The impact and poverty reduction implications of foot and mouth disease control in southern Africa, with special reference to Zimbabwe

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Foreword

Foot and mouth disease (FMD) is perhaps the most contagious cattle disease known, spreading rapidly in cloven-hoofed animals. Infected animals show signs of lameness, and the disease may cause severe losses in reproduction, lactation, growth, and draught power. Preventing contact between infected animals and non-infected stock is fundamental in controlling the disease. This can only be done through rigorously applied controls, the separation and isolation of infected animals, and, when appropriate, the widespread vaccination of stock at risk. The result of effective control has been the development of a valuable export market in livestock products, particularly beef, from the southern Africa region to the lucrative European Union (EU) market.

FMD has been controlled more successfully in southern Africa than elsewhere on the continent. The greater frequency and scale of commercial ranching in the region, together with a colonial history that favoured the establishment of a private sector export-orientated industry, has created an effective environment for FMD control. But have the poor and small-scale subsistence farmers in the region benefited? In the drought-prone countries of southern Africa, livestock support the livelihoods of the rural poor in a number of ways. However, this multiple use, and the economic and cultural value attached to livestock (particularly cattle), make commercialisation very difficult.

FMD control has been successful but has been achieved at considerable cost. Prior to this study little information was available that could be used to assess and quantify the social and economic benefits and costs of maintaining export-orientated veterinary controls, of which FMD represents the most intensive and expensive. Similarly, the benefits and costs to different stakeholders were unknown.

Market liberalisation in Southern African Development Community (SADC) countries is opening new opportunities for increasing volumes of trade. However, increased regional and international trade is contingent upon satisfying ever more stringent food safety and public health standards, which impose an increased burden on producers and may make it more difficult for smallholders to access the benefits of the export trade. Also, outbreaks of FMD in the region, in particular in Zimbabwe, and in Europe during 2001, have led to calls for a ban on imports of beef from southern Africa on the grounds that the area could be a source of FMD infection. In the past donors, especially the EU, have provided considerable support to maintaining and improving FMD controls in the region. Their continued support is essential, and this study will provide them with the information that they require to assess the net social and economic benefits of this support.

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The idea for the study was conceived by Sarah Holden and Peter Bazeley of the IDL Group (formerly Livestock in Development), who originally contacted Brian Perry and Tony Forman in 1999 to determine their interest and availability to undertake a study on the impact of foot and mouth disease control in Zimbabwe. With time the idea grew, and most importantly funding became available, and Steve Ashley of IDL drew up terms of reference, and assembled a multi-disciplinary team of individuals from different countries and organisations to carry out the work.

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Executive summary

This report describes an extensive interdisciplinary study of the impacts of foot and mouth disease (FMD) and its control in southern Africa, with particular emphasis on the case study country of Zimbabwe. Although this highly contagious disease of cloven-hoofed animals is endemic in certain parts of the region, it is generally restricted to areas inhabited by African buffalo, which harbour the virus. Vast areas of southern Africa are free of the disease thanks to considerable investment in FMD control programmes over many years, and this freedom has made it possible for several countries to export boneless beef and other livestock products to high-value markets in countries free of FMD. Some of these countries, notably those members of the African, Caribbean, and Pacific (ACP) group (Botswana, Namibia, Swaziland, and Zimbabwe), have negotiated the export of boneless beef to the European Union (EU) under the lucrative reduced-tariff arrangements of the ACP-EU Partnership Agreement (commonly known as the Cotonou Agreement), successor to the Lomé Convention.

This study was set up to evaluate the benefits and costs of current and alternative FMD control strategies in the case study country of Zimbabwe, and in particular the contributions that FMD control make to poverty reduction. This was done by means of a benefit-cost analysis (BCA), in which different future FMD control scenarios were detailed and compared to a baseline of current practice. As part of the BCA, the broader effects of beef exports on the Zimbabwe national economy were studied using a computable general equilibrium (CGE) model approach. The BCA took account of possible future trends in the international beef market, in particular those affecting the market with the EU resulting from revisions to the Common Agricultural Policy (CAP), from successor agreements to the Cotonou Agreement, and from trends in the World Trade Organization (WTO).

In addition to the economic analyses, an in-depth livelihoods study was undertaken in Zimbabwe to determine the role of livestock in poverty reduction and the effects of FMD and its control on the poor, and to propose opportunities for livelihood improvement for poor stakeholders through export-orientated animal disease control policies.

