged its machinery, and then they went to Reykjavik harbour and sank two whaling vessels based there. Sea Shepherd leader Paul Watson took full responsibility for this action, saying that Iceland should be punished for engaging in illegal harvesting of whales.[144]

For a while Iceland continued whaling for scientific purposes, but halted it in 1989. Whale preservationists had threatened to organise a boycott of Icelandic products all around the world, and Iceland's neighbours, including the United States, also had put pressure on her. Crucially, Japan decided to ban the import of whale products, which meant that Icelandic whalers lost their main market. Iceland left the IWC in 1992, protesting that the Commission had not fulfilled its promise to conduct scientific investigations into the state of whale stocks. Instead, the Icelanders argued, the IWC had become a forum for fanatics who for emotional reasons wanted an absolute ban on whaling. In fact a year later the chairman of the IWC Scientific Committee, Philip Hammond, resigned, complaining that the ban on whaling was not scientifically supported and that the IWC ignored all advice from his Committee. Iceland joined CITES in 2000, not least for the purpose of having the fin whale and the minke whale in the Icelandic waters removed from the CITES list of endangered species. This has not, however, been achieved. In 2002 Iceland rejoined the IWC, finding it more reasonable to work for sustainable whaling inside it rather than outside it. When rejoining, the Icelandic authorities announced that they would only allow commercial whaling on strong scientific evidence and then at the earliest in 2006.

Harvesting of minke whale for scientific purposes started again in 2003 and commercial whaling in 2006. The Icelandic MRI advised that 200 fin whales and 400 minke whales could be harvested over the season. On the basis of its research, the MRI concluded and the Scientific Committee of the IWC concurred that 26,000 fin whales and 70,000 minke whales were to be found in the North Atlantic.[145] Thus, they were by no means endangered species. Even if initial permits were issued only for harvesting 9 fin whales and 30 minke whales over the first season, the United States and the United Kingdom protested vehemently, as did environmentalist organisations. Despite some threats the resumption of whaling did not seem adversely to affect the sale of Icelandic products abroad or tourism to Iceland. However, it turned out to be more difficult than expected to sell whale products to Japan, although it was not explicitly prohibited. Therefore, no fin whales were harvested in 2007 or 2008, but whaling resumed in 2009. It was halted again in 2011 and 2012, but then resumed and then halted again in 2016 for the same reason as before, because of difficulties of selling the meat in the Japanese market. Minke whales were, however, harvested during this period mainly for consumption in Iceland. In many restaurants in Reykjavik, whale meat is on the menu, not least prepared as sashimi. At the same time whale watching has become a popular pastime of tourists in Iceland. Despite all the evidence presented about the strong state of the whale stocks in the Icelandic waters and several attempts by Iceland, the IWC has not changed its stand on whaling. The European Union has also resolutely turned against all whaling.[146]

A significant difference between whale and cod harvesting is that some people seem to hold the view that whales have an intrinsic value. They are, with elephants, a part of the 'charismatic megafauna' that many find charming. The charm occasionally disappears, for example, when the killer whale Tilikum lived up to the name of the species and killed its trainer in front of an audience at Seaworld in Orlando.[147] It does not seem, however, that whales are particularly intelligent. If they were then they would presumably not in large numbers get caught

144 The incident made the front page of *New York Times*, 10 November 1986.

145 *Nytjastofnar sjavar 2008/2009* [Commercially Exploited Stocks at Sea, 2008/1009] (Reykjavik: Marine Research Institute, 2009), 89.–91. bls.

146 This chapter is mainly based on information provided by Tomas Heidar, the specialist on whaling at the Icelandic Ministry of Foreign Affairs.

147 Whale Kills Trainer at Seaworld, *New York Times* 25 February 2010.

by whalers or run aground on beaches. The research at least does not show whales to be more intelligent than many other animals. They do stunts, but so do many other animals.[148] People are of course free to hold the view that whales have an intrinsic value and should, therefore, be preserved. But preserved at whose cost? The problem is that other people reject this view and want to hunt and eat whales. This is a case of incompatible uses of the resource in question. Why should one of the two groups prevail over the other by force? At least it should be pointed out that tradition favours the whalers and their customers: they have been using the whales for their purposes much longer than whale preservationists.

Another difference between whale and cod harvesting is that the whale is near the top of the food chain. The whale eats fish, and other kinds of seafood, whereas the fish does not eat whale. If whaling were completely to stop, then the delicate balance of nature might be upset. Icelandic marine biologists estimate that the fin whale, the minke whale and other species of whales eat about six million tonnes of various food a year in Icelandic waters. Most of it is plankton, but the whales also eat one million tonne of squid and two million tonnes of fish.[149] What whales eat of fish in Icelandic waters is in other words almost double the total catch of fish harvested a year by Icelanders. Marine biologists believe that the cod stock could significantly diminish, if whale stocks in Icelandic waters were allowed to grow to their maximum size. The minke whale eats some cod, but both it and the fin whale eat a lot of the same food that the cod eats.

