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Malthus and Three Approaches to Solving the Population Problem

The terms of Malthus' population principle are clear: there is an intrinsic divergence between population growth and the subsistence needed to sustain it. But difficulties arise when we look at the solutions proposed by Malthus in his writings, since certain essential concepts are used in complex ways. In this article, Donald RUTHERFORD *contributes to the debate by analysing the different concepts of human behaviour and of subsistence that appear throughout Malthus' works. He examines in turn the various solutions to the population problem envisaged by Malthus, and finds each one wanting, before concluding that Malthus appears to advocate a diversified and balanced economy. But Malthus is wary of overspecialization in industry and commerce, and argues for equilibrium between the different sectors and different economic activities, thereby rejecting the solution that was to prevail in the following centuries.*

In the first edition of his *Essay on Population* in 1798 (afterwards *Essay 1798*) the Reverend Thomas Robert Malthus stated his population principle:

> "Population, when unchecked increases in geometrical ratio. Subsistence only in an arithmetical ratio" (Malthus 1966 [1798], p. 14),

thus inaugurating a debate on population questions. Was there a fundamental divergence between the growth of population and the subsistence needed to sustain it? Was there a way of averting the disaster of widespread starvation?

In this re-examination of Malthus, a hunt in the primary and secondary literature is conducted to provide a new conceptual framework which will both show the possible solutions to the population problem and determine whether he accepted them. The original texts and commentaries over two hundred years explain this difference in growth rates largely in terms of a shortfall in subsistence through land scarcity and diminishing returns in agriculture. They then note that the introduction of "moral restraint" from the second edition,

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Essay 1803, as a voluntary check to population growth, provided an apparent solution to this population problem. However these analyses need heavy qualification, and may have to be abandoned.

His expression of the population principle immediately gives rise to two possible solutions. There can be a change in human behaviour to affect the birth rate, and hence population growth, or there can be a change in the production of subsistence. A further, more fundamental, solution can be sought by regarding such a divergence in growth paths as a consequence of the nature of the economy as a whole. For this third option, national income accounting relationships, of which a population function is only a part, have to be described.

These three approaches are not necessarily different possibilities realizable in the same time period. In the case of changing human behaviour, new habits can be adopted in a short time and persist for a long period, even for the foreseeable future, as is the case for new styles of life or new methods of contraception for example. The second approach, i.e. increasing the rate of production of subsistence, is difficult to assign to periods, but an increase in agricultural productivity and food supplies can be introduced in the short run and sustained for long periods. Finally, the balance achieved can be temporary, no more than a transient equilibrium. In the case of Malthus' description of the economy, the balances recommended are perhaps too numerous to be maintained for more than short periods.

Given the interest Malthus arouses in so many different academic fields, summarizing the parallels between this article and contemporary writings is an unending task. Also, the agenda used in this article, taken from Malthus himself, departs from many modern concerns. The first approach, concerning human behaviour, receives less attention today. As there is now little condemnation of unmarried couples having children, Malthus' advocacy of moral restraint in the form of late marriages has little force, though another aspect of conduct, that of consumption, is still investigated. Winch laments (1996, p. 379):

> "... it would have been better if Malthus had spoken of "voluntary restraint" based on foresight and the desire to achieve the comforts and luxuries that make up man's indefinitely and expanding 'secondary' or 'artificial' wants",

but Fiaschi and Signorino (2003, p. 17) find in Malthus' *Principles* an awareness of the significance of consumption.

The second approach presented here features in modern literature in the continued debate about diminishing returns in agriculture. In a review of about 160 books and articles on Malthus published after 1933, Waterman (1998, pp. 314-315) records the names of both the supporters of the idea of diminishing returns in agriculture and the dissenters, who range from Cannan and Schumpeter to Hollander. Wrigley notes that classical economists believed that land is fixed in quantity and agriculture subject to diminishing returns, while failing to see the massive increase in industrial output arising from an economy switching from organic to mineral raw materials (1988, p.34), but

concludes there would be a limit to expansion in the long run because the stock of minerals would be exhausted (43). Malthus was aware of that switch but did not describe the limit in that way. Collard (2001, p. 704) notes in his article that there are many factors that delay the effects of diminishing returns for long periods.

The notion of a balanced economy, the third approach, overlaps with modern models of economic dynamics and economic growth, as in Ehrlich and Lui (1997, p. 237) who note:

> "... the major trend in the literature has been the progressive development of a comprehensive dynamic paradigm which treats population, growth, and development as endogenously and simultaneously determined".

However, that article does not state, as this one does, the many aspects of an economy requiring this determination. There is also a parallel to the third approach in the literature on the nature of oscillations in an economy, first raised by Malthus in *Essay 1798* (1966 [1798], pp. 29-31). Waterman (1987), for example, in his examination of fluctuations, modelled the long lags in the responses of population and the capital stock to prices above equilibrium. Such studies, however, do not look in detail, as Malthus did, at the sub-balances needed to achieve an overall balance in an economy.

First approach: changing human behaviour

Human reproduction is a consequence of deliberate human action. A sensible person perceiving, as Malthus did, that an irresponsible increase in family size could lead to low incomes and misery all round, hears the call to be more moderate in conduct. In Malthus' writings, this call to be more moral takes different forms, with varying power to solve the population problem.

Throughout his works, Malthus presents four models of human behaviour: the worker, the utilitarian, the procreator and the consumer. Each of these has its peculiar mechanism for solving the population problem.

The worker model

As a worker, the problem of inadequate subsistence could possibly be overcome through greater effort. In *Essay 1798* he argues that man is "inert, sluggish, and averse from labour" (pp. 363-4) so that the world is only peopled because of the stimulus to cultivate provided by the human population growing faster than subsistence. He describes this incentive mechanism which keeps subsistence growing:

> "The necessity of food for the support of life, gives rise, probably, to a greater quantity of exertion, than any other want, bodily or mental. The supreme Being has ordained, that the earth shall not produce food in great quantities, till much preparatory labour and ingenuity has been exercised upon its surface..." (1966 [1798], p. 360)

> "It [the principle of population] keeps the inhabitants of the earth always fully up to the level of the means of subsistence; and is constantly acting upon man as a powerful stimulus, urging him to the further cultivation of the earth, and to enable it, consequently, to support a more extended population." (p. 363)

Twice in the second edition *Essay 1803* he quotes the stern text of St Paul "If a man will not work, neither shall he eat" (1989a II, pp. 161-2). For Malthus, it is through participation in the labour market, not through welfare schemes such as the Poor Laws, that the population is to be fed.

