Chapter 13
Is There a Future for Cattle Farming?

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ABSTRACT

Humans have relied on cattle for production of food and work, as a source of capital, for dung, for fuel, building, and many other uses, for a period of about 10000 years. As a result, cattle biomass is now approximately twice that of humans on the planet. However, in the face of diminishing natural resources for the expanding human population and evidence of livestock pollution, cattle farms are currently criticized widely for their inefficient use of resources, the poor cattle welfare in modern farming systems, and their impact on human health amongst other problems. This chapter explores the reasons why cattle farming may ultimately cease in response to these issues. The replacement of cattle on farms began in the industrial revolution, when traction engines superseded many cattle in field operations. However, the replacement of cattle as food products is only now beginning to accelerate. The acceptability of alternative milks is growing rapidly and that of alternatives to meat products is also increasing. However, the major advance in replacing bovine meat products is under development in the laboratory as cultured meat, grown from a biopsied muscle sample on an edible scaffold in a nutrient media. Significant investment has been made in the process, which is technically feasible but is currently too expensive. This chapter explores current concerns about cattle farming as well as current difficulties in the development of meat alternatives, such as plant-based and clean meat. Through this exploration, the authors examine the potential for cattle farming to survive in the wake of alternatives offered by advanced food technology. Given anticipated success in bringing suitable alternative products to the market, most of the functions of cattle in developed countries are likely to be replaced. The process in developing countries will be much slower. Nonetheless, the authors anticipate that ultimately—perhaps in the far future—food technology developments will end the reliance on traditional cattle farming practices.

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INTRODUCTION

Humans are currently dependent on breeding and raising cattle for the production of meat, milk, hides, dung and urine, and for agricultural work, transport, sport and capital. Some of these functions have existed for about 10000 years, especially their use as food sources, whereas others, such as the sport of bullfighting, their use in agriculture and for transportation purposes is more recent (Phillips, 2010). This close connection between the human and cattle led to cattle being revered in ancient times and much cattle terminology being adopted into the vernacular languages around the world.

However, although cattle may have served humans well for a relatively brief period in their development, questions are increasingly asked as to whether humans’ reliance on cattle is outmoded in the modern era. Human society has evolved at a rapid pace in recent years and the products offered by cattle, which supported, amplified and facilitated our development in former years, may increasingly be seen as being of diminishing importance. This chapter explores the future role of cattle in a rapidly changing world, characterised by the growing human population. It considers the alternatives to farmed cattle, in the form of cattle meat grown in vitro and alternative products that offer the same benefits to humans.

BACKGROUND

Some of the concerns surrounding the use of cattle for meat and milk production have been known for many years. Over forty years ago research identified that livestock production systems in the UK were substantially less efficient than crop production systems, in terms of energy input compared to energy output (Leach, 1975, 1976). However, most cattle were fed a diet based on forages at that time, except for brief periods when cereal feeds were cheap. Much of the grazing land in the UK was rough grazing, which did not compete directly with land for producing crops for human consumption.

Nowadays, the extent of cattle production has increased and much land is used to produce feed that could otherwise be utilised to support the growing population of humans (Godfray, Beddington, Crute, Haddad, Lawrence, Muir, … Toulmin, 2010). The recent growth in world human population and in some regions, most notably Asia, the growing affluence, allow those who were formerly vegetarians for economic reasons to include cattle products in their diet. This, coupled with the growing divide between rich and poor, has led to predictions that there will be mounting shortages of staple foods for the poor, as land is increasingly used for production of high cost, less efficient cattle meat and milk (Phillips, 2015).

CONCERNS ABOUT CATTLE PRODUCTION TODAY

The main concerns about cattle production today include the scale and intensity of the farming operations, their use of natural resources, in particular land, water and energy, pollution from the farms, the use of ingredients in their diet that could be fed to humans, their welfare, the ethics of slaughtering unwanted animals and their impact on human health. They are addressed in turn below.