It is well-known and accepted that to maintain balance in nature it is necessary to cull some stocks when they grow too fast, such as bison in Yellowstone Park and kangaroos in Australia. Some might, however, argue that the culling of whales would not lead to an increase in the total catch of cod. But on closer scrutiny that argument is not relevant. Man harvests the cod and the whale for the same reason, to obtain food. If the whale somehow has a better way of finding and eating cod than man does, then this special skill is indirectly utilised by man eating whale. Then the whale basically acts as a food processing plant. Be that as it may, the whale certainly finds and eats capelin and small plankton, which man cannot or will not eat. Thus it transforms organic material into something edible for humans, somewhat like the omnivorous pig and the scavenging haddock do. If it is true that the culling of whales in Icelandic waters would not lead directly to an increase in the total catch of cod, then the whale meat is at least a welcome addition to man's food reserves.

However, the problem of exploiting the whale is similar to that of exploiting cod in that unlimited access to a limited resource leads to overexploitation. Therefore, access has to be limited to those who have an interest in maximising the long-term profit from the resource. In the Icelandic offshore fisheries, this was accomplished by the ITQ system. Such a system might be applicable to whaling. Monitoring would be easier than in the fisheries, and discarding would disappear because the whalers already would have chosen the animals they are going to harvest. Such a system might work in this way: the IWC would allow whaling nations, such as the Japanese or the Icelanders, to harvest animals from stocks that are strong in a certain area. The scientific bodies of the nations in question would advise on the total allowable catch (TAC) in each whale stock in cooperation with the IWC Scientific Committee. Each country would allocate the total quota to whaling companies according to their catch history. In Iceland this would be a simple task. The Marine Research Institute (MRI) would decide on a total allowable catch, for example 200 fin whales and 400 minke whales, and subsequently those animals would be allocated to the companies that have been operating. (In fact, the total allowable catch could be much higher since the rate of growth of whale stocks are usually about 5% and since in Icelandic waters alone there are found 10–20 thousand fin whales and 40–50 thousand minke whales.)

It is important, however, that such whale quotas would be permanent so that their holders would have an interest in maximising the long-term profit from the resource. One deficiency in the analysis by Colin W. Clark of the overexploitation of whale stocks is that he did not fully consider how human behaviour changes under different systems. House owners behave differently from tenants. In a reply to Clark published in *Science* in 2007, three economists pointed out that his 1973 article offered a solution to a mathematical problem rather than practical guidance. The economic maximum for harvesting a stock (chosen by owners) would almost always be below the stock's maximum sustainable yield, not least because the cost of each animal harvested would fall with the increase of the stock (and vice versa). The task at hand would, therefore, be to identify the community or company that would have an interest in the utilisation of the stock. This agent would bring about the growth of the stock to the most profitable level.[150]

As for whaling in Iceland (or, for that matter, elsewhere), the interests of those who make their living by hunting whales and of those who want to eat whale meat should not be completely disregarded. At the same time the interests of those who desperately want to see whales preserved in Icelandic waters should not be disregarded either. This is a coordination problem, unless of course one group tries to force its will upon the other one. Possibly coordination might be achieved by two measures. First, the idea of national parks may apply to the sea as well as to land. It could be a rule that in areas where whale watching is easy and popular, whale hunting would be banned. Something like this is already emerging with the traditional whale watching areas of the sea. Second, whale quotas should not only be transferable amongst whale companies, but also to those who would buy them in order not to use them (unlike cod quotas). Then preservationists could pay for whales not being caught. If it is true that the demand for whale meat is low, then the prices of the quotas would fall, and then the preservationists need not worry. Possibly whales would then play a similar role in Western society as sacred cows do in India or pigs in Jewish society: they would not be eaten. Likewise Westerners do not eat some other animals, such as dogs or rats, which people of other cultures devour without any qualms. If the demand for whale meat, on the other hand, turns out to be high, then hunting would be continued. The advantage of this market solution is that both groups should be able to accept it. Neither of the two groups would force its will upon the other one. Instead it would be left to the two groups to show which of them values whales more highly (in other words, which of them is willing to pay a higher price).

Under a system of catch quotas for the fin whale and the minke whale in Icelandic waters, some kind of property rights would be defined with the result that the two species would end up in the hands of those who value them the most. It is quite true what English biologist Jeremy Cherfas wrote in a 1988 book: 'The great *whales* belong to *nobody* and to everybody. In the struggle to exploit them the spoils go to the stronger and the swifter.'[151] In the future more complete property rights might be envisaged than the imperfect use rights which are implied in permanent, transferable catch quotas in the hands of whaling companies or whale preservation organisations. Property rights of land and livestock are defined by fencing and branding. As technology advances, possibly individual whales – immensely large and distinct animals – could be 'branded', marked or labeled in some way. It is already possible to trace with a DNA analysis the origin of whale meat. Possibly whales could be identified from satellites. Another possibility lies in the fact that they emit sounds that identify individuals just as clearly as fingerprints identify human individuals. Moreover, sound waves or other means might perhaps be used in the future to hinder whales from moving from one area to another, which would really imply fencing.[152] However, such development is only likely to take place if somebody has an interest in it.