The results of the BCA show that FMD control measures are likely to be of considerable benefit to the national economy of Zimbabwe. This was demonstrated in several ways. Firstly, in a comparison between the Baseline Scenario and the pessimistic FMD Control Scenario 3 (in which disinvestments in FMD control by 50% and resultant loss of beef export markets was predicted), it was shown that for every US$ 1 that Zimbabwe disinvests in the FMD control programme, a further US$ 5 are lost by the country. No transboundary effects were taken into account, and the losses calculated are incurred by Zimbabwe alone. However, the association of the outbreak of FMD in south-eastern Botswana in March 2002 (after over 30 years of freedom from the disease) with the outbreaks in western Zimbabwe suggests that the costs to the region as a whole of Zimbabwe's disinvestments could be much greater. In addition, the effects of declining FMD

control infrastructures on the control of other diseases are not taken into account in the BCA.

Secondly, the results show that if Zimbabwe were to invest further in the fences and the veterinary service infrastructures required to create a much larger and much more secure export zone that was internationally recognised as FMD free by the World Organization for Animal Health (Office International des Epizooties, OIE), there would be returns of approximately US$ 1.5 for every US$ 1 invested. As in the disinvestment scenario, this does not incorporate benefits to the region as a whole through greater disease security for FMD control, nor does it include the other benefits that would result from an enhanced national veterinary service. This analysis did not consider in depth whether Zimbabwe would be able to maintain the capacity, in terms of quantity and quality of beef, to supply the export market following the dramatic reduction in the commercial cattle breeding herd associated with current land reforms in the country.

The distributions of the costs and benefits turned out to be highly skewed. Expenditures from FMD control are borne almost entirely by the public sector, but when losses from trade bans resulting from FMD outbreaks are included, private sector costs are dominant. The majority of impacts of FMD and the benefits from its control are related to the ability to trade internationally, and so most of the benefits accrue to the commercial sector, comprising cattle production, beef processing, and related input industries and services. The CGE modelling indicates that approximately 16% of the increased value of economic activity resulting from trade is eventually transferred as income to low-income households in both rural and urban areas.

In Zimbabwe the direct impacts on the poor of FMD, and of measures established to control it, are very limited. FMD has not been a problem in communal areas where the majority of the poor live, and its effects on indigenous cattle are considerably less than on commercially orientated herds. Furthermore, despite the fact that about 75% of poor households own or have access to cattle, over 60% of these own less than five animals. Most of these households use cattle for wealth storing and other livelihoods functions such as traction, and do not have the herd size capacity to engage actively in commercial cattle marketing. As such, only about 2% of households are engaged in regular marketing of cattle. The livestock of most importance to the poor are poultry and goats, also used for wealth storing. For most of Zimbabwe's poor, livestock sales, particularly of cattle, are opportunistic, aimed at raising needed finance for school, medical, and other expenses. Livelihoods studies were not carried out in the other exporting countries of the region, and variations in the contribution of the smallholder sector to cattle marketing are reported.

Livestock are extremely important to the poor in all countries of southern Africa, and beef exports are extremely important to the livestock industries and national economies of many of them. It appears that, at least in Zimbabwe, FMD control makes very positive contributions to the latter, but very limited contributions to the former. But FMD control is extremely important to the region

as a whole, so disinvestments in disease control programmes in any country could have widely disruptive consequences throughout southern Africa, further threatening the competitiveness of the region in global beef markets. This leads us to draw the conclusion that there is considerable merit in continued strong and sustained FMD control in Zimbabwe. However, greater effort should be given to encouraging the various elements of the private sector that stand to gain from lucrative export markets in beef and other livestock products to invest much more in FMD control measures. At the same time, significant benefits would be derived from using public sector funding to extend disease prevention services to the poor livestock keepers in Zimbabwe, focusing on the ailments of animals (such as poultry and goats) that are of importance to them, thereby recognising the relative importance of their livelihoods incentives rather than the standard marketing incentives.

Chapter 1

Introduction

1.1 Background to the study

This study has its roots in several of the issues facing policymakers in many developing countries, one of which is how to best position and prioritise animal health services for national development. The study was originally conceived as a straightforward evaluation of the benefits to be derived from controlling foot and mouth disease (FMD) in Zimbabwe, and the Department of Veterinary Services (DVS) of that country approached a sponsor, the Department for International Development (DFID) of the United Kingdom, to fund the study.

