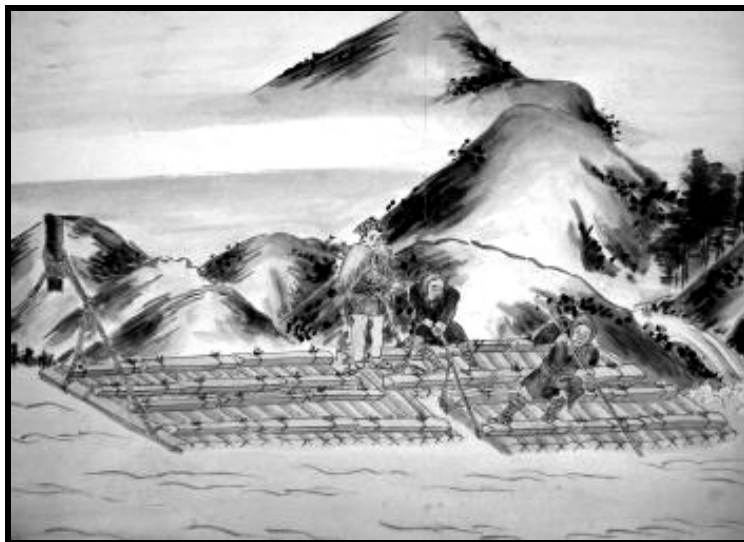


# FOOD COUPONS AND BALD MOUNTAINS

What the history of resource scarcity can teach us  
about tackling climate change



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## Overview

This paper examines two striking examples of societies that faced collapse due to acute scarcity of resources yet successfully countered the problem and survived: the response to forest depletion in pre-industrial Japan during the Tokugawa period (1600-1868); and the introduction of rationing and price controls in Britain and the United States during World War II. After discussing the contexts in which scarcity arose, the processes through which the problem was tackled, and the reasons for the success of the response (and its limitations), the paper draws conclusions about the lessons these case studies provide for confronting the crisis of climate change. The historical examples give some reasons for hope. They show that successful and radical reform is possible, that government regulation is an effective means of response, that local action makes a difference, and that tackling scarcity can be a means of promoting social equality. Unfortunately, the cases also give strong reasons for pessimism. They demonstrate: the importance of political resolve and long-term vision, which today's politicians generally lack; that people and governments will take action when there is genuine fear in society, yet fear of climate change is absent in most countries today; that market solutions must be approached with caution, yet we seem to be placing considerable hope in them for solving the climate crisis; and that societies must be weaned off consumerism, yet modern consumer culture appears so deeply ingrained as to be unassailable. Overall, the historical case studies allow us to step back and look at the big picture of climate change with a clarity that the intricacies of contemporary policy debates do not allow.

## INTRODUCTION

Climate change is often described as a global challenge without historical precedent. Never before has there been a problem that is so potentially destructive to humanity, so irreversible or so borderless. The temptation, therefore, is to look to the present or future for solutions (such as new technologies) rather than to look to the past. How could one draw lessons from the past if there are no comparable crises, if climate change is unique?

However, if we think about climate change not as a scientific or ecological problem, but as one of responding to acute resource scarcity that requires massive social adjustment, then history becomes relevant. This is because human societies have, at various points, faced collapse or breakdown due to a scarcity of resources, yet managed to adjust and avoid destruction or impoverishment. Two of the most striking examples are the response to forest depletion in pre-industrial Japan during the Tokugawa period (1600-1868), and the introduction of rationing and price controls in Britain and the United States during World War II.

Both these instances of social change are well known and have been subject to comprehensive scholarship. What has not been done is to analyse in depth how they can illuminate the struggle to tackle climate change, which has at its centre a problem of scarcity: only a limited amount of carbon dioxide (and other greenhouse gases) can be safely emitted into the atmosphere. Current emission levels need to be drastically reduced and new ways of allocating the right to emit carbon dioxide urgently need to be drawn up. Of course, carbon dioxide is not scarce in the same way that food is scarce during a famine, since there continues to be large amounts of fossil fuels available for producing it. The point is that reducing carbon dioxide emissions requires treating it *as if it were scarce*.

The purpose of this paper is, therefore, to present two detailed case studies of responses to acute resource scarcity and then to highlight the lessons they provide for confronting the climate crisis. My hope is that an historical perspective will help us to step back and look at the big picture of global warming, and to temporarily escape from being ensnared and sidetracked by the intricacies of contemporary policy debates.

For each case study I will examine:

- The context in which scarcity arose
- The processes and policies through which the problem was tackled
- The degree of success of the response
- The underlying reasons for the success of the response, and where appropriate the explanations for failures

As you read the case studies, the parallels with the current crisis of climate change will become apparent. I will leave discussing the lessons we can draw until the conclusion of the paper.

## **RATIONING AND PRICE CONTROLS IN BRITAIN AND THE UNITED STATES DURING WORLD WAR II**

Imagine a government today in a wealthy country suddenly announcing that within a few months – or even from tomorrow onwards – consumers would be permitted to purchase no more than a few ounces of cheese, tea, sugar, tinned beans and meat each week. Imagine also that there were no new cars for sale and that people were granted only enough petrol to travel 150 miles per month. Imagine that bread could not be sold above a set price, and that retailers only received supplies in accordance with the number of customers registered with them.

All this seems unthinkable today in our era of consumer choice and free markets. Yet this is precisely what happened in the 1940s in two of the world's great powerhouses of industrial capitalism, Britain and the United States. Due to wartime shortages and inflationary pressures, rationing and price controls became the primary method of allocating scarce consumer goods. The most fundamental element of a capitalist economy – prices freely determined by the market – was largely suspended.<sup>1</sup>

Today we can hardly imagine people accepting and adjusting to such a lifestyle upheaval, yet they did. Today we expect policy to be phased in gradually, yet this happened virtually overnight. Today we would anticipate such a system to fail, yet for the most part it was highly successful. So how was the system of rationing and price controls introduced? How did it function? What factors contributed to its successes, and to its limitations?