148 Margaret Klinowska, Brains, Behaviour and Intelligence in Cetaceans, W*hales and Ethics*, ed. Orn D. Jonsson (Reykjavik: University of Iceland Press, 1992), pp. 23–37. Dr. Klinowska was a member of a research group at Cambridge University on whales and other mammals.

149 Information from marine biologist Gisli A. Vikingsson at the MRI.

150 R. Q. Grafton, T. Kompas and R. W. Hilborn, Economics of Overexploitation Revisited, *Science*, Vol. 318, No. 5856 (2007), p. 1601.

151 Jeremy Cherfas, *The Hunting of the Whale: A Tragedy that Must End* (London: Bodley Head, 1988), p. 218.

152 Michael De Alessi, Property Rights and Advanced Technologies, *Individual Transferable Quotas in Theory and Practice*, pp. 141–48.

14

# ELEPHANTS

It would take an unusual farmer to let his cattle stray into his neighbour's meadow and graze there. But foreigners expect Icelanders to feed at least two 'gate-crashers' in the Icelandic waters, the whale and the mackerel. Those who want to protect the whale by banning all whaling (instead of allowing sustainable whaling) do not seem to be ready to pay for the six million tonnes of food which this immense animal annually eats in Icelandic waters. And the EU watches the mackerel enter Iceland's EEZ and feed there without giving Icelanders a share in the total catch proportional to how much of the total mackerel stock is found and fed in Icelandic waters. There are several other fascinating cases where animal preservation may cause nuisances and where the interest of all those involved should be fairly weighed. One case is that of the majestic Icelandic sea eagle (the European cousin of the North American bald eagle), which has been protected by Icelandic law since 1914.[153] It was no coincidence that the stock plummeted in the 19th and 20th centuries. Farmers killed the birds and destroyed the nests because the sea eagle preyed on livestock and the nests of eider, which produce valuable eiderdown. Now the stock has recovered and is growing rapidly and so are the problems of the few farmers that are left in its habitat.

Icelandic eider farmers are not compensated by the government or by preservationists for the damage the sea eagle inflicts on their eider nests. The wolf in the French alps is a different story. Being a nuisance, it was hunted to extinction in the 1930s. But late last century the EU made the wolf a protected species, and it invaded the French Alps from Italy in 1992. Since then the number of wolves has multiplied many times over and may now, in 2017, be growing at an annual rate of 20%. The wolf has plenty to feed on: 20,000 sheep in the French Alps are believed to have been killed by wolves in just five years. The French government pays the farmers compensation for the damage. But this means, as Rognvaldur Hannesson points out, that the wolf is dining at the expense of the French taxpayers. The protection of the wolf also creates problems for small scale, sustainable farming by way of sheep grazing, found attractive in its own right by many environmentalists.[154] Should their interests count for nothing? Should the wolf not be kept to areas where it does not cause a nuisance, even if it is compensated?

Another animal may cause a nuisance for human beings and create a danger to animals and plants in its habitat: the elephant, the world's largest terrestrial animal. Biologists distinguish between three main species: the Asian elephant and the two African species, the bush elephant and the forest elephant. The Asian elephant can be trained and used for transport, both of goods and humans, whereas African elephants mostly are wild. In ancient times elephants were considered to be formidable instruments of war. The Carthaginian general Hannibal famously used African elephants in his campaigns against the Romans. One of George Orwell's best-known short stories is 'Shooting an Elephant'. Orwell (whose real name was Eric Blair) tells the story of a police officer in Burma who is sent for when a tamed elephant goes on a rampage and kills a man. He feels that he has to shoot the elephant, not least because the natives want it. He is hesitant, but does it. 'Somehow it always seems worse to kill a large animal,' the protagonist wistfully comments.[155] Nevertheless it is usually the African elephant – larger than the Asian one – which captures the imagination of Westerners and that certainly belongs to what is called 'charismatic megafauna'. Elephants are not always as popular with those people who have to live near them because they compete with them for food, water and space. Elephants are herbivorous and can consume as much as 150 kilogrammes of food and 40 litres of water in a day. They, like humans, prefer to live near water, and they require a lot of space – in some woodland habitats about four square kilometres per animal.[156]

The elephants are a part of the 'charismatic megafauna' that capture the imagination of Western city-dwellers. But for their immediate neighbours in African and Asian villages, they can be a great nuisance and even danger. While in some African countries, the elephant is an endangered species, in others the elephant stocks are strong, not least because people are allowed to establish some kind of use rights to them and thus are transformed overnight from poachers to gamekeepers. Photo: Creative Commons.

Elephants have slowly retreated as man has advanced, with more and more land being cultivated. But their stocks have not only declined because food has become scarcer, but also because their ivory is in high demand, and to a lesser degree their meat and hide. At the end of the past century, many started to worry about the African elephant. It is estimated that about 1.3 million elephants were to be found in Africa in 1979, but their number went down to 760,000 in 1987. At a 1989 meeting of the Convention on International Trade in Endangered Species (CITES), the African elephant was listed as an endangered species. The Asian elephant had already been on the list since 1973. This meant that all trade in ivory was banned from the beginning of 1990.