The DVS was particularly interested in the possible merits of further investments in FMD control, enabling Zimbabwe to meet the requirements of the World Organization for Animal Health (Office International des Epizooties, OIE) and so become an internationally recognised FMD-free zone from which beef and other livestock products could be exported. Although the export of boneless beef to the European Union (EU) from an FMD-free zone in the country was negotiated in 1985, FMD-free status has not been recognised by OIE. This has been due in part to the perceived lack of adequate protection of the zone (through fencing and other infrastructural safeguards) from the risk of introduction of the disease, particularly in the northern part of Zimbabwe. Three of Zimbabwe's neighbours, Namibia, Botswana, and South Africa, have all achieved the status of OIE-recognised FMD-free zones.

The original fundamental question was: 'Is investment in FMD control worthwhile for Zimbabwe, and would further investment yield greater returns?'

In developing the terms of reference, the scope of the study grew in three principal directions:

- Firstly, it was felt important to consider the benefits of FMD control not only in terms of national economic returns on investment, but also in the broader context of the impacts on poverty reduction.
- Secondly, given that the main benefits of FMD control are considered to be derived from the export of beef and other livestock products, it was felt that a broader consideration of the links between international trade in livestock products and poverty reduction would be useful in extrapolating the findings from the Zimbabwe study to other countries and regions of the developing world.
- Thirdly, it was therefore felt important to broaden the geographical scope from Zimbabwe to the southern Africa region, with particular focus on the other countries of the region that have developed effective FMD control in order to establish meat export markets.

The widened terms of reference[1] thus generated a broader set of impacts to be measured, and a multidisciplinary team was assembled to undertake the task. The make-up of the team provided knowledge and experience in FMD, livelihoods and poverty assessments, disease epidemiology and impact assessment, agricultural economics, trade economics, and development issues in southern Africa. This breadth of issues considered constitutes a novel approach to the assessment of FMD and its control. The study ran from September 2001 to August 2002.

1.2 Overall study aims[2]

1.2.1 Study goal

- To establish cost-effective disease management strategies that reflect national economic development priorities, including poverty reduction.

1.2.2 Study purpose

- To enable objective decisions to be made by regional governments, in particular that of the case study country Zimbabwe, and by donors, on optimal FMD control policies.

1.2.3 Study outputs

- A disaggregated benefit-cost analysis (BCA) of current and alternative FMD control strategies in Zimbabwe, under different predicted scenarios of change in export markets resulting from the Cotonou Beef and Veal Protocol (Protocol 4 of the Cotonou Agreement, June 2000) and other factors.
- A synthesis of the constraints and opportunities for livelihood improvement for poor stakeholders in Zimbabwe through export-orientated animal disease control policies.
- A synthesis of the possible implications, for other countries of the region, of issues identified and conclusions drawn in Zimbabwe.

1.3 Report structure

The report is structured as a series of chapters addressing the different elements of the study. It opens with a review of the occurrence, impact, and control of FMD in the southern African region (Chapter 2), and scenarios for the future control of the disease in Zimbabwe are presented. These scenarios form the basis for the disaggregated BCA that was undertaken to determine the economic impact of different control options. Given the importance to this study of the poverty reduction implications of FMD control, poverty, livestock, and livelihoods are then

[1]The terms of reference for the study team are presented in Appendix 1
[2]The study aims are summarised from the terms of reference

reviewed using secondary data assembled for the southern African region, as well as primary studies undertaken in Zimbabwe by the study team (Chapter 3).

The external trade environment for livestock products, particularly beef, is then presented and discussed, and the influences this has, and may have in the future, on the benefits of FMD control are emphasised (Chapter 4). A chapter on the economics of FMD follows, describing the costs of the disease, their measurement, and the implications of these different costs to different sectors (Chapter 5). Then follows the presentation of the BCA carried out for Zimbabwe, which discusses the analysis and economic implications of the different control scenarios (Chapter 6). Finally, the results of the entire study are synthesised, and conclusions are drawn (Chapter 7).

1.4 Livestock, the poor, and animal diseases

Livestock are estimated to contribute to the livelihoods of 70% of the world's poor (LID 1999). They contribute not only to supporting the livelihoods of poor farmers, but also those of traders in livestock products and labourers in livestock enterprises throughout the developing world. Livestock are particularly important in Africa, where the rate of growth of poverty is estimated at 3% per year, higher than any other region of the world (World Bank 2001). Livestock play many roles in the livelihoods of the peoples of Africa. They provide protein for human consumption in the form of meat and milk, they are an important source of cash to cover expenses such as education and health, they provide traction to till the land and harvest the crops, their manure fertilises the soil, they constitute a means of investment in societies in which cash is a scarce commodity, and they perform an important social networking function in most African communities.