However, it is questionable that Malthus believed working harder was the solution to the population problem. In his *Principles of Political Economy* he is acutely aware of the work-leisure trade off. Instead of desiring more income, and therefore needing to work more, a person can choose more leisure. Thus it is doubtful if manufactured luxuries will be increasingly desired, as indolence might be preferred (1989b I, p. 358). Malthus also thought that the labouring classes worked too hard, so there was a case for sacrificing part of national wealth and populousness (1989b I, pp.473-74), but doubted if that would happen, partly because it would be wrong to force people to work less and not take advantage of the only property – labour – that they possess. Later in classical economics, J.S. Mill, in Book IV, chapter VII of his *Principles*, similarly questions the pursuit of economic growth through endless striving.

The utilitarian model

As a utilitarian, a person considering the consequences of human action exercises rationality. Malthus anticipates the neoclassical school by regarding economic decision-making as the weighing of pleasure against pain in the forms of happiness and misery. This grand strategy for solving the population problem does require heroic assumptions. Everyone, especially those he calls the "lower classes", would have to be rational and endowed with foresight. The benefits and detriments would need to be observable or measurable.

It could be argued that the rational economic agent, aware of the shortage of resources in the population at large, would recommend a redistribution of the scarce means of subsistence to maximize welfare. Malthus, however, thinks that changing the character of the better-off so that they can help the starving is of little value:

> "But though the rich by unfair combinations contribute frequently to prolong a season of distress among the poor, yet no possible form of society could prevent the almost constant action of misery, upon a great part of mankind." (1966 [1798], p. 36)

Not for Malthus the socialist route to increased welfare through redistribution. His opposition to schemes of equality prevent him from advocating income transfers from the rich to the poor.

In *Essay 1798* he muses over the fact that man can use his reason to consider the consequences of bringing children into the world without adequate

subsistence (1966 [1798], pp. 27-8). He argues further in a utilitarian way (pp. 359-60):

> "To avoid evil, and to pursue good, seem to be the great duty and business of man; and this world appears to be peculiarly calculated to afford opportunity of the most unremitted exertion of this kind; and it is by this exertion, by these stimulants, that mind is formed."

In a letter of 20 August 1798 to William Godwin, his utopian opponent, soon after the publication of *Essay 1798,* Malthus wrote:

> "The prudence you speak of as a check to population implies a foresight of difficulties; and this foresight of difficulties almost necessarily implies a desire to remove them [p. vi]....The very admission of the necessity of prudence, to prevent the misery from an overcharged population, removes the blame from public institutions to the conduct of individuals. And certain it is, that almost under the worst form of government, where there was any tolerable freedom of competition, the race of labourers, by not marrying, and consequently decreasing their numbers, might immediately better their condition..." (Bonar 1926, pp. vii-viii),

setting the agenda for the individualist conception of morality, expressed in decisions about marriage.

This possible solution to the population problem ultimately fails, as Malthus is reluctant to regard rationality as universal. In the *Principles* (1989b I, p. 250), he is sceptical, for example, about getting the lower classes to reason from the past to the future.

The procreator model

The notion of a human being as a procreator is largely ignored in *Essay 1798,* but a dominant theme of the second edition, *Essay 1803.* What Malthus can propose is limited. Unable to recommend the crude and socially unacceptable contemporary methods of contraception, he has to find another way of reducing the number of children per married couple. In *Essay 1798,* the idea of a restraint is hinted at when discussing the human response to a shortage of provisions:

> "These considerations are calculated to prevent, and certainly do prevent, a great number in all civilized nations from pursuing the dictate of nature in an early attachment to one woman." (1966 [1798], p. 28),

and suggests that in most cases this would lead to vice rather than chaste celibacy.

In *Essay 1803,* he extends the notion of population checks from being entirely vicious to possibly virtuous in the form of postponed marriage (1989a I, p. 18). In the last chapter of that and subsequent editions, he writes that this prudential check to marriage based on a desire to better one's condition had brought greater happiness in Europe (1989a II, p. 198). In a letter to Nassau Senior on 23 March 1829, he stated that it would not be:

> "by exertions to increase food, but by the moral restraint which will diminish the misery and vice constantly occasioned by the tendency of population to press against subsistence." (Senior 1829, p. 71)

In the Appendix to the fifth edition *Essay 1817*, Malthus bluntly states:

> "I have always considered the law of population as a law peculiarly suited to a state of discipline and trial... each individual has the power of avoiding the consequences to himself and to society resulting from the principle of population by the practice of a virtue..." (1989a II, p. 250)

In near theological terms Malthus is looking at the human race as a group of individuals each needing to find salvation, which, translated into material terms, means coming to terms with the population problem.

There is no doubt that Malthus was intellectually committed to moral restraint as an important answer to the population question, but he did not believe his hope would be fulfilled. He admitted in *Essay 1803* that the check of moral restraint, "whatever hopes we may entertain of its prevalence in the future, has undoubtedly in past ages operated with inconsiderable force" (1989a I, pp. 329-30).

Later in that edition (1989a II, pp. 99-100), he acknowledges that non-Christians regard delaying marriage as difficult but that Christians accept it as a duty. Such comments would justify the view that Malthus had to recognize that the preventive check was an ideal unlikely to be followed by the majority in an increasingly urbanized and secularized society.

The consumer model

A consumer has an opportunity, by changing behaviour, to bring population and subsistence growth into line. There is the choice between either using one's income to maintain a large family, or accumulating surplus income to spend on comforts, and even luxuries. Malthus was very aware of the allure of consumer goods, and of how the desire for non-food goods could dominate human behaviour to the point that it would reduce population growth and bring it into line with changes in the amount of food.

Changing consumption habits is a more powerful method than exhorting the poor to exercise moral restraint by reducing family size. The incentives of enjoying higher real incomes or at least avoiding starvation are central to his policy recommendations.

It is the nature, rather than the amount, of subsistence that becomes crucial to affecting conduct. Paley had firmly stated:

> "The kind and quality of food and liquor, the species of habituation, furniture, and clothing, to which the common people of each country are habituated, must be attainable with ease and certainty, before marriages will be sufficiently early and general to carry the progress of population to its just extent." (Paley 1785, p. 423)

There is a distinct echo of Paley in Malthus. Both see a linkage between age at marriage and population growth. Both appreciate that moral restraint

is not a separate solution to the population problem, as it is reducible to subsistence issues. An embarrassing feature of Malthus' population principle thus emerges: population and subsistence are interdependent. The comparison between two progressions, of population and of subsistence, matters less and is hardly credible if they are not independent entities.