The argument for a ban on the ivory trade was based on Colin W. Clark's analysis, already discussed, that overexploitation of renewable resources, such as stocks of animal, might occur if the cost of hunting them was low, their rate of reproduction was low and the discount rate was high.[157] It was said that international and local authorities could not change the fact that the elephant's rate of reproduction was slow: each cow only bears a few calves over her life, and pregnancy takes a long time. But a ban on ivory trade would presumably reduce demand for ivory, which would lead to a fall in its market price. If elephant hunting would also be banned, then the cost of hunting would go up. Thus, a ban on ivory trade and elephant hunting would hinder the extinction of elephants.

From the beginning the CITES ban on ivory trade was, however, subject to much criticism, mainly because of the fact that the African elephant was not an endangered species everywhere. It is true that in some African countries, particularly in Kenya, the number of elephants had gone down dramatically. But in other African countries like Botswana, Zimbabwe and South Africa, the stocks were strong and the number of animals had actually gone up. These countries operated national parks where wild animals like elephants could find a shelter. These operations were also partly financed by the sale of ivory and elephant hide. Limited hunting as a tourist recreation was also allowed there. These Southern African countries

153 White-tailed eagle monitoring, Icelandic Institute of Natural History, http://en.ni.is/zoology/birds/White-tailed-eagle-monitoring/

154 Hannesson, *Ecofundamentalism,* p. 46.

155 George Orwell, Shooting an Elephant, *New Writing,* Vol. 2 (Autumn 1936), pp. 1–7. Reprinted in many anthologies.

156 Ike Sugg and Urs Kreuter, *Elephants and Ivory* (London: Institute of Economic Affairs, 1994), p. 20. I am much indebted to this monograph in this chapter.

157 Clark, The Economics of Overexploitation, *Science.*

had opposed the ban for good reasons. From 1970 to 1989 the number of elephants had gone down from 167,000 to 16,000 in Kenya, but it had gone up from a little less than 40,000 to a little more than 60,000 in Zimbabwe. In other words the elephant was an endangered species in Kenya, and not in Zimbabwe. Why was it necessary to impose a ban on trade with Zimbabwe because of a danger found in Kenya? The majority behind the CITES decision to put the African elephant on the list of endangered species consisted, on one hand, of countries where there were no elephants and, on the other hand, of those countries that had seen their elephant stocks dwindle significantly. It was also supported by some environmentalist organisations. The minority consisted of countries where the elephant stocks were either stable or increasing in number.

The opponents of the CITES ban did not only emphasise the fact that the African elephant as a whole was not an endangered species, since its number was going up in some countries. They also pointed out that some numbers used by CITES, such as the state of elephant stocks until 1989, seemed implausible. According to those numbers, 300,000 elephants were supposed to have disappeared from the Congo (then called Zaire) without a trace. The critics found the decision by CITES to be political rather than based on scientific research.[158] They added that it hindered the utilisation of elephants which, it should be recalled, had often had harmful effects in areas cultivated by African peasants. The cost of the ban was imposed on those peasants, but the benefit was enjoyed by Western environmental organisations that wanted to preserve all existing elephants instead of conserving elephant stocks. The critics also doubted that the decline of elephant stocks was derived solely from the demand for ivory. A more important reason could be that land that had been the habitat of elephants was being claimed for cultivation. For all these reasons the secretary of CITES, Canadian civil servant Eugène Lapointe, opposed the ban, but he was fired in 1990, not least because of pressure from Western environmental organisations. Subsequently Lapointe founded an organisation devoted to the sustainable use of resources on land and at sea.[159]

The experience of the CITES ban on ivory trade has been mixed. Demand for ivory fell in the beginning and has nearly disappeared in Europe and North America. It has, however, increased somewhat in Asia, especially in Japan, China, South Korea and Taiwan. Initially when the ban was announced, poaching was reduced with the result that the number of elephants went up, especially in Kenya. However, from there on the reports on their increase are suspicious. It is said that as a result of the trade ban, their numbers went up from 16,000 in 1989 to 26,000 in 1994. This can hardly be the case because the elephant's rate of reproduction is low: a stock only grows by 5% to 6% a year under normal circumstances. Either elephants mysteriously had flocked to Kenya or these numbers were inaccurate. But when demand for ivory increased again in Asia as a result of increased affluence, poaching rose again.[160] One problem about the ban is that most African states are weak and impoverished and cannot adequately perform the monitoring necessary to constrain elephant poaching. Moreover, the trade ban is not complete because some countries in Southern Africa, such as Zimbabwe, Botswana and Namibia, have been granted exemptions so that they have been able to sell ivory to Japan and China.