One of the main constraints on more efficient use of livestock in each of these roles is animal disease (Perry et al. 2002). Disease directly affects animal productivity through morbidity and mortality, but it also constitutes a major source of risk to the development of livestock-centred enterprises by both rich and poor. In particular, some diseases severely limit the access of certain products to local and international markets. Important in this group are the highly infectious 'transboundary' diseases, such as FMD.

1.5 Globalisation, trade, and poverty reduction

There are ever-increasing opportunities for international trade in a wide range of commodities and products that could permit greater participation by developing countries in markets to which they have not had access, or to which access has been limited for a variety of reasons. For southern Africa, livestock and their products are a clear example of such opportunities, and indeed many countries have had access to the EU beef market for several years under the beef and veal protocols of the Lomé Convention and, more recently, the Cotonou Agreement (see Chapter 4). These allow exports of up to 31,000 tonnes of boneless beef to the EU each year under preferential tariff conditions, with the quota divided between Botswana, Namibia, Swaziland, and Zimbabwe. These countries also have access

to several other markets for boneless beef, developed as a result of bilateral arrangements. Many see these markets as a significant development pathway for the countries involved.

Two major questions arise from this discussion. What are the costs and benefits of such export markets in livestock products in which the countries of the region appear to have a comparative advantage; and what is the distribution of these costs and benefits, particularly with respect to economic growth and poverty reduction? Do they contribute, for example, to appropriate producer and food prices, employment generation and stimulation of wages, improved food safety for all, improved quality and consumer choice, and the protection of the environment? Are small farmers and small-scale enterprises marginalised, and do more advantaged groups gain their advantage at the expense of the rural poor?[3] This is particularly important given the current global concerns about the escalating scale of poverty and its effects (which have led to the development of the Millennium Development Goals)[4], and the specific concerns of southern Africa, where poverty and inequity are particularly prevalent.

1.6 FMD and its impact on market access

FMD occurs in many countries and regions of Africa (Thomson 1995). It is a highly infectious disease that affects several species of cloven-hoofed animals, and it spreads rapidly, particularly in the temperate climates of northern Europe. There are many regions of the world that are free of the disease, particularly in the developed world (notably North America, Australasia, and much of Europe), and do not want the disease introduced. This is because FMD would have highly significant effects on livestock productivity in the high-input livestock production systems of these countries, would cost a large amount of money to control and re-eradicate, and would reduce the access of their livestock products to high-value markets in countries that are themselves free of FMD. Many countries will therefore not import animal products from countries where FMD is inadequately controlled.

In southern Africa, due to a variety of factors, FMD occurs infrequently (see Chapter 2 for details of the disease, its impact, and its control). Indeed, there are several areas in the region that have been free of the disease for many decades. This is due to relatively strong public and private sector veterinary services, and a

[3] These issues and others were raised by T. Reardon and C. Barrett in a recent paper entitled 'Agro-industrialisation, globalisation and international development: an overview of issues, patterns and determinants' (Agricultural Economics, 2000, 23:195-205).

[4] A reduction by half in the proportion of people living in extreme poverty by 2015; Universal primary education in all countries by 2015; Gender disparities in primary and secondary education removed by 2005; A reduction by two-thirds in the mortality rates for infants and children under five and a reduction by three-quarters in maternal mortality by 2015; Access through the primary health care system to reproductive health services for all individuals of appropriate ages as soon as possible and no later than 2015; To implement national strategies for sustainable development in all countries by 2005, so as to ensure that current trends in the loss of environmental resources are effectively reversed at both global and national levels by 2015. For a fuller description see http://www.developmentgoals.org.

focus within them on FMD control. In addition, there may be other, as yet poorly defined, characteristics of the disease itself that result in it spreading more slowly under southern African conditions than under those prevailing in the temperate regions of Europe, for example. Moreover, the disease appears to have less impact on the less productive indigenous livestock of the region. This may be real, it may be a reflection of the small proportion of meat and milk from the traditional farming sector that finds its way onto the open market, it may be that the changes induced by FMD on the contributions of livestock to poor rural societies have been inadequately identified or quantified, or more likely it is a combination of all of these factors.