### ***THE BRITISH EXPERIENCE***

#### **Context**

Rationing of basic foodstuffs and household goods began in January 1940, only months after war with Germany broke out, and was soon extended to include other items such as clothing, soap and petrol. It continued into the post-war period and did not end until the early 1950s. During these years of austerity there was an exceptional degree of state involvement in the economy, and an unprecedented regulation of, and reduction in, consumption. Consumption as a share of net national expenditure fell from 87% in 1938 to 55% in 1943, whereas military expenditure rose from 7% to 55% over the same period.<sup>2</sup> Food in particular was highly managed: by 1942 rationed and price-controlled foods constituted over 50% of total food expenditure.<sup>3</sup>

What were the main reasons for introducing rationing? First, to redirect resources to the war effort (e.g. food for troops, raw materials for producing war machinery, freeing-up shipping space). Second, to prevent food and other consumer-good shortages on the 'home front' (i.e. in Britain) and the related problems of queuing, hoarding and spiralling prices. Third, to ensure that 'fair shares' of goods were received by all citizens. Food was seen to be an especially problematic area because of the country's position as a net food importer. When the war began, Britain was importing 50% of its meat, 70% of cheese and sugar, 80% of fruit and 90% of cereals and fats.<sup>4</sup>

#### **How did the system develop?**

### *Pre-war planning*

The British government was already prepared for rationing when the war broke out. In 1936 – two years before Prime Minister Chamberlain declared ‘peace in our time’ – it established an influential subcommittee to plan for wartime rationing, chaired by Sir William Beveridge (who had been permanent secretary to the Ministry of Food during World War I and was to be influential in the development of the post-war welfare state). The subcommittee concluded that war would require comprehensive control of supply and distribution of goods such as cereals, meat, sugar, fat and tea, and that ‘every member of the public would be able to maintain a fair share of the national food supply at a reasonable price’.<sup>5</sup> The country was divided into 19 administrative units and 1400 local food committees were established in local authorities. A Food (Defence Plans) Department was set up. A further indication of this administrative and political foresight was that 50 million ration books had been printed before Germany invaded Poland in September 1939.

### *Introducing rationing*

When war broke out each person over the age of six was issued with their own ration book. The first goods to be rationed were sugar, butter, ham and bacon (in January 1940), followed by tea, margarine and cooking fats (in July 1940), and preserves and cheese (in 1941). There were three main principles of this ‘straight’ rationing system. First, there was an individual flat-rate ration (although a few special groups received extra rations, such as pregnant women and children). Second, each consumer had to register with a retailer, who would receive supplies based on the number of registrations. Third, ration allocations were not tradable: although it became legal to give a ration as a gift to someone, it was illegal to engage in the barter or trade of rationed foods.<sup>6</sup> The prices of other basic non-rationed goods such as bread and potatoes were kept down through government subsidy.

### *Points rationing*

The next stage of rationing began in 1941 with the introduction of a parallel ‘points’ rationing system for foodstuffs such as canned and processed foods, dried fruits, rice and biscuits. Consumers were allocated a number of points, and all foods were given a points price (which the government periodically adjusted). Unlike the straight rationing system, people could choose which goods to spend their points on, and also choose between retailers, but there was no guarantee their chosen goods would be available. The remarkable aspect of this development was not that the points system was copied from the Germans but that rationing was extended in response to public demand. The continued lavish eating of the rich was exacerbating class tension and there was widespread dissatisfaction with wealthy consumers being able to buy up unrationed goods which were expensive and in short supply. Combined with the growing food shortages during the winter of 1940-41, this ‘led to public discontent with the unequal distribution of unrationed foods and demands for an extension of rationing’.<sup>7</sup>

### *Post-war rationing*

The final stage of rationing was its operation after the war, when rationing became even more extensive. When the war ended in 1945, the combined straight and points rationing systems were maintained by the new Labour government of Clement Atlee. Bread rationing was introduced for the first time for two years after July 1946 and there was a potato control scheme operating in the winter of 1947/8. After this time rationing was gradually dismantled. In 1950 milk and soap were decontrolled and the points rationing system was also discontinued. The new Conservative government in 1951 ended

rationing for tea, sugar and sweets. All other rationing and most price controls ceased between 1952 and 1954.

### **How successful was the system?**

There is general agreement amongst scholars that rationing in wartime Britain was highly successful despite the existence of some black markets. First, severe food shortages of basic goods, extensive queuing and hoarding were largely avoided. Second, public opinion polls showed the system to be not only accepted by consumers but also popular, evident in the demand for the extension of rationing in 1941. A third and highly significant aspect of the system's success was that rationing and other food control policies contributed to reducing social inequalities and had a positive effect on nutrition levels of the poorest social sectors, who for the first time had a guaranteed source of basic foodstuffs. The acute inequality in food intake between rich and poor, which had been a continuous theme in British history up until the 1930s, was largely brought to an end. As one analyst points out: 'The Second World War represented a major turning-point in the history of the British diet. The rise in consumption of brown bread, milk, and vegetables, coupled with food fortification resulted in a healthier diet and no social group fell short of its basic nutritional requirements. Middle-class food consumption standards undoubtedly deteriorated while the poor sections of the working class were the main beneficiaries of the policy.'<sup>8</sup>

There were also problems with Britain's rationing system. First, wealthy individuals were still able to buy highly priced unrationed goods, such as pheasant and champagne. Second, black markets developed (although they were not as extensive as in the United States). Problems included the sale of rationed foods without coupons, sale above the maximum price, the manufacture and supply of controlled goods and the illegal slaughter of animals. The Ministry of Food's successful prosecutions against emergency legislation peaked in September 1941 to August 1942, with 26,403 convictions, mostly resulting in small fines.<sup>9</sup>

The most problematic black market emerged with petrol. Private motorists (around one in ten households ran a car at the beginning of the war) were initially given a basic ration, amounting to around 1,800 miles per annum. This basic ration was abolished in 1942 and was not restored until 1945, resulting in many private vehicles being taken off the road. The black market arose mainly due to the over-issue of petrol coupons for commercial use. Haulage and other commercial vehicles often did not use their full ration and the excess coupons were frequently sold (illegally) to garages or private motorists. Moreover, the system of petrol rationing was poorly enforced.<sup>10</sup>

Although coal was in short supply throughout the war (partly because miners were called up to fight), Conservative Party opposition prevented it from being rationed. Instead the government ran a mass campaign to encourage the public to ration coal on a voluntary basis. People were asked to replace coal with logs, to eat food cold instead of hot, to lag their hot water systems, and not to have baths more than five inches deep. Families were encouraged to work out their 'fuel target' (the maximum amount of fuel they should use), and central heating was cut in government offices. Neighbours and friends went to each others' homes carrying a lump of coal as a contribution to a shared fire. By 1944 coal consumption had dropped to three-quarters of its pre-war level.<sup>11</sup>

## Why was it successful?

Despite some limitations, it is clear that rationing and price control system in Britain was a major success, particularly during the war. The main explanations include the following:

### *Early preparation*

Britain was extremely well-prepared for wartime scarcity. The Ministry of Food was established within days of the outbreak of war, and ration books were ready for distribution. Although the system did not always work smoothly, and adjustments had to be made (such as the introduction of points rationing), the government could not be accused of doing 'too little too late'.

### *System integration and regimentation*

Rationing worked because of the high degree of integration of the system. The Ministry of Food controlled the whole chain of supply of rationed goods, far more extensively and effectively than in the United States, from raw materials to final output and sales. They also had the resources and staff to make the system function.<sup>12</sup> The existence of these administrative measures must be understood within the context of wartime political organisation: it was possible to impose such a system because the wartime national unity government acted effectively as a dictatorship and was not plagued by extensive party political dissent. This context permitted the government to impose a non-voluntary rationing system (except on a few items such as coal).

### *Fear of shortages*

There was a genuine fear of shortages of basic consumer goods. Rationing was accepted by politicians, industry and the public as the best way of ensuring that everyone had sufficient food, clothing and other items, that prices did not rise out of control, and that food queues were avoided as far as possible.