Clark's mathematical analysis does not fully apply to the African elephant. It does not take adequately into account the circumstances, traditions and interests in Africa. If farmers are not allowed to utilise elephants, then they want to get rid of them. Despite the trade ban, some demand for ivory remains. Poachers and smugglers do not respect any trade ban, while authority is weak. In such circumstances a black market usually replaces ordinary trade. The species stays endangered. Whereas Clark presents an analysis of how low costs of utilisation and hefty profits from it leads to overexploitation, making a ban necessary, a more plausible account would be of high cost for local groups with special interest in the matter and small benefits of a total ban on hunting elephants.[161]

The CITES ivory trade ban was a temporary measure, applying to countries where the elephant really was an endangered species rather than a framework for the future. The choice is between significantly reinforcing monitoring of poaching, which would be very costly, or arranging matters in such a way that the farmers and villagers in the elephant habitat have a special interest in protecting the elephants so that they would not cull more of them than would allow for reproduction. In this case Zimbabwe might serve as a model. There inhabitants of the elephant habitat have a common right to utilise the elephants around them, to sell ivory and hide and to allow tourists to watch them and even occasionally to hunt them. Consequently, the inhabitants look after the elephants as they would look after other valuables under their control. The more tourists who visit, the more income local people derive. In Southern Africa there are also large parks, such as the Kruger Park in South Africa, which is 20,000 square kilometres, roughly the same size as Slovenia. The managers of such parks could utilise elephants in the same way and reserve the revenue for their operations. But if they are to do so, they have to be able to sell ivory and elephant hide and to cull elephants within sustainable limits.

Certainly, the elephant is a charismatic animal. I still remember how intrigued I was in the autumn of 1987 when I spent a few days in Mala Mala, a park close to the much larger Kruger Park, watching the herds of elephants and giraffes move lazily and rather grandly around the bushland, as if they owned it, while the supple lions appeared at dusk and dawn, looking intently around with their big amber-coloured eyes, ready to seize their prey. But here as elsewhere the choice is between preservation and conservation. Which is better in the long run, to preserve elephants or to conserve elephant stocks? Some environmentalist agencies demand a total ban on utilising elephants. But they bear no cost from maintaining the elephants and are themselves funded by affluent Westerners who cannot accept that elephants are culled or killed, believing falsely that they are everywhere an endangered species. They are like the police officer in Orwell's short story, who was not really interested in all the harm the elephant was inflicting on villagers, although he reluctantly decided in the end to shoot the elephant. Conservation of elephant stocks requires the definition or appointment of protectors who have an interest in maintaining them – and culling them within limits – at the same time as they bear the costs involved in it. Indeed in 1999 CITES accommodated its critics by moving elephants in Botswana, Namibia and Zimbabwe from its list of endangered species (Appendix I) to another list that allows restricted trade (Appendix II). Elephants in South Africa were moved to the other list in 2000.[162] Sport hunting for elephants is also still legal in some African countries.

It should be noted, moreover, that elephants are not always as lovely as Westerners see them from a distance. They do not only stay in the bushes and forests of the wilderness, but are also a threat to cultivated land, breaking fences and eating crops, destroying homes and killing people, often by trampling them to death. It is estimated that elephants kill 500 people each year.[163] Elephants can also upset the delicate balance of nature. For example, the baobab tree, which grows to be quite old, is often found in African elephant habitats. The convolutions in its trunks form cracks and holes that provide shelter to many small animals and birds and offer ideal sites to rear their young. But elephants also feed on baobab trees, stripping the bark off and chipping away the wood with their tusks so that the trees topple over and die.[164] It is estimated that in Kruger Park, the number of elephants should not exceed 7,000 so that they have sufficient food without depriving other species or destroying too many plants. But managers hesitate to cull elephants because of the ivory trade ban and because of pressure from environmentalist agencies. Instead of a worldwide ban on trading ivory and hunting elephants, the environment would be much better served by allowing national parks, reserves and local communities close to elephant habitats to sell access to elephants, cull them down to what is sustainable and trade in ivory and hides. This would be 'saving by selling'.

158 Sugg og Kreuter, *Elephants and Ivory*, p. 28.

159 Eugène Lapointe, *Embracing the Earth's Wild Resources* (IWMC World Conservation Trust, Lausanne 2003). Information available online, http://www.iwmc.org

160 Campaigners' fear for elephants, and their own credibility, *The Economist* 17 July 2008.

161 Sugg and Kreuter, *Elephants and Ivory*, p. 48.

162 African Elephant, CITES, https://www.cites.org/eng/gallery/species/mammal/african_elephant.html

163 Brian Handwerk, Elephants Attack as Humans Turn Up the Pressure, *National Geographic News* 3 June 2005. https://news.nationalgeographic.com/news/2005/06/0603_050603_elephants.html

164 Ian Whyte, Headaches and heartaches: The Elephant Management Dilemma, *Environmental Ethics*, eds. David Schmidtz og Elizabeth Willott (Oxford: Oxford University Press, 2002), pp. 293–305.