Many countries have been able to capitalise on the relatively low incidence of FMD and engage in the export of boneless beef from areas free of the disease. This has been made extremely attractive by the conditions of the Cotonou Beef and Veal Protocol, whereby certain African, Caribbean, and Pacific (ACP) countries have preferential access to the EU, and are exempt from paying most import duties within certain quota limits. One of the main challenges to their continued participation in this and other markets is compliance with the sanitary and phytosanitary (SPS) regulations of the World Trade Organization (WTO), the standards for which are drawn up by OIE. For southern Africa, these standards stipulate the construction and maintenance of adequate barriers between cattle and African buffalo (Syncerus caffer). African buffalo are known to carry FMD viruses, and are probably the major source of cattle infection in the southern African countries under consideration (Hedger and Condy 1985; Thomson et al. 1992).

1.7 FMD control and development policy

The challenge for public animal health services is to protect the health of producers and consumers of livestock products, while at the same time implementing disease control strategies that promote agricultural and livestock development policies advocated by governments. In all of the southern African countries, agriculture, of which livestock rearing forms a major component, is seen as central to development. Agriculture feeds the population, provides employment, provides both assets and a safety net to the poor, and produces commodities that can be traded with other nations. When it comes to livestock disease control, therefore, national strategies should not be made in a vacuum, but need to reflect higher-level imperatives, such as national economic growth, the priority given to poverty reduction, the privatisation of services, and the liberalisation of markets, among many others. While this study cannot address all these different issues, it will try to tease out the distribution of costs and benefits to FMD control, and the implications that this might have for national economic growth and poverty reduction.

Clearly, an understanding of national development and agriculture policies is important in interpreting the results of this study. As background to this, the national development and agriculture policy frameworks for Zimbabwe, the case study for the BCA and livelihoods studies, are reviewed and summarised below.

1.8 National development programmes and agricultural policy framework for Zimbabwe

Over the last 20 years, three major economic reform programmes have dominated Zimbabwe's development policy. The Economic Structural Adjustment Programme (ESAP) was the first of these (Government of Zimbabwe 1991). This sought to achieve a shift from the domination of state intervention in the previous decade to a system driven largely by market forces. It had targets for growth in the annual gross domestic product (GDP), and for savings and investments, and targets for a reduction in inflation. Of significance to this study was a target to achieve an export growth of 9% per annum.

The Zimbabwe Government then launched the Zimbabwe Programme for Economic and Social Transformation (ZIMPREST) in April 1998 (Government of Zimbabwe 1998). With an estimated 61% of Zimbabweans living in poverty at that time, poverty reduction was identified as a major challenge, and in the strategy to eradicate poverty, employment creation was given top priority.[5] The programme also contained, in what it termed 'a minimum growth scenario', a target of continuous growth in exports of at least 9% per annum.

The most recent set of economic reform measures were set out in the Millennium Economic Recovery Programme (MERP), launched in 2000 (Government of Zimbabwe 2000) and designed to restore macro-economic stability. The four elements for focus in the medium-term plan of MERP are very relevant to this study. These are: sustainable macro-economic stability and growth; land reform and agricultural development; infrastructure development; and human resource development.

With regard to agriculture, the policies for the development of the livestock sector, and the focus and role of veterinary services, are contained in Zimbabwe's Agricultural Policy Framework 1995-2020 (Government of Zimbabwe, undated). These specify that the aims of livestock policies include increasing the national cattle herd (particularly in smallholder areas), increasing milk production, and increasing the offtake from smallholder farms. The document notes that beef exports are an important foreign currency earner, and this may be strengthened in the future. Three strategies to achieve these aims are listed:

- Provision of special credit facilities to farmers for cattle purchase
- Intensive production in the smallholder sector through pen fattening
- The promotion on the marketing side of high-value-added products

[5]Specifically, ZIMPREST sought to 'pursue economic empowerment and poverty alleviation by generating opportunities for employment and encouraging entrepreneurial activity'.

In the policy of veterinary services, the following four strategies are listed:

- Promote increased productivity through extension and training
- Protect the human population from zoonotic diseases
- Protect livestock populations against diseases and pests that adversely affect productivity
- Maintain an animal health status suitable for trade in livestock and livestock products

In the synthesis and conclusions of this report, the compatibility between the study results and these national and agricultural policy strategies for Zimbabwe will be discussed.