### *Idea of 'fair shares'*

There was a widespread public belief that the wealthy should not be able to 'buy their way out' of rationing and that everybody should receive a fair share of the available goods. The idea of 'fair shares' – one of the staple phrases of wartime propaganda – was a conception of justice entailing equality of sacrifice and the guarantee of a basic minimum. For some of the poorest British citizens, wartime austerity was little different from their usual austerity, and was popular because it resulted in them being better off. Of course, while the wealthy were given the same ration allocations as the poor, 'fair shares' could not prevent those with the economic means from dining out in expensive restaurants.<sup>13</sup>

### *Belief in sacrifice*

There was general public acceptance that rationing was a major contribution towards the collective war effort. People believed that the threat from Germany was real and required sacrifice. Wartime propaganda contributed to the belief that action on the 'home front' was as important as action on the military front. Although some scholars contend that the 'Dunkirk spirit' should not be overemphasised in explanations for the success of rationing, it is clear that grass roots support for the system was extensive.<sup>14</sup> Moreover, rationing and price controls were not a sacrifice 'in isolation'. They were just one of the many aspects of wartime exceptionalism and state control of people's lives (other examples being conscription and factory work for women).

### *Dig for Victory*

The government's 'Dig for Victory' campaign, which encouraged people to grow vegetables in their household gardens and on allotments, had a major impact on wartime food production and helped offset the food scarcity resulting from the war and rationing. A Cultivation of Lands (Allotments) Order in 1939 empowered councils to take over unoccupied lands. Dig for Victory was spectacularly successful: by 1944 around 10% of all food production in Britain came from allotments and private gardens, and by the end of the war there were around 1.5 million allotments compared to 610,000 in 1935. Seed swapping, sharing produce and other cooperation in home food production also had a significant positive effect on wartime morale and community-building. There were, in addition, over 6,900 'pig clubs' with hundreds of thousands of members.<sup>15</sup> At the same time, there were significant increases in farm yields and the ploughing up of previously uncultivated land, such that the amount of Britain's land under cultivation increased 91% during the war.<sup>16</sup>

### *A temporary measure*

Rationing was considered a temporary measure for the duration of the war. That is, the system was supported partly because the public could see an end to it. This helps explain the widespread public dissatisfaction with rationing in the post-war period, particularly amongst women (who were most directly affected by rationing restrictions through being responsible for shopping and cooking in most households).<sup>17</sup> Without the threat from Hitler, rationing no longer seemed justifiable. This was despite the efforts of the Labour Party, who argued that post-war rationing was necessary to help deal with external economic problems (the balance of payments deficit, the dollar shortage and large overseas debts), to keep down inflation (which was under pressure due to their policy of maintaining full employment), and to ensure that the social equity established during the war was maintained. Increasingly voters took the Conservative Party's view that in the post-war context austerity was an unnecessary limitation on individual liberty and the free market, which helps explain the Conservative's electoral victory of 1951. Rationing could not be sustained in a context of party-political ideological conflict.

## ***THE EXPERIENCE IN THE UNITED STATES***

### **Context**

Despite the fact that US soldiers were dying for their country alongside their British counterparts after the US entered the war in 1941, the situation on the home front was markedly different. While Britain was in an era of austerity, the US was experiencing a wartime economic boom: civilian consumption increased 22% during the war. According to the economist John Kenneth Galbraith, head of the government's price control system at the Office of Price Administration (OPA), the sacrifices US consumers had to make were relatively mild: 'Never in the long history of human combat have so many talked so much about sacrifice with so little deprivation as in the United States during World War II.'<sup>18</sup>

Nevertheless, US citizens were subject to rationing and retailers were faced with an extensive system of price controls throughout most of the war. It is remarkable that so many aspects of the price mechanism were placed under government control in a country with such a strong free market heritage and ideology, and that the system worked as effectively as it did.

Why were rationing and price controls introduced? The primary reason differed from the British case: instead of being motivated by the fear of food and other consumer-item shortages, the greater fear was inflation resulting from a full-employment war-production economy. In 1940 and 1941, writes Galbraith, fear of inflation reached ‘paranoia’ levels in government circles.<sup>19</sup> Second, there was – as in Britain – a need to shift raw materials to wartime production and to divert food supplies to troops abroad. Third, there was a desire amongst some members of the administration to consolidate the ethos of government intervention in the economy and Keynesian demand management that had been established in the New Deal period in the 1930s, and to ensure the equitable distribution of scarce goods.<sup>20</sup>

### **How did the system develop?**

#### *The necessity of politics*

Unlike Britain, the US had not undertaken significant preparations for wartime rationing and price controls. However, once the US entered the war, the OPA (which operated from 1941 to 1946) played a major role in economic life and eventually had over 60,000 paid staff and some quarter of a million volunteer staff.<sup>21</sup> The OPA, like Britain’s Ministry of Food, wished to impose a system of cheap prices and equitably distributed goods during the war. Yet it was more difficult for the OPA to act with undisputed authority, partly because the war was more distant and less directly threatening than in Britain. The OPA was thus forced to be more political, building coalitions with labour, consumer groups and other organisations in opposition to industry, and having continually to lobby Congress to be given new powers.

#### *Increasing powers*

The fear of inflation was strong, and in January 1942 Congress gave the OPA the authority to enforce rationing, rent control and price control. In April 1942 President Roosevelt announced the General Maximum Price Regulation (‘General Max’), which instructed sellers of goods to take as the ceiling the price that had been charged in March for the same good (or a similar item). This method of price control clearly left much to the discretion of the seller. Another problem was that agricultural products had been exempted from General Max, a situation that was reversed by the Economic Stabilization Act of October 1942. The system was given a major boost by Roosevelt’s ‘Hold the Line’ order of April 1943, which introduced standardized dollar and cents prices for a whole range of consumer items, allowing shoppers to check prices against an official list. By 1944 the OPA was affecting 3 million businesses, issued regulations controlling 8 million prices, and stabilised rents for 14 million dwellings (affecting 45 million tenants).

The OPA was also responsible for rationing foods and other items to 30 million shoppers through a mixture of points and ration stamps. Within 16 months after Pearl Harbour there were 13 major rationing programmes in operation, covering products such as tyres, cars, petrol, sugar, coffee, meat, processed foods, fat and cheese. By the end of the war rationing accounted for around one-third of the value of consumer goods purchased (compared to about half in Britain).<sup>22</sup>

#### *The collapse of the system*

Whereas the post-war Labour government in Britain pushed for the continuation of rationing and price controls, by 1946 US Congressmen (especially those representing ranchers, textiles and wheat) were doing their best to deprive the OPA of its powers. The meat packers put their market domination into practice, cutting slaughtering by 80%,

which led to the so-called ‘meat famine’ (highly problematic in a country where eating meat had great cultural importance).<sup>23</sup> Under such pressures the administration was forced to dismantle the OPA and reinstate the price mechanism, despite continuing inflationary pressures.