15

# RHINOS

The rhino (abbreviated from rhinoceros, which in Greek means nose-horned) is a very large animal, although smaller than the elephant. It can weigh between one and almost three tonnes, whereas an elephant can weigh up to six tonnes. The rhino is divided into five species, three in Asia (the India, Sumatra and Java rhinos) and two in Africa (black and white rhinos, though neither of them is in fact respectively of that colour). Three species have two horns: the two African rhinos and the Sumatra rhino. Rhinos are not as charismatic as the serene-looking elephants. To humans they appear as if they are perpetually in a bad mood. Perhaps this is the reason Romanian playwright Eugène Ionesco put them into a widely-acclaimed play called *Rhinoceros*. An allegory about the rise of European totalitarianism, the play describes inhabitants of a small town in France who fight rampaging rhinoceroses, but who eventually turn into rhinoceroses themselves with the exception of one bewildered, ordinary citizen, who ultimately decides to take on the rhinoceroses instead of turning into one of them.[165] (Some might even read the play as an allegory about ecofundamentalism.)

Rhinos are like elephants in that because of their strength and size, they are not really threatened by any predator – except man. During the last century their numbers went down dramatically. This was for two reasons. First, many of their natural habitats, especially in Asia, had been taken over for cultivation. Second, their horns were, and still are, much in demand. The horns are made of keratin, the same protein that makes up nails. In Yemen the horns are carved for traditional daggers, whereas in China, Vietnam and other Asian countries, they are believed to have therapeutic qualities when ground into powder. Some Western doctors dismiss this belief, but others say that the powder may reduce fever and headache.[166] It is, however, a myth that the powder is used in Asia as an aphrodisiac. The crucial point here is that there seems to be a stable demand for rhino horns with deep cultural roots. By weight rhino horns can cost as much on the black market as gold, diamonds or cocaine.

Unfortunately rhinos are easy targets. Poachers can kill them while they drink at the water holes they visit every day. In Asia the killings were rampant, and in the 1990s there were only 50 Java rhinos and about 1,500 Indian rhinos to be found, while the number of Sumatra rhinos was not known. It was then estimated that in Africa the number of white rhinos was 3,500 and of black rhinos 12,700.[167] After CITES was established in 1973, all five species of rhinos were put on its list of endangered species. This means that international trade of rhino horns is banned. Countries with rhino habitats have also banned their hunting.

Certainly the rhino was and still is an endangered species. However, the ban on rhino horn trading and on hunting has not been very effective. The demand for rhino horns is so strong that poachers do not hesitate to shoot rhinos and saw off their horns, even if they risk being shot on sight themselves. Hundreds of poachers have been killed without any significant effects. Rhino horns are sold on a flourishing black market in Africa, where government authority is weak and corruption widespread. The possible profit for the poachers has been so big and the surveillance so ineffective that the number of illegal rhino killings increased significantly in some African countries, mostly in Zimbabwe and South Africa. CITES has responded by using stronger rhetoric in its declarations against rhino hunting, but to little avail. At a CITES meeting in 1987 a total ban on all rhino horn trade was passed, not only internationally but also locally. Those countries that had reserves of rhino horns were also directed to destroy them. This directive was, however, cancelled in 1994.

The rhino is everywhere an endangered species. It is easy to kill and its horn is much in demand in parts of Asia. Arguably, the only way to save the African rhino stocks is to establish some private property rights in them and to allow the holders of those rights to dehorn rhino and sell the horns in the international market, and to sell safari tours through their habitat to tourists and even to sell hunting licenses for them.

Even if rhino horns and ivory are often discussed together, there are significant differences between these two goods. Rhinos are in much more danger of extinction than elephants, and the market for rhino horns is also different from the ivory market. The demand for the horns in Yemen, China, Vietnam and elsewhere in Asia is stable, and it seems to remain unchanged by exhortations or announcements from the West. If anything it has increased as a result of the newfound affluence of some of these countries. Another difference is that elephants have to be killed to utilise the ivory, but the horns can be sawed off rhinos, and they grow back. In the early 1990s in the national park of Hwange in Zimbabwe, experiments in such dehorning were made, but they had to be stopped for lack of funding. Each rhino had to be sedated so its horn could be sawed off, and each operation then cost about $1,000. Some environmentalists complained that the animals were being abused by the operations although they may not reduce much their defensive potential in the wilderness.[168]

The argument for the ban on rhino horn trade is the same as for the moratorium on whaling and the ban on ivory trade. It is based on the analysis of overexploitation by Colin W. Clark: a species will probably be hunted to extinction if the cost of hunting is low and the market price of the products from the animal is high, and if the hunters want a quick return on their effort (in other words if the discount rate is high).[169] This could happen, Clark pointed out, even if the utilisation of the species was in the

165 Anne Holloway Quinney, Excess and Identity: The Franco-Romanian Ionesco Combats Rhinoceritis, *South Central Review,* Vol. 24, No. 3 (2007), pp. 36–52.

166 Michael t'Sas-Rolfe, *Rhinos: Conservation, Economics and Trade-Offs* (London: Institute of Economic Affairs, 1995), p. 14. I am much indebted to this monograph in this chapter.

167 t' Sas-Rolfe: *Rhinos*, p. 13.

168 't Sas-Rolfes: *Rhinos*, p. 21.

169 Clark, The Economics of Overexploitation, *Science*.

hands of a coherent group. It could pay for the group to harvest all the stock over one hunting season. A ban on hunting and trade, on the other hand, would drive up hunting costs while market prices would fall, and consequently the danger of extinction would be reduced.