1.9 The scope of the study leading to this report

Evaluating the impact of controlling an animal disease in which BCA plays a major role, may suggest to some that the study leading to this report was fundamentally an accounting task, weighing up, with carefully assembled figures, the two sides of the equation, and delivering a single and definitive answer: yes, it is cost beneficial to control FMD in southern Africa; or no, it is not. While we will provide certain such definitive statements based on our analyses, it is important at the outset to lay out some of the complexities of this task, and the likelihood that conclusions may well be qualified in different ways.

Firstly, as will be dealt with in considerable detail, there are several different ways of measuring the economic impact of a disease and the benefits or otherwise of its control. While the measures do provide us with different pieces of the jigsaw puzzle, they still need to be assembled to provide the full picture. Secondly, there are different stakeholders who stand to gain or lose, or be unaffected, by the effects of FMD and of measures to control it, so what is to the advantage of one may not necessarily be to the advantage of another. And thirdly, virtually all of the processes that we have attempted to measure are dynamic, some changing very fast, some changing more slowly, and others fluctuating due to both exogenous and endogenous influences. We are dealing with a moving target.

The impacts of FMD control are manifold and exert their influences on different groups and at different levels. There are the macro-economic benefits to a country as a whole, critical to national economic growth. But in addition there are the sector- or community-specific benefits, which may be as or even more important, requiring different measurement techniques, and specific weighting in the interpretation of results. An appreciation of the different stakeholders involved in FMD control in southern Africa, and how their interests might compare or contrast, is essential to an understanding of these complexities.

The first of these stakeholders is the DVS in Zimbabwe, the initiator of this study, and its counterpart departments in other countries of the southern African region. The DVS in Zimbabwe has been, since the 1930s, actively engaged in controlling FMD, researching the epidemiology of the disease, and building a

partnership with the livestock industries of the country in order that they can participate actively in domestic and international markets for their products. The job of the DVS is to control, and if possible eradicate, diseases, in support of government policies to promote the livestock enterprises of the country. The DVS of Zimbabwe has played an important role in requesting and supporting this study, and would probably benefit if the results show positive returns to current and future investments in FMD control.

Second is the beef industry, and in particular the sector contributing to the export trade in beef. Again, this group of stakeholders, whether its representatives be in Zimbabwe, Botswana, Swaziland, or Namibia, has very competently developed a quality and eminently marketable product that has been exported to the EU under very favourable conditions (through the Lomé Convention and its successor the Cotonou Agreement, see Chapter 4), and to other European and non-European markets, earning the countries concerned valuable foreign exchange, and providing funds for investment and employment in each of the exporting countries. The key questions arising are whether this trade does indeed benefit the country, and if so, who specifically benefits.

Third is the Government of Zimbabwe (and by extension the governments of the other countries of the southern African region), interested in seeing its investments having an impact on the objectives of its agricultural policy framework, thereby actively promoting national economic development.[6]

Some view livestock as a valuable instrument for poverty reduction, and the promotion of market opportunities within the different components of the livestock industries and at different levels of the economy as critical pathways for economic growth (see for example World Bank 2001:38; Perry et al. 2002:117). There is an undeniable utility in livestock as a mechanism for poor livestock keepers to promote specialisation and integration into local markets, thereby reducing poverty. This begs the question: 'Does the increased access of developing countries, and the poor within these countries, to international trade markets in livestock products contribute to poverty reduction?' Here we have potentially a broader group of stakeholders, those public and private sector organisations keen to promote the future capacity of developing countries to comply with the increasingly stringent health and quality demands of beef importers in the West, and to promote the participation of the poor in developing countries in these export markets. This includes donor organisations such as DFID, the sponsor of this study, and international implementation bodies such as the EMPRES programme (Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases) of the Food and Agriculture Organization of the United Nations (FAO), pursuing the effective global control of transboundary diseases. Put another way, given the high cost of maintaining effective FMD control measures, would investment in them, and in compliance with the rigorous SPS requirements of the WTO, along with a programme to support the greater participation by the

[6] In Section 1.8 the key elements of Zimbabwe's national and agricultural policies are presented.

poor in meat export markets, be compatible with economic growth and poverty reduction agendas? From this study such public and private sector investors would need to know firstly what the overall returns are to current FMD control, secondly what those returns would be with increased investment in FMD control ensuring a long-term continuation of export opportunities, and thirdly what the potential mechanisms are which might allow the poor greater access to any benefits, by both direct and indirect means.