### **How successful was the system?**

Although scholars tend to emphasise the failures, it is clear that OPA policies played a major role in keeping inflation down during the war. Consumer prices rose under 2% between 1943 and 1945, and total food costs, constituting a third of the average family budget, actually fell 4%.<sup>24</sup> The mobilisation of hundreds of thousands of volunteers to enforce the system (see below) demonstrated a widespread support for price controls amongst consumers. As Galbraith points out, however, not all the credit for keeping inflation down should go to rationing and price controls, as taxation and compulsory savings also played an important part in dampening demand.<sup>25</sup>

There were serious problems with the system and it is clear that there was more evasive and illegal activity in the US than Britain.<sup>26</sup> Amongst the difficulties with General Max were that retailers charged exorbitant under-the-counter prices, sold shoddy merchandise at regular prices or simply closed down and reopened with new higher prices to avoid the General Max price ceilings.<sup>27</sup> It is estimated that in mid-1944 as much as 40% of meat was being sold on the black market.<sup>28</sup> Selling or trading coupons by consumers was technically illegal but rarely prosecuted.

More generally, trade association and business leaders mounted fierce opposition to the OPA, in stark contrast with British business’s largely accepting attitude to wartime economic necessities. The opposition of the meat packing lobby (a virtual cartel) has already been mentioned above. The OPA attempted to introduce textile rationing, but opposition from industry forced it to abandon the idea.<sup>29</sup> In 1941 the head of the OPA suggested limits on car production as it was draining enormous resources that were required for the war effort. Industry representatives, unsurprisingly, attacked the idea viciously.<sup>30</sup> Nevertheless, it was still possible to force all plants to cease production of passenger cars, and commuting by car was limited by petrol rationing (most people received three gallons per week).<sup>31</sup>

### **What accounts for the accomplishments?**

To the extent that rationing and price controls were successful, the following factors were of importance:

#### *Voluntary action*

Shoppers – especially women – became invigilators of the price control system. Hundreds of thousands of women took ‘The Home Front Pledge’, publicly swearing an oath to ‘Pay no more than Ceiling Prices’ and to ‘Pay your points in full’. Over 250,000 volunteers worked with 5,525 local War Price and Rationing boards, regularly checking neighbourhood prices to ensure that local retailers were not cheating the system (very different from the British case, which did not rely on such voluntary action).<sup>32</sup> Here the OPA was drawing on a long tradition of US civic participation and a growing culture of consumer rights. By 1945, 7% of all women shoppers (around 2.1 million people) claimed to have reported a price violation. An historian of the system emphasises, ‘For one of the few moments in history, and certainly the only time at the government’s

initiation, the possibility of an organized, broad-based, cross-class consumer movement existed'.<sup>33</sup>

#### *Victory Gardens*

Like Britain, there was a mass government campaign for people to grow their own vegetables in what were known as 'Victory Gardens'. By 1943, 20 million households (around three-fifths of the population) were producing more than 40% of the vegetables Americans consumed. Amongst the incentives were that Victory Gardeners were granted 300 miles of extra petrol rations. As in Britain, 'wartime victory gardening and canning functioned as community builders'.<sup>34</sup>

#### *Industry structure*

The oligopolistic structure of major US industrial sectors – such as steel, aluminium, oil, chemicals and pharmaceutical – made it easier to impose price controls. As Galbraith says, 'We were successful also because, even in those days, concentration in American industry had gone far beyond the current estimate or appreciation of the textbooks... It is far easier to deal with a handful of large firms than with a plethora of small ones'.<sup>35</sup>

### **What accounts for the failures?**

The main factors limiting the effectiveness of the system were:

#### *Lack of regimentation*

As discussed above, the British system of rationing and price controls was far more regimented than in the US. The OPA was never able to gain control of the supply chain of key goods or to restrict the range of goods available (which would have simplified supervision of the market). In addition, fewer resources were put into administration and enforcement. The OPA was much stronger at the local level, where its volunteers operated, than at the federal level.<sup>36</sup>

#### *Business and political opposition*

The OPA was continuously fighting political battles against the private sector, as well as Congress, which resulted in its limited power and non-compliance with its regulations. Compared to Britain, rationing and price controls were seen much more as a political issue than as a matter of national interest.

#### *Freedom from fear*

The US public, in addition to politicians and business, did not feel the same fear or threat from the war as did people in Britain. Although Pearl Harbour had been bombed and hundreds of thousands of US troops were abroad, most people felt that the war was distant and did not necessitate drastic sacrifices. As a head of the US rationing programme wrote in 1945, Americans 'have found it hard to believe that genuine shortages exist'.<sup>37</sup>

#### *Absence of the Dunkirk Spirit*

Some commentators argue that US citizens lacked the public spirit and moral fibre to comply with rationing and price controls. While the US may not have had an equivalent to the 'Dunkirk Spirit', the evidence suggests that this factor should not be overemphasised. In both countries, 'there were early attempts to control prices that relied primarily on voluntary compliance, and in both countries these attempts failed'.<sup>38</sup> That is,

something more than public spirit was required to make rationing and price controls work, in Britain as well as the US.

## RESPONSES TO FOREST DEPLETION IN TOKUGAWA JAPAN

### Context

‘Japan today should be an impoverished, slum-ridden, peasant society subsisting on an eroded moonscape, rather than a wealthy, dynamic and highly industrialized society living on a luxuriant, green archipelago.’<sup>39</sup>

It seems hard to believe this apocalyptic vision of the environmental historian Conrad Totman. Yet for centuries Japan seemed ‘bent on accomplishing its own destruction’ through ravaging its woodlands, leaving bald mountainsides where there had once been dense forests.<sup>40</sup> Pre-industrial Japan was a wooden-structured civilization as dependent on timber as we are today on oil. In order to meet its huge appetite for timber, the old-growth forests of the three main islands (especially in the Kinai Basin, encompassing Kyoto and Osaka) were largely cut down or otherwise depleted, particularly between 1570 and 1670. Natural re-growth and scattered efforts of re-planting were unable to keep pace with demand. By the eighteenth century, during the Tokugawa shogunal regime, this destruction of the forests had led to severe resource scarcity that raised the prospect of economic and social collapse.

How was the impending environmental catastrophe averted? How is it that today Japan is a ‘green archipelago’, 80% of which is covered with forested mountains, rather than a ‘slum-ridden, peasant society’?

The short answer concerns woodland management. There was the development of a ‘negative’ regime of regulations to limit timber extraction, followed by a ‘positive’ regime of producing more trees which saw the introduction of plantation forestry from around the 1760s. This latter development made the most substantial difference, allowing the archipelago slowly to renew its forest coverage during the nineteenth century. In contrast with rationing during World War II, this was a long-term problem with a long-term response. Like climate change, it required policy changes of which the main beneficiaries would be future generations.