From *Essay 1803* onwards, subsistence, in the broadest sense, can take over the role of checks, including moral restraint. He notes there that the incentive to labour is sophisticated subsistence:

> "the prospect of a good meal, a warm house and a comfortable fireside in the evening." (1989a II, p. 90)

In *Essay 1806* he asserts that the deficiency of cottages is a strong check to marriage (1989a I, p. 363). In a letter to the Geneva professor Pierre Prévost, who translated his works into French, Malthus wrote on 23 December 1822 about the indirect effect of house-building on the decision to marry. (Zinke 1942, p. 184). Housing, part of subsistence, thus becomes an enforcer of moral restraint, the benign check to population growth.

Whereas Malthus was sceptical about moral restraint having a widespread impact, he was more confident in *Essay 1803* of a change in consumer behaviour taking hold:

> "England possesses very great natural and political advantages … above all, throughout a very large class of people, a decided taste for the conveniences and comforts of life, and a strong desire of bettering their condition…" (1989a II, pp. 144-45)

And in Ireland, he argues that an elevation of character will make the labouring classes look forward to comforts as well as mere support:

> "We should rejoice to hear, that the check to the present rapid increase of population….had begun to operate from an increasing taste for comforts and conveniences, before it was forced from the absolute want of food…" (1986 [1809], p. 62)

Subsistence is hardly a constraint at all if population can determine its nature.

In his *Principles,* Malthus looks at the alternative consequences of rising incomes:

> "… one, that of a rapid increase of population, in which case the high wages are chiefly spent in the maintenance of large and frequent families; and the other, that of decided improvement in the modes of subsistence, and the conveniences and comforts enjoyed, without a proportionate acceleration in the rate of increase." (1989b I, p. 250)

An investigation of the first of three attempts to solve the population problem thus shows that it is not human behaviour in general but consumption preferences in particular which could provide the solution.

Second approach: changing the quantity of subsistence

Throughout classical economic writing, the notion of subsistence is seen to be complex. Even Ricardo had to acknowledge this: in chapter V of his *Principles* he recognizes that subsistence varies according to time and place. For Malthus, this crucial half of his population principle is even more multi-faceted. The concept needs to be torn apart and the relationship between subsistence and economic development unravelled.

As he develops his population theory, his notion of subsistence becomes more intricate. For reasons of stylistic variety, or theoretical repositioning, he uses different expressions for this constraint. When considering these different terms it is salutary to recall the warning of Adam Smith:

> "Studying much to vary the expression leads one also frequently into a dungeon of metaphorical obscurity." (Smith 1983, p. 8)

In the first chapter of *Essay 1798*, Malthus states that "...food is necessary to the existence of man" (1966 [1798], p. 11) but in the second chapter "... population cannot increase without the means of subsistence...." (p. 37)

As the essay continues, population is related to a multitude of expressions for the limit to its growth. These include *food, power in the earth to produce subsistence, subsistence, means of subsistence, produce, nourishment, means to/of support, necessaries of life* and *spontaneous produce*. The most repeated terms are, in descending order of occurrence, *food, produce, means of subsistence, subsistence* and *provisions*. These concepts are taken to be different in usual discourse. Travel and the means of travel, for example, in the form of a voyage and a ship, are very different. Was Malthus carelessly substituting one expression for another to vary his text, or making a transition from one idea to another? There is an obvious case for distinguishing the factor inputs for producing food from the output itself. His expressions *power in the earth to produce subsistence*, *means of subsistence*, *fertility of the soil*, *funds necessary for the maintenance of labour* and, possibly, *support* and *resources* sound like factor inputs. *Food* and *produce* are obviously descriptions of output. Perhaps it could be argued that Malthus cared little about distinguishing means of subsistence from subsistence itself. In *Essay 1798* he both loosely refers to "the means of subsistence being scattered over a large extent of territory" (1966 [1798], p. 39), a description of output, and to China as being "... so populous in proportion to the means of subsistence, that the average produce of it is but barely sufficient to support the lives of the inhabitants...." (pp. 130-31), an input expression. Not surprisingly, a contemporary such as Purves thought "means of subsistence" to be "indistinct, vague and improper" (1818, p. 104).

In a survey of diverse countries for *Essay 1803*, Malthus was able to examine differences in basic subsistence. In some countries such as China, India, and Bedouin Arab countries, the subsistence consisted of a very minimal

diet. The other extreme would be southern England and America where food was sufficiently plentiful to provide a rich diet which, in times of scarcity, could be reduced to avoid starvation. When writing about Ireland, Malthus ascribes the choice of a staple food to soil, climate, the political state and periods of prosperity and adversity affecting the wage fund (1986 [1808], p. 40).

Making the issue even more complex, Malthus broadens the idea of subsistence to "quantity of food, and of the materials of clothing and lodging" (Malthus 1989a II, p. 30) as his precursor Wallace had done in an extended notion of necessaries as "food and cloathes, houses and a little furniture are necessary for all" (1753, p. 24). Malthus is aware that there are three categories of a good – a necessary, a comfort [or convenience] and a luxury. Interestingly, as subsistence takes these different forms it assumes new roles. It can be a stimulus, such as food or housing, or a restraint in the case of inessentials which are so strongly desired that family size is restricted in order to obtain them.

Edmonds remarks that the terminology for the constraint on population growth varies according to the stage of development. This perceptive comment points to the fact that as population grows, subsistence has a dynamic of its own which makes it hard to detect whether the population problem is worsening. In the earlier stages of economic development, "population has a tendency to increase faster than food", while in advanced civilized states "the population has a tendency to increase faster than the funds devoted to the support of industry" (Edmonds 1832, p. 25). He needs to explain in greater detail what has happened. As an economy progresses from the simplest to the most sophisticated state of technology, products and patterns of consumption all change. Subsistence changes from the fruits of nature to a mixture of agricultural and manufactured products serving as "funds" to support labour.