In addition to the four groups mentioned above, there is another very important stakeholder—the region as an entity in itself. There are close links between most of the countries of the region, and many share common borders. Furthermore, regional organisations, such as the SADC, are actively promoting regional growth and integration. The health of livestock in the countries of the region will therefore be critical to the further development of livestock trade in the region as a whole, and FMD is undoubtedly very close to the top of the agenda as the major potential impediment to this, given its highly infectious nature and the increased risk of its spread presented by uncontrolled movements of livestock in some areas. Countries in the region, and the region as a whole, will be interested in how FMD control might contribute to development and growth.

Last on this list of stakeholders, but by no means least, are the poor themselves. With the current focus on poverty reduction as a primary development strategy across the southern Africa region, the poor are clearly a primary stakeholder group in any kind of policy assessment. Despite this, the poor frequently lack a voice in the planning and implementation of macro policies. It is therefore critical that their views on, and responses to, existing policy are given a voice. Placing the poor as a key stakeholder group also prevents them from being viewed simply as recipients or beneficiaries of policies, rather than as actors themselves, taking informed decisions about how to get themselves out of poverty. This 'actor-orientated' approach is integral to sustainable livelihoods approaches (see Carney 1998, for example). The decisions that people take to try and get themselves out of poverty are shaped by the livelihood opportunities and constraints that exist in a particular locality. In this study we identify the different groups of poor stakeholders across different localities, and determine how they use livestock to support their wider livelihood strategies, including their livestock accumulation, investment, and marketing strategies, in relation to both cattle and small stock. The poor will therefore be interested in seeing how livestock policy and FMD control measures support their livelihood strategies.

Six stakeholder perspectives have been presented here, and from these examples it can be seen that the scope of the study is considerable and complex. To this complexity is added the further dimension of the economic uncertainties in some countries of the region, particularly Zimbabwe, the case study country for the detailed economic analysis. For this reason, the report will try wherever possible to be forward looking, using the study findings to analyse and predict the outcomes of a range of different future scenarios that cover investment levels, international market trends, and pro-poor livestock policies, among many others.

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Chapter 2

Foot and mouth disease(FMD): its occurrence, impact, and control in southern Africa

2.1 The occurrence of FMD

2.1.1 FMD in the southern African region

FMD is a highly infectious disease of ruminants and pigs caused by a virus of the Picornaviridae family. There are seven virus types, six of which are present in southern Africa.[7] The disease has been recognised in the region since the latter part of the 18th century and appears to have increased in prevalence and impact since the 1930s. Currently, it has a very restricted distribution in the countries of southern Africa. Large areas of Namibia, Botswana, Zimbabwe, South Africa, and Swaziland are free of the disease, and have been for many years. The threat of FMD comes almost entirely from areas in which buffalo are kept, and in which there is a potential for buffalo-cattle contact, as the African buffalo (Syncerus caffer) is a maintenance host for the three Southern African Territories (SAT) types of FMD virus.

Some of the southern African countries have established a zoning system in which buffalo are kept geographically separated from cattle, and buffer zones that border buffalo areas have been established. In such zones, cattle are vaccinated at regular intervals and monitoring for FMD infection is intensive, in order to maintain large FMD-free zones from which beef can be exported. As a result, FMD has rarely occurred in the FMD-free zones, and has only occurred at very infrequent intervals within the buffer areas over the last 15 years or so.

However, in all of these countries except Namibia, there have been recent outbreaks of FMD in the FMD-free zones—in South Africa during 2000 and 2001, Swaziland in 2001, Zimbabwe in 2001 and 2002, and Botswana in 2002. Apart from one of these, which resulted from the introduction of a virus type never before recorded in the region (the PanAsia strain of type O) and probably introduced with galley waste from a ship in Durban harbour and subsequently fed to pigs, all the other outbreaks are presumed to have come directly or indirectly from buffalo. The South African outbreaks were reportedly a result of extensive flood damage to fences bordering the Kruger National Park, which allowed buffalo-cattle contact to occur. The Zimbabwean outbreaks appear to have been due to increased damage to fences that have gone unrepaired as a result of

[7]The virus types of FMD present in the region are Southern African Territories (SAT) 1, 2, and 3, and types O, A, and C. Almost three-quarters of reported outbreaks in southern Africa during the period 1981-1990 were caused by SAT types.

budgetary constraints, increased illegal movement of cattle, and reduced vaccination coverage in buffer areas, again due to budgetary constraints. The Botswana outbreak, which was rapidly brought under control by vaccination and slaughter, appears to have been an extension of one of the Zimbabwean outbreaks.