How was Japanese society organised at the time of this threat? The Tokugawa *bakufu* (shogunate) was a military dictatorship based in Edo (today’s Tokyo), which directly administered one-quarter of Japan. The remainder was ruled by around 250 subordinate barons or *daimyo*, each in charge of their own government or *han*. The bureaucracies of both the *bakufu* and *han* were staffed by samurai. Of the country’s 30 million population in the eighteenth century, some 85% lived in rural areas, the vast majority being peasants. A peculiarity of the Tokugawa regime is that it enacted a policy of economic and cultural isolation from foreign influences and effectively became an autarky, engaging in almost no foreign trade that could help relieve its resource scarcity.<sup>41</sup> The regime was also marked by a long period of peace following over a century of civil war. Confucianist ideals, such as the stress on social order and hierarchy, were prevalent amongst Tokugawa elites.

What caused such extensive forest depletion in the seventeenth century? First was the vast construction boom instigated by the elite, which required a surge in logging and the wholesale destruction of forests to build thousands of wooden castles, mansions, palaces, temples and shrines. Unlike in Europe during the same period, there was little use of alternative materials such as stone, bricks or mortar.<sup>42</sup> Governments in particular were

continually requisitioning lumber for these monumental building projects, many of which were designed to enhance the status of major regime officials and leaders. Second, cities and towns were growing at a fast pace, leading to greater demand for housing construction timber (almost every element of a Japanese home being made from wood) and also for wood for fuel (firewood and charcoal). By 1800 the population of Edo, at 1 million, was greater than that of Paris or London. General population growth exacerbated the demand for timber.<sup>43</sup> A third factor was the expansion of agricultural land for food production at the cost of forests. Finally, agricultural development required large amounts of natural fertilizer because of the intensely farmed poor soil, and much of this fertilizer (e.g. scrub brush and leaf fall) was sourced from woodland.<sup>44</sup>

Deforestation was not only problematic because of the potential constraints it placed on urban development and agricultural production (through the scarcity of fertilizer). Governments were dependent on timber as a source of income, selling it from their own lands or raising taxes from commercial logging. Villagers were dependent on woodland for their everyday livelihood. And forests also played a vital role in preventing erosion and flooding of Japan's ecologically fragile lowlands.

Before analysing how Japan resolved the problem of woodland depletion and acute timber scarcity, it is important to clarify who was responsible for the forests. The concept of 'owning' land did not exist in Tokugawa Japan. Rather, there was a complex system of overlapping use rights. By around 1700 large portions were designated 'lord's forest' or *obayashi*, which were overseen by the government and its ruling lords. In addition there were communal tenure forests subject primarily to local jurisdiction, which were used mainly by villagers for their timber and woodland needs. In practice, most woodland was subject to multiple use by both rulers and commoners.<sup>45</sup>

### **How did the responses to forest depletion develop?**

#### *Negative regime*

From around 1630 to 1720 a 'negative' regime of ad hoc woodland management gradually developed as a response to forest depletion and the increasing competition for forest resources between government, merchants and villagers. By the 1660s this had evolved into a nationwide attempt to limit forest usage. Awareness of timber scarcity in the islands was possibly spurred on by the Meiriki fire, which swept through the city of Edo in 1657, killing around 100,000 people and destroying thousands of mansions and dwellings. It is estimated that reconstructing only half the houses of commoners would have required logging some 2,500 hectares of prime forest.<sup>46</sup>

Policies pursued by both the *bakufu* and *daimyo* governments included: decrees closing forests to logging to allow for regeneration; placing limits on the amount of timber that could be extracted from government-controlled lands; and limiting the felling of trees over a certain size or of a particular species. Such regulations could apply not only in lord's forests but in any areas of woodland, including a villager's front yard. *Han* officials and their subordinates surveyed woodlands, kept records of timber usage, and investigated breaches of restrictions. At the local level, there were complex regulations introduced to limit the gathering of fuelwood and organic fertiliser on both household and communal land. There were also rules about the number and type of tools that could be used for logging and the type of pack animals for carrying the yield.

In addition to these supply-side controls were a series of demand-side regulations to limit wood consumption, which amounted to a system of rationing. Edicts were introduced specifying the type, size and number of pieces of wood that could be used to construct or repair bridges, dykes, dams, and boats. The size of new buildings was also regulated, and peasants were forbidden from using certain precious woods when building their homes. In an effort to link consumption to status, those higher up the social hierarchy were permitted to use scarce timbers and build larger houses. This was clearly a less equal system than the 'fair shares' rationing of World War II Britain.

Although this negative regime constituted an elaborate system of administrative controls and legal sanctions, it was poorly enforced and had little effect on regenerating Japan's increasingly scarce woodlands. Pressure to open up more agricultural land also limited the impact of the negative measures, as did governments' continuing demand for lumber for construction and for sale in order to raise revenues (despite their rhetoric about the need to limit forest depletion). Government attempts to limit tree felling was also frequently opposed by villagers who demanded continued access to the forests, in accordance with their customary use rights. Overall the main role of the negative regime was that it 'bought time' until the introduction of plantation forestry.<sup>47</sup>

#### *Positive regime*

The real saviour of Japan's forests was the development of a positive regime of afforestation during the eighteenth century, which has continued into the present. Like the negative regime, it was a slowly evolving and often localised response to a long-term problem that only became consolidated and relatively systematic from around 1760. There were three main elements to its development.

First was the emergence of new forms of silviculture knowledge from the seventeenth century, often in the form of manuals or treatises on how to plant trees and maintain forests to maximise timber yields. These were written by an assortment of itinerant scholars, village headmen, minor officials, practicing farmers and others. New methods were used to ensure that propagation through seed or vegetative cuttings was more effective, with increased survival rates. More effort was placed on tree aftercare to make sure that not only did the saplings survive into maturity, but that they yielded straight and valuable timber. Greater knowledge of soil types and habitat developed, so tree species were grown in appropriate locations. New systems for thinning and trimming branches also emerged. All this arboreal knowledge helped foster a basic conservation ethic in pre-industrial Japan. It was also a necessary part of the establishment of successful plantation forestry for it transformed it into a potentially profitable enterprise. Such new silviculture methods were helped by topographical and climatic conditions which facilitated rapid tree regrowth.

Second was the widespread planting of new forests, rather than just the protection of old ones or reliance on natural regeneration. This was undertaken primarily by governments but also by village communities and entrepreneurs in the timber trade who could reap the yield of their investment after several decades. In the region of Hida, for example, the *bakufu* forests had been largely stripped of timber by the 1740s. From then on officials ordered villagers to plant new trees and by the 1850s they were being paid to set out around 100,000 seedlings per year. Entrepreneurial tree planting developed more slowly and commercial forestry did not become common until the mid-nineteenth century.<sup>48</sup>

A third element in the establishment of successful plantation forestry was changes in landholding arrangements. As noted above, most woodland had been open to multiple users for centuries. The problem was that this system, which entailed continual demands on woodlands by both government and villagers, was not conducive to long-term forest growth and maximising timber yields. As disputes over scarce timber increased (e.g. between *daimyo* and villages, and between and within villages) a new system gradually emerged where forests were designated as having a single or primary user. One example was the practice of *wariyama*, in which lord's forest or village common land was divided amongst householders in a village, helping to clarify use rights and reduce disputes. Rental forests became more common, often in the form of *nekiyama*, in which a villager planted a site and sold the timber in advance to a merchant. The villager nurtured the trees and when the trees were harvested after several decades, the villager could replant and re-lease the land. Under another arrangement (known as *bunakebayashi*), the government leased land to a village or peasant, who planted and nurtured the trees and was then permitted a share of the yield.