Stages of economic development

Malthus began his writing career in the eighteenth century and followed its tradition of using a stages theory to describe economic development. Wallace (1753, p. 15) defines the three stages as "rude and barbarous" (including hunting, fishing and pasturage), agriculture, and industry and commerce. Kames, describing the different stages of improvement, mentions hunters, shepherds and agriculture (Home, 1776, pp. 98-103). This progress is extended by Smith, in the fifth book of the *Wealth of Nations,* to a fourth stage of commerce and manufactures (1976 [1776], pp. 691-92). More immediately for Malthus, Condorcet (1795, pp. 5-8) has an elaborate progression from a primitive stage of hunting, fishing and spontaneous fruits to pastoral and finally agriculture, with some simple manufacturing and trade. When there is a surplus over subsistence from a harvest, the arts and occupations can multiply (Condorcet 1795, p. 43) . In *Essay 1798,* Malthus uses a four-stage account. He refers to

hunting over large areas, nations of shepherds, a mixture of pasture and tillage (his description of agriculture) and finally industry and trade (1966 [1798], pp. 39, 44, 53, 55). In the second edition, *Essay 1803* (1989a I), he uses twenty-five chapters to examine population and subsistence in different countries, starting with those which are primitive, then pastoral and finally agricultural or manufacturing.

This stadial framework was important to Malthus. He refers to it often throughout his writing life. For example, late in his life, in a letter to Nassau Senior he admitted:

> "... in every stage of society, there have been some nations, where, from ignorance and want of foresight, the labouring classes have lived very miserably, and both the food and population have been nearly stationary long before the resources of the soil had approached towards exhaustion. Of these nations, it might safely have been predicted, that in the progress of civilization and improvement, a period would occur when food would increase faster than population." (Senior 1829, p. 67)

Despite Malthus repeatedly referring to stages, there is little attempt in the secondary literature to grant them prominence. This could be because in *Essay 1798* he states in the very chapter headings, especially chapter III, that he is using this methodology; in the subsequent editions the chapters have different titles.

In the first and second stages, the savage and the pastoral, subsistence consists of food in the form of largely unprocessed vegetables and meat. In the third, agricultural, stage, the food is to some extent processed as milling and baking are needed to produce bread. Smith writes in *The Wealth of Nations* about what appears to be an early industrial society with simple crafts when he mentions obtaining food from different kinds of supplier: the butcher, the brewer and the baker (1976 [1776] I, p. 27). Everything on this simple menu needs processing. In the most advanced stage, subsistence will include both food and non-food items produced at home or abroad and requiring much more manufacturing.

When using a stadial approach to Malthus' population theory, it is essential to ask if his theory applies to a particular country or to the world as a whole. Perhaps much of the complexity of Malthus' population theory has been ignored because his use of two models has been overlooked. In modern experience, we are aware that large surpluses in some American and European countries co-exist with famine elsewhere in the world. Wallace (1753, p. 22) considered a case where the world as whole could be losing population, while a single country could be gaining. In *Essay 1798* Malthus looks at the population-subsistence relation for an island or one spot, then for the whole earth (1966 [1798], p. 35). In his *Encyclopedia Britannica* article (1986 [1824], p. 181) he refers to "the surface of the earth" and to "the full cultivation and peopling of

the globe". However, he usually applies the population principle to one country at a time. The second edition *Essay 1803* asserts that:

> "In the actual circumstances of every country, the principle of population seems to be always ready to exert nearly its full force…" (1989a I, p. 362)

In *Essay 1817* he writes that the principle of population was confirmed by experience "in every age and in every part of the world" (1989a I, p. 336). In *Essay 1826* he extends the reference to "the proportion between the natural increase of population and food…" by adding "in a limited territory" (1989a I, p. 309 footnote 8). In *Principles of Political Economy* he says he is confident in the theory of population as it is confirmed "by the state of society as it actually exists in every country with which we are acquainted" (1989b I, p. 11).

Having largely applied his theory to single countries Malthus can investigate whether the theory is affected by the state of a country's economic development. Cocks sees a connection, arguing that Malthus had a number of population theories referring to societies which were variously primitive, classical, modern agricultural and emerging industrial (1986, p. 233). One wonders what shape these theories would take. At least we know that in every stage of development, the resource required to maintain a population changes.

Subsistence in the different stages

In this first stage of development, *the savage or hunter stage,* animals, vegetables and fruit are there for the killing and the picking to provide subsistence. Initially it would appear to be hard to justify a faster growth rate for a human population than for food, as such subsistence is provided by animals and plants which are remarkably prolific in their reproduction. Rabbits, for example, an acceptable food for humans, have an average gestation period of 31 days compared with 267 for humans. Although Malthus concedes that non-human life can multiply at high rates, he still sticks to his population principle. His disciple Charles Darwin avoided the sharp contrast between human and other populations by stating that the expansion of the animal and vegetable kingdoms is also geometric (Darwin 1859, chapter III). In *Essay 1798* Malthus recognises that animals and vegetables have profuse seed but are limited by "room and nourishment" (1966 [1798], p. 15). There is thus a two part subsistence constraint at this stage for human populations in that they are limited by the supply of raw produce, which in turn is limited by space. The ultimate constraint is land scarcity.

At the beginning of his research into population, Malthus raises a priori the idea of land scarcity; in subsequent editions of the *Essay* he gathers information on virtually all the countries of the then-known world to discover the state of their land. He found that an area such as Arabia had an abundance of spontaneously produced fruits (1989a I, p. 92), while many other primitive societies had little subsistence at all. In *Essay 1798* he states that where hunting

is the chief means of obtaining food, subsistence is meagre as animals are spread over a wide area (1966 [1798], p. 39). In *Essay 1803* he discovers many examples of sparse food supplies in primitive societies. In New Zealand where fish is an important source of food, subsistence is inadequate as it is only available to coastal populations, and at certain times (1989a I, p. 48). Tierra del Fuego, Van Diemen's land and the Andaman Islands with savage populations have such bare provisions that a natural disaster would wipe them out (1989a I, p. 29).

Whether land scarcity is considered in crude quantity or in quality terms, a question remains unanswered: is the fixed nature of land the central key to understanding the population principle? These countries are so diverse that the relative importance of land and other factors of production as inputs varies greatly.

The next stage is *the shepherd stage*. Condorcet explains the transition from hunting to the pastoral as the consequence of docile animals taken in hunting being domesticated and fed (1795, p. 29). Malthus calls this stage "the nation of shepherds" in which families benefit from staying together as they move in search of new pasture (1966 [1798], p. 46). Possession of cattle provided immediately available food in greater quantities but, as in the primitive stage, land scarcity impelled frequent movement in search of new grazing. The population was never large because of the unproductive nature of the land (1966 [1798], p. 50). The struggle for room and nourishment led to wars and, presumably, to a further reduction in subsistence for those who lost territory. But in this stage there would be a saving of labour as the keeping of herds avoids time-consuming, and often unsuccessful, hunting expeditions.