However, this analysis, while theoretically impeccable, cannot be applied thoughtlessly to the situation of the African rhinos. First, the poachers are desperately poor. For them the risk is low, even if occasionally they are caught and killed because the potential benefit of killing a rhino and selling its horn on the black market is very high. Second, the market price for rhino horns does not fall much despite the ban because the demand remains strong and stable in Yemen, China, Vietnam and other countries. Third, government authority is weak in most African countries and in some Asian countries. Fourth, rhinos outside national parks compete, just as elephants do, with the local population for food and space. There is, therefore, little local interest in protecting them.

The numbers certainly are alarming. The Indian rhino now exists almost solely in national parks. The Java rhino is one of the most endangered large mammals in the world. It is estimated that only about 60 animals remain in Java, and all are in the wild. The Sumatra rhino is also endangered. It is estimated that less than 300 animals remain, living high up in the mountains of Sumatra and Borneo. In 2011 Africa's western black rhino was declared extinct. Africa's other rhino populations are also threatened. In 2017 the number of white rhinos was estimated to be about 20,000 and black rhinos about 5,000. In South Africa – home to 90% of the remaining white rhinos and 40% of the remaining black rhinos – poaching more than doubled each year over the course of five years from 2008 to 2012. If poaching continues to accelerate, Africa's two remaining rhino species may become extinct in the wild within 20 years.[170] The question now is whether to try and preserve the existing specimen by a ban on hunting or trade or to try and conserve the species. Preservation requires funding, which does not seem to be available. Conservation, however, seems a feasible alternative. Rhinos live in three kinds of places: within national parks, in the wilderness not far away from villages and on private land. If the three agents who control the habitat of the rhinos, the management of national parks, village communities and owners of private land, are given rights to utilise the rhinos, and if CITES revokes its ban on rhino horn trade, then there is some hope that the stocks would not become depleted, at least not in Africa.

The 'owners' of rhinos could utilise them in at least three ways. First, they could sell access to them to tourists on safaris. There is much demand for this kind of entertainment. (This does not apply in Asia because the Java and Sumatra rhinos live in mountainous woodlands, so it would be difficult to organise safaris to their habitats.) Second, these agents could sell horns from dead animals and saw off horns from living animals, as has been done with good results. The price of dehorning has gone down a lot. While it used to be about $1,000 for each operation, now it can be done for about $20.[171] Third, these agents could sell licenses to hunt some of the animals. They would usually be old bulls whose departure would not affect the stocks. CITES has actually allowed such hunting in South Africa, although it still maintains the ban on rhino horn trade. A hunting license for a rhino could probably be sold for tens of thousands of dollars, and at least some of the revenue could be used for the operations of the national parks. By one stroke of the pen, poachers would be turned into gamekeepers.[172] Probably the Asian rhinos will not survive except in zoos, although they do not reproduce easily there. But under the present arrangements, everybody loses except lucky poachers, smugglers and corrupt officials. The two African rhino species could be saved, if they would be taken into custody by people who would have an interest in protecting them.

170 Duan Biggs, Franck Courchamp, Rowan Martin, and Hugh P. Possingham, Legal Trade of Africa's Rhino Horns, *Science*, Vol. 339, No. 6123 (2013), p. 1038.

171 Biggs et al., Legal Trade of Africa's Rhino Horns, *Science*, p. 1038.

172 't Sas-Rolfes: *Rhinos*, pp. 43–50.





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# CONCLUDING REMARKS

The main conclusion of this report is that the best remedy for the perceived failings of capitalism is more capitalism. One of the most commonly cited failings of capitalism is that it does not take into account the environment. This was partly true in the past, but it was, as has been argued there, because often capitalism had not been given the chance to develop rules that would enable individuals by trade to eliminate or reduce harmful effects of human activities on the environment. 'Green capitalism' could also be called 'free market environmentalism' or 'wise use environmentalism' because the emphasis is on the compatibility of a clean and healthy environment with economic growth and individual freedom. On the basis of the analysis offered here, some practical suggestions or recommendations may be made to the European Parliament and other bodies.

1. WHO and other international organisations should permit DDT again. Its excessive use in agriculture had some undesirable effects, especially on birdlife, but these effects need not reappear. DDT remains the cheapest – and safest – way to fight against malaria, which is claiming millions of lives.

2. Governments and business should take a critical look at some of the political prejudices and prophesies about the environment that are being offered to the public in the name of science. Freedom of thought does not require public funding of shrill, irresponsible propaganda.

3. The United States, the European Union and countries in the British Commonwealth – those parts of the world that are traditionally most receptive to freedom – should turn broadcasting licenses, defined by location and frequency, into private property rights, freely transferable.

4. In order to move to fisheries that are sustainable and profitable, the European Union should adopt a comprehensive system of individual transferable quotas that would initially be allocated on the basis of catch history. The ITQs should be permanent.

5. In the future, based on the subsidiary principle, fishing communities should as much as possible manage the fisheries themselves and bear as well the costs of their management.