By the mid-nineteenth century long-term forest stability had been achieved across the archipelago, a revolution of sorts that had involved government, villagers and entrepreneurs in a mosaic of practices that contributed to the development of plantation forestry.

### **Why was afforestation successful?**

There are several underlying factors explaining the successful development of plantation forestry in pre-industrial Japan, which was fundamental in preventing an ecological catastrophe that could have brought about severe economic and social breakdown. Before specifying these factors, it should be noted that societies have often solved their problems of resource scarcity by seizing foreign territory or engaging in trade. Both of these options were precluded by the Tokugawa isolationist policy, forcing the development of home-grown solutions to timber scarcity.<sup>49</sup>

#### *Political authority and labour control*

Much plantation forestry took place as a consequence of decrees by the Tokugawa shogunate and regional barons, who realised that their long-term survival and financial solvency depended on maintaining and developing forests. Frequently the result of such top-down policies was depriving villagers of their customary use rights. The authoritarian political system permitted new laws and regulations to be introduced without significant opposition, just as the effectively authoritarian government that existed in Britain during World War II could introduce rationing without substantive resistance. Governments also had the power to draft in forced (*corvée*) peasant labour to undertake the arduous task of planting. When this feudal unpaid labour was not available (particularly the case by the nineteenth century), governments could depend on extremely low wage rates to keep costs to a minimum. In several regions 'the *han* governments used their authority to hold down labour costs, thereby making their forest products competitive in the marketplace'.<sup>50</sup>

#### *Action by local communities*

Although there were strong top-down forces behind afforestation in Japan, we should not forget the importance of activities by local communities (beyond their role in providing labour for governments and lords). It was often village communities who put in place new regulations and use-rights to help adjudicate between those disputing over

access to scarce forest resources. Villages also planted forests on communal lands or limited lumbering to ensure an inheritance for all their future members, not just for their own families. Additionally, they planted woods to protect their lands from erosion and flooding. Thus there was a strong element of community preservation in the history of afforestation.<sup>51</sup>

#### *The changing economics of the timber industry*

Plantation forestry was an extremely long-term, costly and risky investment. There was usually around fifty years between planting and harvesting the timber, large amounts of labour was required for planting and aftercare, and trees could easily be lost in severe weather or through disease. Plantation forestry expanded when it became financially viable or profitable for governments, entrepreneurs and villagers to make such a substantial investment. A new investment climate emerged due to the scarcity of timber (which pushed up its price), improved silviculture knowledge and the shift from multiple to single-use forests. All this depended on Japanese society continuing to rely on timber as one of the central resources of everyday life as well as on ever-increasing demand due to rising urban population.<sup>52</sup>

#### *Concern for future generations*

One of the puzzles of forest recovery in pre-industrial Japan was why anybody would be interested in planting trees that could only be harvested after fifty years, when those who had instigated the planting may well be dead. An answer lies in the great concern for the well-being of future family generations in traditional Japanese culture (which partly has Confucian roots), in addition to the principle of heredity that shaped political authority.<sup>53</sup> Shoguns and barons envisaged their descendents surviving as rulers into future generations, and plantation forestry became a means of ensuring their patrimony. This held for entrepreneurs and villagers as much as for political leaders: 'a basic assumption on which villagers commonly planned the future was that ideally one's heir would inherit one's estate'.<sup>54</sup> Such cultural attitudes created a long-term vision which encouraged them to invest in plantations and engage in long-term contracts that would ultimately benefit the family lineage rather than themselves.

#### *The love of nature*

Some analysts suggest that a specifically Japanese love of nature helps account for forest recovery. This connection with nature is expressed in many areas, such as raising *bonsai*, developing ornamental gardens, viewing cherry blossoms, landscape painting, flower arranging and the literary works of Bashô. The argument is that depleted woodlands and bare hillsides prompted a society that loved nature to protect and plant forests.<sup>55</sup> There are several problems with this perspective. First, it is not clear why those possessing such a strong love of nature would have plundered the forests in the first place. Second, many scholars suggest that the Japanese 'love of nature' is less a concern with the real ecosystem than it is an aesthetic abstraction which is more urban than rural, more indoor than outdoor, and more about luxury and delicacy than the crude, disordered and grubby world of planting trees on remote hillsides. The evidence suggests that those who were behind afforestation in Japan were not particularly concerned with restoring lost natural beauty.<sup>56</sup>

In sum, a conjunction of top-down and bottom-up policies, and producer responses to the changing timber marketplace, all set against a cultural background of respect for the well-being of future generations, helped ensure that today's Japan is not the denuded lunar landscape it could so easily have become.

## CONCLUSION

What can we learn about tackling climate change from this analysis of forestry policy in Japan, and rationing and price controls in Britain and the United States?

There are two major problems with attempting to draw conclusions from just two historical case studies.

First, they illustrate only a small number of the ways in which social change takes place. Change happens in many ways, such as legal decrees from above or social movements from below, through educational empowerment or the development of new technologies, or due to the formation of political coalitions or emergence of elite divisions.<sup>57</sup> The fact that the selected cases both used strong top-down methods to confront resource scarcity, for instance, does not mean that such an approach is always necessary or indeed desirable.

A second problem concerns the specificities of historical context. Japan is no longer ruled by shoguns and Britain is not about to be invaded by Hitler. It would be unwise to draw too many specific lessons from the past for application in a very different present. The case studies in this paper cannot tell us how to design the details of the third phase of the European Union's Emissions Trading Scheme, whether the Contraction and Convergence model promoted by the Global Commons Institute is the most effective approach to reducing carbon emissions or how to allocate renewable energy technology funding.<sup>58</sup>

Yet these case studies are still instructive. They provide an opportunity to step back and consider the big picture of tackling climate change as opposed to getting ensnared by the complexities of contemporary policy debates.

The case studies reveal several lessons for successfully confronting the climate crisis. Unfortunately these lessons leave me with a greater sense of pessimism (if not despair) than of hope.

## ***REASONS FOR HOPE***

### **1. Successful, radical reform is possible**

The case studies demonstrate how governments can introduce far-reaching reforms to tackle resource scarcity that change patterns of consumption, production and distribution. We live in an era in which national governments are afraid of radical legislation (in fact, they rarely use the term 'radical'). Most governments are more interested in gradual change, in compromising, in taking the path of least resistance. Yet the case studies in this paper remind us this is only one approach to politics. As we have seen, in two of the leading capitalist economies of the mid-twentieth century – Britain and the United States – the price mechanism itself was suspended for a vast array of consumer goods. Consumers adjusted to rationing and price controls, and became habituated to them (just as London's car drivers have become accustomed to paying for driving in the centre of the city in recent years). Business accepted the changes as a necessity (though with less success in the United States). In the Japanese case, too, extensive reform by both the shogunate and regional barons took place, with radical schemes that resulted in the closing of whole forests to logging and the planting of vast mountainsides in one of the world's first efforts of mass afforestation. With this

historical perspective, more radical policy options such as per capita emission rights no longer appear so unrealistic.