In addition to nomadic societies, there can be pastoral parts of countries, such as in Norway, and Switzerland, where some cantons are microcosms of the great nomadic areas found on vast plains. In Switzerland:

> "there are no grounds less susceptible of improvement than mountainous pastures. They must necessarily be left chiefly to nature; and when they have been adequately stocked with cattle, little more can be done." (1989a I, p. 225)

This is a reminder that a country can have different regions at different stages of development, and that its success in tackling the population problem depends on which stage is predominant.

The theoretical implications of the first and second stages are similar, as the shortage of good land is the ultimate limit to human population growth.

If Malthus' theory is principally a story about diminishing returns, then the *agricultural stage* is the most important. It is argued that agricultural activity has an inherent tendency which inhibits fast growth rates of subsistence.

Unlike hunting and shepherding, agriculture is a form of production. It is important therefore to search for traces of a production function in Malthus' works. He chooses a wages fund notion. Investment in the fund makes

employment possible and the resulting labour force produces the subsistence to increase the population. In *Essay 1798* he complains:

> "... the demand for a greater population is made without preparing the funds necessary to support it. Increase the demand for agricultural labour by promoting cultivation, and with it consequently increase the produce of the country, and ameliorate the condition of the labourer, and no apprehensions whatever need be entertained of the proportional increase of population" (1966 [1798], p. 133)

and neatly defines "the fund appropriated to the maintenance of labour" as "the aggregate quantity of food possessed by the owners of land beyond their own consumption" (1966, p. 205). In *Essay 1817*, he succinctly states "...the progress of population is mainly regulated by the effective demand for labour..." (1989a I, p. 346) and in *Essay 1826* states that population growth is regulated by "the quantity and value of the food which in the actual state of things is awarded to the labourer, and the rate at which these funds appropriated increase" (1989a II, p. 28, footnote 10).

Scattered throughout his work are hints of other determinants of agricultural production. In *Essay 1798*:

> "...the increase of the produce of any country will always very greatly depend on the spirit of industry that prevails, and the way in which it is directed. The knowledge and habits of the people, and other temporary causes, particularly the degree of civil liberty and equality existing at the time, must always have great influence in exciting and directing this spirit." (1966 [1798], p. 123 footnote)

and in *Essay 1803* he writes that in America, produce resulting from "the knowledge and industry of an old state operate on the fertile unappropriated land of a new one." (1989a I, p. 303). In the *Principles* he refers to "... the fertility of the soil, the powers of man to apply machinery as a substitute for labour, and in the motives to exertion under a system of private property..." (1989a I, p. 463) providing enough subsistence to sustain even a leisure class. In the case of middling land, he saw the greatest impediment to be "the difficulty, the expense, and sometimes the impossibility, of procuring a sufficient quantity of dressing" (1989a I, p. 443). There is also the effect of engaging in one type of agriculture rather than another. In *Essay* 1798 he laments the reduction in food production caused by using land to produce high quality meat and to maintain a great number of horses for pleasure purposes (1966 [1798], p. 319).

Despite the numerous determinants of agricultural output, much attention has concentrated on the nature of returns. Given the quality of land, he argued that it is inconceivable for its produce to more than double in twenty five years and in fifty to quadruple, despite great encouragements to agriculture (p. 531). The existence of passages in Malthus' works asserting that agriculture is subject to diminishing returns cannot be doubted. Firmly from *Essay 1798* he asserts:

> "When acre has been added to acre, till all the fertile land is occupied, the yearly increase of food will depend upon the amelioration of the land already in possession; and even this moderate stream will be diminishing." (1966 [1798], p. 107 footnote)

Eltis (1984, p. 107) observes that this is different from any of his predecessors' writings. Although the description of diminishing returns might be new, an inherent productivity problem in agriculture had been noted, for example, by Adam Smith who attributed it to the absence of a division of labour.

Other writings of Malthus continue to mention diminishing returns. In his *Principles of Political Economy* he notes that:

> "... the quantity of labour and capital necessary to procure the last addition which has been made to the raw produce of a rich and advancing country, has a constant tendency to increase." (1989b I, p.197)

In his late *Encyclopaedia Britannica* article he insists:

> "... specifically with this diminishing and limited power of increasing the produce of the soil, that we must compare the natural power of mankind to increase." (1986 [1824], p. 187)

Given such passages, it is not surprising that modern writers on Malthus' population principle have emphasized diminishing returns as central to explaining his views on population and subsistence. Examples include Robbins (1967, p.258), Lloyd (1969, p. 25), Eltis (1984, pp. 107-8), and Waterman (1991, p. 255), who derived from the geometrical and arithmetical ratios an aggregate production function with diminishing returns. Hollander discusses at length this theme of diminishing returns and tentatively suggests that productivity may diminish in the short term but that constant returns can be achieved after measures such as the dressing of land (1997, p. 26).

Even if it were conceded that agricultural production is blighted by diminishing returns, the question of its overall effect on subsistence remains unanswered. Consumer expenditure includes non-food necessaries such as clothing and housing, as well as comforts and luxuries, which are substantially manufactured. Even food itself is largely processed: the product consumed is bread, not grains of corn.

Finally there is the *commercial and manufacturing stage*. In *Essay 1803*, Malthus simply states:

> "We have now, however, stepped out of the agricultural system into a state in which the commercial system clearly predominates..." (1989a I, p. 400)

The chief advantage of this stage is that manufacturing is subject to increasing returns. As Young explains in a celebrated article:

> "... the securing of increasing returns depends upon the progressive division of labour, and the principal economies of the division of labour, in its modern

> forms, are the economies which are to be had by using labour in roundabout or indirect ways." (1928, p. 539)

Smith in *The Wealth of Nations* argues that the division of labour is applicable to manufacturing but not to agriculture which consequently has diminishing or, at best constant, returns:

> "How many different trades are employed in each branch of the linen and woollen manufactures, from the growers of the flax, and the wool, to the bleachers and smoothers of the linen, or to the dyers and dressers of the cloth! The nature of agriculture, indeed, does not admit of so many subdivisions of labour; nor of the separation of one business from another, as manufactures. It is impossible to separate so entirely, the business of grazier from that of the corn farmer, as the trade of carpenter is commonly separated from that of the smith.... This impossibility of making so complete and entire a separation of all the different branches of labour employed in agriculture, is perhaps the reason why the improvement of the productive powers of labour in this art, does not always keep pace with their improvement of manufactures." (1976 [1776], pp. 15-16)