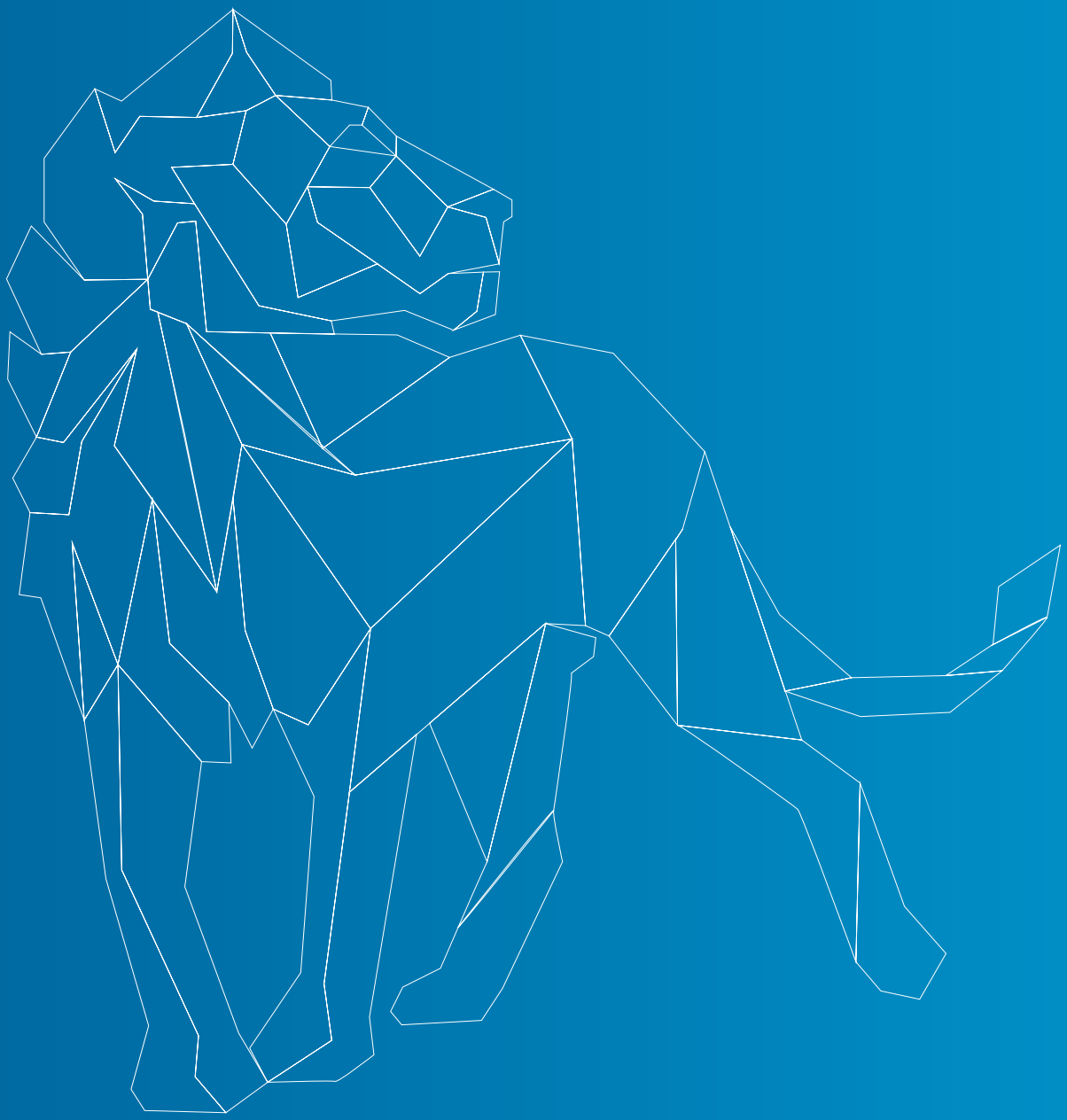
6. The International Whaling Commission should revoke its ban on whaling in cases where whale stocks are strong, as the fin whale and the minke whale are in Icelandic waters. On scientific evidence CITES should remove those two stocks from its list of endangered species. Whaling should, however, be firmly managed.

7. When governments protect wildlife that can cause nuisance to human beings, such as the wolf in the French Alps is a nuisance to sheep farmers and the Icelandic sea eagle is to eider farmers, they, or the preservationists who insist on the special protection, should compensate those on whom the nuisance is inflicted. Still better would be to confine protected wildlife to areas where they would not cause any such nuisance.

8. On scientific evidence CITES should remove those elephant stocks that are strong from its list of endangered species and encourage the development of local use rights in elephants, which would imply trade in ivory and hunting licenses.

9. On scientific evidence CITES should encourage the development of local use rights in rhinos held by national parks, communities and private landowners, which would imply dehorning, trade in rhino horns and hunting licenses.

10. The European Parliament and other international bodies should commission many more studies in how to apply the price mechanism and private property rights to environmental problems in order to resolve them. They should use the expertise of think-tanks, like the Institute of Economic Affairs in London and the Property and Environment Research Center (PERC) in Bozeman, Montana.



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