## **2.Regulation is more effective than voluntary schemes and incentives**

Japan was not able to reforest its denuded mountainsides through gentle encouragement of villagers and lumbermen, or through hoping that the invisible hand of the market would solve the problem. Similarly, when voluntary price control schemes were introduced in the United States, they failed dismally. And in Britain, the fact that rationing was mandatory for everyone, with paupers and aristocrats receiving the same allocation, contributed to the widespread support for the system. Although we should be wary of the abuse of political authority and the danger of ‘being forced to be free’, the case studies suggest that compulsory forms of adjustment by individuals, the private sector and the public sector are vital tools in tackling resource scarcity. We can learn from this history that, in the right circumstances, regulation works.

## **3.Local action makes a difference**

Although the case studies reveal the importance of national government action to tackle resource scarcity, they also demonstrate the significance of local action in making the policy effective. In Japan villagers developed their own forest protection and plantation schemes. In the US, hundreds of thousands of women were volunteer price-checkers as part of a highly decentralised system of price control enforcement. In Britain, millions of people were digging for victory, making a fundamental difference to food production, nutrition and community development. One of the lessons of the history of human societies (and also of the history of development policy) is that major social change cannot be sustained without grass-roots action and support. Tackling climate change should not be reduced to a raft of national legislation and international agreements. Our reinvented world must be fuelled not only by renewable energy but by a new culture of local activism, cooperation and education that encourages those with high-carbon lifestyles to adopt a more humble way of living. The local action that is already taking place must be built upon.<sup>59</sup>

## **4.Tackling scarcity can be a way of creating equality**

One of the most significant effects of rationing and price controls in Britain and the US was that they resulted in more egalitarian societies, particularly with respect to consumption. While the wealthiest members of society were forced to cut back their consumption levels, the poorest citizens were given guaranteed access to scarce goods, rather than being excluded by exorbitant prices for products in short supply. Nutrition levels for those of lower income levels improved, especially amongst children. In the British case, there was even a strong demand for the *extension* of rationing once it became clear that the wealthy could buy their way out of scarcity. The US case illustrates that the equality effect will diminish if weak administrative systems and poor enforcement mechanisms allow the development of substantial black markets. Tackling climate change through policies such as Contraction and Convergence may be a unique opportunity to introduce greater equality both within and between countries.<sup>60</sup>

## ***REASONS FOR PESSIMISM***

### **1.Political resolve combined with long-term vision is necessary**

One of the reasons why Japan solved its woodland depletion problems was that the country’s elites had a long-term vision of hereditary rule which facilitated afforestation schemes that would reap benefits only after decades. Today’s politicians, in contrast, are

locked into electoral cycles, and a culture of immediacy and media sound bites, which seem to preclude the long-term vision required to confront global warming.

There is also the related matter of political resolve. Japan was successful in tackling scarcity partly because there was a military dictatorship that permitted the shogunate and regional barons to issue decrees to replant forests and limit timber consumption without significant opposition. Similarly, Britain during World War Two had effectively an authoritarian government that could impose rationing more or less by decree. Governments were able to make major decisions and act upon them. Today, in an age of party competition and regular elections, it is more difficult for governments to impose radical legislation without the fear that it will alienate both electorates and wealthy party funders, and be reversed after an electoral defeat. In the current context politicians need considerable resolve and courage to push through radical policies to tackle climate change, yet this is precisely what they appear to lack. I am reminded of the British television comedy 'Yes Minister', in which a senior civil servant gives a junior colleague the following advice: 'Above all, if you wish to describe a proposal in a way that guarantees that a Minister will reject it, describe it as courageous.'

## **2. Fear and propaganda are essential**

A major reason why rationing was so successful in Britain compared to the US was because in Britain there was a genuine fear of shortages of consumer goods and a fear that without major sacrifices on the home front Britain could lose the war. This was a key reason explaining why not only individual citizens, but also businesses, supported rationing schemes. In the US, by contrast, the war seemed far away and substantive sacrifices felt excessive to many, especially business leaders who spent much of their time fighting against the rules and regulations of the Office of Price Administration. In Britain, wartime propaganda was also more extensive and effective, helping to generate a public consciousness of sacrifice in the face of scarcity and the threat from Hitler. In Tokugawa Japan, one of the explanations of the slow initial response to the destruction of the forests was that it occurred gradually, over a long period of time, and there was limited fear of immanent shortages that would fundamentally disrupt daily life. It was when there were cataclysmic events such as the Meiriki fire that government woke up to the dangers of woodland depletion.

The problem today is that, particularly in the wealthy countries of the North, there is no strong fear of the realities of climate change that parallels the fear of wartime invasion and occupation. This fear may not appear until there are repeated cataclysmic events equivalent to Hurricane Katrina which devastated New Orleans, or until governments undertake mass propaganda campaigns to generate fear of climate change, just as they have done in the cases of smoking and drink-driving. There is a danger that this fear could contribute to psychological denial and paralysis, so it is important that people are also given a sense of hope that the climate crisis can be overcome.<sup>61</sup> Nevertheless, it is important to remember that human societies have taken action based on shared fear.

## **3. The market must be approached with care**

The Japanese case illustrates how a new investment context (partly created by the revolution in silviculture knowledge) evolved that made it economical and profitable to engage in plantation forestry on a commercial basis. Similarly today markets are advocated as a central tool in tackling climate change, for instance providing the incentive for companies to invest in developing new renewable energy technologies, or through trading systems operating to allocate carbon emissions in the transport sector.

But during World War II, it was absolutely clear to the British and US governments that the market could not allocate scarce resources effectively and equally, in a way that would ensure citizens received a 'fair share' of basic consumer goods. And in Japan, the market was only one part of a solution to the problem of forest depletion. In a neoliberal age it seems obvious to resort to the market to solve the problems of climate change but the wartime case signals the need for caution.

#### **4. Consumerism must be curbed, but it is difficult to sustain limits on consumption in the long term**

One of the factors that facilitated curbs on consumption in wartime Britain was that the culture of consumerism was not as deeply ingrained as it is today. British people in 2007 are used to choosing amongst thousands of products when they visit a supermarket; such expectations did not exist in pre-war Britain. Only one in ten British households ran a private car at the beginning of the war while today in England three in every four households has at least one vehicle, with almost one in three having two or more vehicles.<sup>62</sup> When rationing began in 1940, large sectors of the population had personal memories of rationing during World War I; most British people today have lived their whole lives in an era of consumer choice and relative abundance. Weaning consumers in wealthy countries off their high-carbon consumption lifestyles will require significant and long-term cultural change.