Malthus, too, in his *Principles of Political Economy* firmly asserts this contrast:

> "The cost of manufactures, or the quantity of labour and capital necessary to produce a given quantity of them, has a constant tendency to diminish; while the quantity of labour and capital necessary to procure the last addition which has been made to the raw produce of a rich and advancing country, has a constant tendency to increase..." (1989b I, p. 197)

making it perfectly clear that manufacturing was regarded as a case of increasing returns. There is a neatness in associating increasing returns with the final stage of economic development and in regarding agriculture, the previous, as the centre of the population problem. But do increasing returns occur only in the fourth stage of economic development? Edmunds identified the division of labour as early as the primitive stage of hunting where "one prepares the bows and arrows, another hunts, another prepares the food and a fourth provides the clothing" (1832, p. 29).

Likewise, Everett comments:

> "I ..... take for granted, that an increase of population on a given territory necessarily and naturally produces a division of labor, and a consequent increase of skill in its application." (1826, p. 28)

This is consistent with a central point of Smith that division of labour requires a large market which an increased population itself will create. Ogilvy (1891, pp. 292-93) asserts that it is wrong to describe the process of procuring subsistence as one of cultivating the soil in isolation, since the process, for example, of obtaining bread involves a network of actions by innumerable persons, including the lumberman and miner who produced the agricultural

tools and even the judges and the police who create the peaceful society necessary for the conduct of production. This means that the influence of diminishing returns is only slight and that Smith was wrong to assert that the division of labour was not practised in the agricultural stage. The notion of increasing returns begins to exercise its powerful effects even in less advanced societies.

This fourth stage is not identified with increased domestic production of raw agricultural produce or of food in all its variety but with increased resources. This means that "the inhabitants of the manufacturing nation enjoy a greater quantity of subsistence than what their own land, in the actual state of their cultivation, could afford" (1989b I, p. 406). The broad notion of subsistence as resources, rather than food or provisions, can be used. The implications for Malthus of an economy developing into this stage of commerce and manufacturing are considerable. This provides a chance to shake off any effects of diminishing returns in agriculture and to cast aside the central problem of subsistence rising more slowly than the human population. Spengler wrote:

> "He [Malthus] found in that industrialization ... and in the associated development of.... "tertiary" employments, the means of providing an effective and expanding demand for labour, and, consequently, for population." (1945, p. 264)

Third approach: changing the structure of the economy to avoid population problems

An economic problem in one part of a national economy is not isolated, since production in one sector, of food or whatever, requires the co-operation of other sectors. Population problems therefore have to be considered in a broad context, whether the national economy be specialized or diversified.

The specialized economy

An industrial country with little agricultural output can feed its population by importing raw produce or food. Through specialization, sufficient subsistence is obtained for an expanding population. Wallace had written:

> "... such is the force of industry and commerce that by means of them many more inhabitants may be maintained in a country than the produce of the lands can possibly support, as their produce may be brought from a distance." (1753, p. 18)

Malthus himself takes up the theme of importing food in *Essay 1817*. A country excelling in commerce and manufacturing could purchase from abroad the subsistence it needed for "a great number of ages" (Malthus 1989a II, p. 32). When he examines the case of Switzerland, he acknowledges the significance for subsistence of manufacturing activity in one region:

> "In some of the smaller cantons, manufactures have been introduced which, by furnishing a greater quantity of employment, and at same time a greater

> quantity of exports for the purchase of corn, have of course considerably increased their population." (Malthus 1989a II, p. 243)

In his *Principles* he is willing to contemplate a manufacturing and commercial country purchasing all its corn from abroad (1989b I, p. 234). But in considering this possibility for an advanced society he discusses two issues: the wisdom of dependence on foreign food producers, and the reliability of manufacturing.

From *Essay 1798* Malthus expressed a dislike of trade. As a professional man, he would of course regard tradesmen as socially inferior, but there was more to his criticism of trade than that. Living through a period of war had reinforced his insular attitudes and belief in self-sufficiency. He spent his adult life in Surrey, Cambridge, Hertford and Bath, far away from ports and the bustle of large city markets. What he occasionally saw did not excite his imagination, unlike Adam Smith who knew Glasgow merchants well and learned from them. Familiar with trade shocks to the national economy, including blockades, both during and after the French Revolutionary and Napoleonic wars, he was distrustful of an open economy. To him, security of food supplies was vital. In one passage he questions the wisdom of a heavy reliance on food imports for a country such as England:

> "It might also be said, that the additional capital of the nation would enable it to import provisions sufficient for the maintenance of those whom its stock could employ. A small country with a large navy, and great inland accommodations for carriage, such as Holland, may, indeed import and distribute an effectual quantity of provisions; but the price of provisions must be very high, to make such an importation and distribution answer in large countries, less advantageously circumstanced in this respect." (1966 [1798], p. 311)

Thus in *Essay 1798* he warns that large countries like England must continue to produce much of their own food. In the second edition he examines such a policy by looking at the case of other large nations such as France, Germany and Prussia, and asking where they would obtain their food if manufacturing became their primary activity (1989a, p. I 403). In his *Principles,* Malthus worries about whether manufactured exports peculiar to a country, such as cotton goods, would be sufficient to pay for a proportionately larger volume of food imports (Malthus 1989b I, p.236). In *The Corn Laws* (1986 [1814]), he questions free trade in corn on the grounds of the insecurity of supplies, fluctuations in manufacturing, and the possible stimulation of population growth through the availability of cheap grain (pp. 100-104).

Throughout his works, he also expresses doubts about the reliability of manufacturing. One of the earliest writers on the trade cycle, Malthus was acutely aware of the cyclical character of manufacturing. In *Essay 1798*, for example, he observes that "the caprice of fashion" can cause failures in manufacturing (1966 [1798], p. 320). In *Essay 1806* he adds a footnote referring

to "those occasional variations which among manufacturers often produce the most severe distress" (1989a I, p. 388). Further, it has been argued that he was often Physiocratic in his sympathies, given his reluctance to acknowledge that manufacturing can be as productive as agriculture, especially in *Essay 1803* when he argues that manufacturing does not produce a surplus (Semmel 1965, p. 525). In *Essay 1798* he argues that manufacturing could benefit the individual, but not the society as a whole, as the diversion of resources from agriculture would reduce the food supply (1966 [1798], p. 333). Moreover, the higher wages in manufacturing would attract workers, causing farm labour shortages and a fall in the amount of cultivated land (1966 [1798], p. 337). But this opinion is heavily qualified, reflecting his fears that foreign competition might depress export prices, for example, or that foreign agricultural countries might create their own manufactures, thus destroying British markets (Malthus 1989a II, p. 32-36).

The diversified and balanced economy

His final position appears to favour a diversified and balanced economy. There are many references in Malthus' works to the notion of "balance", sometimes expressed as "proportions" (Pullen 1982, p.42. Hollander 1997, p. 982). In his *Principles of Political Economy* he discusses several balances. Previous writers had already used the balance concept. Steuart repeatedly employed the term with regard to balances of payments, trade, wealth and work (1998 [1767] IV, pp. 332-3). Malthus looks first at balances in the context of the population principle then adds further balances, or proportions, to create a general description of an economy in equilibrium.

From the first edition, he states clearly that economic welfare depends upon following an equilibrium path:

> "The happiness of a country does not depend, absolutely, upon its poverty, or its riches, upon its youth, or its age, upon its being thinly, or fully inhabited, but upon the rapidity with which it is increasing, upon the degree in which the yearly increase of food approaches to the yearly increase of an unrestricted population." (1966 [1798], p. 137).

In *Essay 1803* he bluntly states that his argument "depends entirely upon the differently increasing ratios of population and food" (1989a I, p. 445). A population problem emerges if there is a disequilibrium between these two rates of growth, of population and subsistence. The whole of his writing on demographic matters addresses the issue of how to get off a disequilibrium path. In *Essay 1798* he argues:

> "By that law of our nature which makes food necessary to the life of man, the effects of these two unequal powers must be kept equal." (1966 [1798] p. 14)

with the suggestion that the equalizing mechanism is the misery of starvation which will increase mortality and hence reduce the rate of natural increase:

> "The superior power of population cannot be checked, without producing misery or vice" (p. 37),

and in *Essay 1803* he adds moral restraint to the misery and vice checks.

The further solution he suggests in that edition is to base a demographic equilibrium on structural balances within the economy. This is an echo of Condorcet's allusion to "the laws of that equilibrium between the wants and resources of men which is continually tending to establish itself." (1795, p. 235).

Having expressed the need for equilibrating mechanisms, Malthus presents the set of balances required, beginning with the balance within agriculture itself:

> "The soil of England will not produce much without dressing; and cattle seem to be necessary to make that species of manure, which best suits the land." (1966, p. 187)

There has to be a balance between arable and cattle farming. Once he has dealt with that intra-sector proportion he considers the inter-sectoral relationship between agriculture and manufacturing. Malthus was not the first to discuss inter-sectoral harmony. Montesquieu was an early propounder of the doctrine that agriculture and manufacturing are complementary:

> "... if one neglects the arts and attaches oneself only to agriculture, the country cannot be populated. As those who cultivate or supervise cultivation have fruit remaining, nothing commits them to work the following year... the arts must be established in order for the fruit to be consumed by plowmen and artisans." (1989 [1748], p. 436)

Malthus built upon this theme as he developed his views through successive editions of the *Essay*. In *Essay 1798* he argues that there would not be a material improvement for labourers unless additional capital were added to both manufacturing and agriculture (1966 [1798], pp. 307-9). In *Essay 1817* he argued for an inter-sectoral balance on incentive grounds:

> "If in the best cultivated and most populous countries of Europe the present divisions of land farms had taken place, and had not been followed by the introduction of commerce and manufactures, population would long since have come to a stand from the total want of motive to further cultivation, and the consequent want of demand for labour..." (Malthus 1989a I, p. 102 footnote 16)

In a rewritten chapter for that edition, he sets out the merits of having a combined agricultural and commercial economy. These include abandoning feudalism through introducing manufacturing so there is an encouragement and ability to save and invest, and having enough agriculture to safeguard against falls in food imports, deterioration in the terms of trade for manufactured exports and a decline in prosperity of the countries buying its produce. Thus the two sectors would beneficially act and react upon each other (1989a I, pp. 40-42).

He goes on to explain that such an economy could withstand downturns in major foreign markets which would cripple an economy specializing in manufacturing. This economically more secure economy would have a glowing future:

> "I can easily conceive that this country, with a proper direction of the national industry, might, in the course of some centuries, contain two or three times its present population, and yet every man in the kingdom be much better fed and clothed than he is at present. While the springs of industry continue in vigour, and a sufficient part of that industry is directed to agriculture, we need be under no apprehensions of a deficient population..." (Malthus, p. 1989a II, p. 111)

Malthus' accounting framework

Increasingly, Malthus saw the demographic problem in the context of the economy as a whole. This is his great innovation, as noted by Winch (1987, p. 55). Eltis (1984, p. 137) briefly alludes to Malthus' advocacy of balanced growth and is acutely aware that Malthus thought in terms of a series of balances to explain the economic growth process (p. 323). In his *Principles of Political Economy,* Malthus considers the basic balance between consumption and production. This is a translation into general macroeconomics of the balance between population and subsistence, for he considers people primarily as consumers.

Noting with approval the crucial significance of "the balance of the annual produce and consumption" postulated by Adam Smith for discerning the state of a nation, Malthus relates the concept to the population question:

> "If in given periods the produce of a country exceeds its consumption, the means of increasing its capital will be provided, its population will soon increase, or the actual numbers will be better accommodated, and probably both. If the consumption in such periods fully equals the produce, no means of increasing the capital will be afforded, and the society will be nearly at a stand. If the consumption exceeds the produce, every succeeding period will see the society worse supplied, and its prosperity and population will be evidently on the decline." (1989b I, p. 34)

In addition to this basic balance between consumption and production, other balances are necessary in the economy between:

- the exertion of labour and the desired quantity of conveniences and luxuries (1989b I, p. 406);
- distribution of production and existing wants (p. 414);
- savings and increased income (p. 421);
- small and large proprietors (p. 432);
- productive and unproductive classes (p. 464);
- demand and supply in the economy (p. 466);
- saving and the demand to produce (p. 468);

– capital and population (p. 490);

– savings and advantageous investment (p. 497).

However, this analysis did not prompt Malthus to advocate rigid rules for running an economy. In *Essay 1803* he mocks the idea that justices of the peace or parliament can balance an economy:

> "....when the demand for provisions is greater than the supply, by publishing a particular edict, to make the supply at once equal to or greater than the demand." (1989a I, p. 356).