An additional factor that helped the success of wartime rationing was that people believed it to be temporary. There was always the promise that rationing would end once the war had been won. The British Labour government's efforts to maintain rationing in the post-war years was extremely unpopular and, according to many scholars, was a major factor in their downfall in the election of 1951. The contrast with today's context is clear: carbon dioxide emission levels need to be reduced for the long term. We must cut back on how often we fly abroad not just for a few years, but for our lifetimes. This is an enormous challenge that will only be alleviated through substantial increases in the production and use of clean renewable energy.

#### **5. It is easier to tackle a national problem than an international one**

A bias of the two case studies is that the problem of scarcity was largely contained and confronted within national borders. Forest usage in India was not affecting woodland depletion in Japan. Consumption patterns in Brazil during World War II had little impact on consumption and scarcity in Britain and the United States. In both case studies policy responses were on the national level without significant resort to international cooperation (although the US did supply some foodstuffs to Britain). Climate change, however, is an inherently cross-border problem requiring international cooperation to devise mitigation and adaptation solutions. The case studies can give little help in solving the problem of how to make this cooperation happen.

In the face of these reasons for pessimism about the possibility of successfully tackling climate change, I can only conclude with the following:

**GET RADICAL:** radical policies, at the national and international level, are the only option.

**GET MOVING:** massive social mobilisation from below is necessary to raise public awareness, change consumer culture and pressure governments.

**GET SCARED:** if we don't learn how to fear climate change, the planet will burn.

**GET USED TO IT:** we all have to adopt a low-carbon lifestyle and a humble way of living.

Roman Krznaric  
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## NOTES

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<sup>1</sup> Rationing and price controls have a long history, going back to 301 CE when the Emperor Diocletian issued an edict fixing maximum prices for around 900 goods throughout the Roman Empire (Michell 1947).

<sup>2</sup> Zweiger-Bargielowska 2000, 5.

<sup>3</sup> Zweiger-Bargielowska 2000, 31.

<sup>4</sup> Gardiner 2004, 139.

<sup>5</sup> Quoted in Gardiner 2004, 139.

<sup>6</sup> Zweiger-Bargielowska 2000, 174-5.

<sup>7</sup> Zweiger-Bargielowska 2000, 19.

<sup>8</sup> Zweiger-Bargielowska 2000, 44. See also Longmate 2002, 152.

<sup>9</sup> Zweiger-Bargielowska 2000, 163.

<sup>10</sup> Zweiger-Bargielowska 2000, 192-195.

<sup>11</sup> Longmate 2002, 322-326.

<sup>12</sup> Mills and Rockoff 1987.

<sup>13</sup> Gardiner 2004, 152-153.

<sup>14</sup> Compare, for example, Longmate (2002, 140) with Zweiger-Bargielowska (2000, 2, 152).

<sup>15</sup> Crouch and Ward 1988, 75-76, 97-98; Gardiner 2004, 141-143.

<sup>16</sup> Gardiner 2004, 140-141.

<sup>17</sup> Zweiger-Bargielowska 2000, 86.

<sup>18</sup> Galbraith 1981, 172.

<sup>19</sup> Galbraith 1981, 127.

<sup>20</sup> Jacobs 1997, 911; O'Leary 1945, 1089; Bentley 1998, 14-15.

<sup>21</sup> Jacobs 1997, 911; Mills and Rockoff 1987, 209.

<sup>22</sup> Mills and Rockoff 1987, 209.

<sup>23</sup> Jacobs 1997, 939-940; Bentley 1998, 94.

<sup>24</sup> Jacobs 1997, 918.

<sup>25</sup> Galbraith 1981, 130.

<sup>26</sup> Mills and Rockoff 1987, 197.

<sup>27</sup> Jacobs 1997, 917.

<sup>28</sup> O'Leary 1945, 1103.

<sup>29</sup> Mills and Rockoff 1987, 208.

<sup>30</sup> Galbraith 1981, 150.

<sup>31</sup> [http://en.wikipedia.org/wiki/Homefront-United\\_States-World\\_War\\_II](http://en.wikipedia.org/wiki/Homefront-United_States-World_War_II).

<sup>32</sup> Jacobs 1997, 921.

<sup>33</sup> Jacobs 1997, 924.

<sup>34</sup> Bentley 1998, 114-115.

<sup>35</sup> Galbraith 1981, 173. See also Galbraith (1952, 67).

<sup>36</sup> Bentley 1998, 17; Mills and Rockoff 1987, 207; Lang 1945.

<sup>37</sup> O'Leary 1945, 1100.

<sup>38</sup> Mills and Rockoff 1987, 202.

<sup>39</sup> Totman 1989, 171. The following material draws substantially but not exclusively on Totman's studies, which have recently received public attention through their discussion in Jared Diamond's *Collapse: How Societies Choose to Fail or Survive* (2005, 294-306).

<sup>40</sup> Totman 1989, 25; Totman 1985, xiii.

<sup>41</sup> Braudel 1981, 156.

<sup>42</sup> Totman 1989, 79; Braudel 1981, 266-282.

<sup>43</sup> The evidence suggests that population growth levelled off in the latter part of the Tokugawa period. See, for example, Hanley and Yamamura (1977, chapter 1).

<sup>44</sup> Totman 1989, 175; Totman 2005, 255; Totman 1985, 7-12.

<sup>45</sup> Iwamoto 2002.

<sup>46</sup> Totman 1989, 68.

<sup>47</sup> Totman 1989, 115.

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- <sup>48</sup> Totman 1989, 166-7.
- <sup>49</sup> Totman 1989, 184.
- <sup>50</sup> Totman 1989, 148.
- <sup>51</sup> Iwamoto 2002, 5; Totman 1989, 43.
- <sup>52</sup> Totman 1989, 113, 130-1, 147-8.
- <sup>53</sup> See the discussions in Martin (1990, 105) and Bhappu (2000, 410-412).
- <sup>54</sup> Totman 1989, 185.
- <sup>55</sup> For discussions of Japanese natural aesthetics see Kurita, and Yanagi (1978).
- <sup>56</sup> Totman 1989, 179.
- <sup>57</sup> For an analysis of paradigms of change in over a dozen academic disciplines, see Krznaric (2007).
- <sup>58</sup> Papers on Contraction and Convergence are available at the Global Commons Institute website, <http://www.gci.org.uk>.
- <sup>59</sup> The call for a 'more humble way of life' is central to Bill McKibben's book *The End of Nature* (2003, 201). An important model for local action on climate change is the work of the Climate Outreach and Information Network, <http://www.coinet.org.uk>.
- <sup>60</sup> Unlike wartime rationing, the Contraction and Convergence model assumes trading of carbon allocations, allowing the poorest members of society not only to consume but also to sell their allocations.
- <sup>61</sup> For an analysis of the psychology of denial about climate change see Marshall (2005). On the general problem of psychological denial see Cohen (2001).
- <sup>62</sup> The number of households in the 2001 census was around 20.5 million, with 8.9 million having one vehicle and 6.0 million having two or more vehicles. <http://www.statistics.gov.uk/census2001/profiles/64.asp>.