In his *Principles*, the powerful forces of the market would accomplish the equilibria he desired:

> "... even in the most uncertain parts of the science, even in those parts which relate to the proportions of production and consumption, we are not left without guides; and if we attend to the great laws of demand and supply, they will generally direct us into the right course." (1989b I, pp. 515-6)

Conclusion

Springing immediately from the imbalance he identified between population growth and subsistence growth, Malthus attempts to solve the problem by either changing human behaviour so that population growth would slow, or by changing the quantity of subsistence. Broader economic solutions can also be suggested for removing the imbalance at the heart of the economy.

Malthus has four human roles to consider: the worker, the utilitarian, the procreator and the consumer. By changing the behaviour arising from each role, some impact on the population growth can be achieved but not enough to solve the problem. He is ultimately sceptical about all four excepting, possibly, consumer behaviour.

In considering subsistence, he describes the varied forms of subsistence within the context of the economic development process. Real incomes increase as a national economy progresses from a primitive condition to an advanced stage of commerce and manufacturing. With higher incomes, the population can enhance its type of subsistence from the simple food needed for survival to a sophisticated mixture of necessaries, comforts and luxuries. Economic progress also means that subsistence is produced more efficiently under conditions of increasing returns. This would suggest that through industrialization, the problem whereby subsistence grows more slowly than population within one country would be solved. But to make an economy so specialized would raise new problems, making it vulnerable in new ways. Too much reliance on manufacturing and commerce was a precarious course to follow.

Underlying his argument, there was a fundamental reason against relying too heavily on industrialization as the solution to a single country's demographic dilemma. He had always formulated the population principle as a tendency

for a country to suffer a fundamental structural disequilibrium between consumption and production, between a population of consumers and a group of producers using the cooperating factors of production to hand. To avoid such an imbalance, the only solution was a balanced economy. His remarkable achievement in the *Principles of Political Economy* is his implicit national accounting approach. A single balance at the aggregate level of consumption and production would not be enough: there had to be balanced relations between different sectors and different activities throughout a national economy. However, in suggesting a balanced economy as the best solution to an individual country's population problem, Malthus was proposing a short-term remedy since it is unlikely that all the conditions for a full balance would hold for a long time. History has shown that specialization in manufacturing and commerce is a durable way of reconciling population growth and available resources.

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DONALD RUTHERFORD • **MALTHUS AND THREE APPROACHES TO SOLVING THE POPULATION PROBLEM**

Throughout his writings, especially in the six editions of his *Essay on Population*, Malthus' extended discussion of his population principle – the fundamental tendency towards divergence between population and subsistence growth rates – suggests several solutions to the problem he defined. To clarify the nature of his theory, detailed conceptual analysis is essential. The four human roles of worker, utilitarian, procreator and consumer identified by Malthus need to be assessed to explain the behaviour of the human population. Subsistence, like human behaviour, is a complex idea. It takes different forms, ranging from basic food to luxuries, and is rendered obscure in Malthus through his use of many different expressions for it. The concept of subsistence is analysed in this article within the eighteenth century framework of the four stages of economic growth and largely uses a population model for a single country rather than for the whole world. The conclusion to this enquiry is that although Malthus admits that an advanced country is able to deal with population growth through industrial specialization and food importing, he rejects this solution in favour of an approach based on a balanced economy.

DONALD RUTHERFORD • **LES TROIS APPROCHES DE MALTHUS POUR RÉSOUDRE LE PROBLÈME DÉMOGRAPHIQUE**

L'analyse approfondie que Malthus a consacrée au principe de population – la tendance à la divergence des taux d'accroissement respectifs de la population et des subsistances – dans toute son œuvre, en particulier dans les six premières éditions de son *Essai sur le principe de population*, suggère plusieurs voies de résolution de ce problème. Pour cerner la vraie nature de sa théorie, il est nécessaire de la disséquer au moyen d'une analyse conceptuelle minutieuse. Il faut examiner les quatre fonctions de l'homme définies par Malthus (le travailleur, le calculateur, le géniteur et le consommateur) pour expliquer les comportements des populations humaines. Le concept de subsistance, comme celui de comportement humain, est une notion complexe. Il revêt plusieurs formes, depuis l'alimentation de base jusqu'au luxe, et il est d'autant plus obscur que Malthus recourt à plusieurs expressions différentes pour le désigner. Dans cet article, le concept de subsistance est analysé dans le cadre du schéma des quatre stades de la croissance économique, développé au XVIII^{e} siècle. On modélise en général la dynamique démographique d'un pays plutôt que celle de l'ensemble du monde. La conclusion de cette recherche est que, si Malthus admet qu'un pays économiquement avancé peut faire face à sa croissance démographique en se spécialisant dans l'industrie et en important des denrées alimentaires, il écarte cette solution au profit d'un plaidoyer pour un système d'économie équilibrée.

DONALD RUTHERFORD • **LOS TRES ENFOQUES DE MALTHUS PARA RESOLVER EL PROBLEMA DEMOGRÁFICO**

El amplio estudio que Malthus dedicó al principio de la población y en concreto a la tendencia intrínseca a la divergencia entre las tasas de crecimiento de la población y de subsistencia, en toda su obra, pero sobretodo en las seis primeras ediciones de su *Ensayo sobre el principio de la población*, sugiere varias vías para resolver este problema. Para fijar la verdadera naturaleza de su teoría, es necesario desglosarla bien mediante un minucioso estudio conceptual. En primer lugar, hay que examinar cuales son las cuatro funciones del hombre definidas por Malthus (el trabajador, el calculador, el procreador y el consumidor) para explicar los comportamientos de las poblaciones humanas. El concepto de subsistencia, así como el de comportamiento humano es una noción compleja que reviste varias formas, desde la alimentación básica hasta el lujo, y que no acaba de ser del todo transparente y clara desde el momento en que Malthus recurre a distintas expresiones para designarlo. En este artículo, el concepto de subsistencia se analiza en el marco del esquema de las cuatro fases del crecimiento económico que se desarrolló en el siglo XVIII. En general, se utiliza como modelo la dinámica demográfica de un país y no tanto la del mundo en su conjunto. La conclusión de esta investigación es que, si Malthus admite que un país económicamente avanzado puede hacer frente a su crecimiento demográfico especializando su industria e importando productos alimenticios, descarta esta solución en favor de un sistema económico equilibrado.

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