In the neighbouring countries to the north and east, namely Angola, Zambia, and Mozambique, FMD remains endemic in certain areas. In Angola civil war reduced cattle populations, and restrictions on their movement have reduced the prevalence of the disease in recent years. Zambia suffers sporadic outbreaks of the disease (Perry and Hedger 1984) and Malawi is generally free of FMD. Further north on the continent, FMD is endemic and poorly controlled.

2.1.2 FMD in Zimbabwe

Over a 70-year period, from 1931 up to and including the outbreaks in 2001 and 2002, there have been 87 recorded primary outbreaks of FMD in Zimbabwe (Department of veterinary services (DVS) 1989, updated)—an average of about 1.2 per year. Over the past 20 years, when routine control measures have been at their best, there have been 17—an average of about 0.85 per year. This includes seven years when no outbreaks were recorded (1992-1996, 1998, and 2000). Between 1991 and 2000 there were only six outbreaks. In 2001 there were at least two primary outbreaks of FMD in the south of the country, with spread during the period August 2001 to July 2002 to at least a further 18 outbreaks.

There have been distinct phases in the occurrence of FMD in Zimbabwe, reflecting changing capacity to control the disease effectively. From the early 1930s, when the disease reappeared in the country, there was increasingly effective control until the mid-1970s, when the civil war that preceded independence caused severe disruption to animal disease control efforts (Lawrence et al. 1980). Following independence, increasing levels of control led to Zimbabwe opening up export markets of beef to the European Union (EU) in 1985, and despite occasional outbreaks, including one that led to an 18-month interruption of meat exports to the EU between 1989 and 1991, the incidence of FMD in the country has been relatively low. Nevertheless, when compared to most of the other beef-exporting countries in the region with comparable levels of control, there has been a relatively high number of FMD outbreaks in Zimbabwe. This probably reflects the difficulty of maintaining the separation between domestic cattle and wildlife when the latter occupy extensive areas on the periphery of commercial farming areas in both the north and the south of the country. Since 2001 the incidence is again on the increase, with declining capacity to control the disease.

2.2 The impacts of FMD

The impacts of FMD in the region are manifold, and are covered in considerable detail in Chapter 5 on the costs of FMD and its control. They are also reviewed elsewhere by Perry and Randolph (2003). They include the impacts of overt disease (such as market disruption and declines in farm-level and sector-level

productivity), as well as the impacts of disease risk (including the cost of preventive control measures at national and farm levels, closure of national and international markets, and environmental impacts).

As regards overt disease, the productivity impacts of FMD in the region have generally been very limited, particularly in the indigenous cattle kept in the communal and smallholder systems. The major direct impact of FMD outbreaks has been on the infrequent occasions when they have occurred in FMD-free zones, at which time the countries concerned, and/or their export partners, have closed international markets in meat.

For a number of reasons, the impact of FMD on commercial livestock producers is generally greater than on communal farmers. It is common throughout the world for FMD to have a less severe clinical expression in animals that are not under the stress of heavy production demands, and this is reflected in the generally mild disease seen in indigenous cattle and commercial range cattle in southern Africa. High-producing dairy cows suffer much more severe effects than milking cows in communal herds. Weight loss is generally followed by compensatory weight gain, and for animals at pasture this comes at a relatively minor cost. The cost becomes more significant in feedlot cattle. Although sheep, goats, and pigs are susceptible to FMD, they have only infrequently been affected in southern Africa.

For communal farmers, the greatest potential impact of FMD in cattle is likely to be the fact that the cattle cannot be used for draught during periods when they are lame. The effects of the disease are variable and, while many animals will suffer minimal lameness, others can be severely affected for several weeks. In Zimbabwe, the areas in which most outbreaks have occurred have been those in which there is now a preference for donkeys rather than cattle for draught power, and historically the impact of FMD on draught requirements has probably been very limited. This may differ in other countries in the region and in circumstances of less rigorous FMD control, where the disease could have a greater impact on the availability of animals for traction.

Neither commercial nor communal farmers can market affected animals, and this can impact significantly on their livelihoods. In the circumstances of the countries under consideration in this report, where stringent control measures are instituted, it is these control activities that dictate the restrictions on livestock movement.

In countries within the region and elsewhere in Africa where effective FMD prevention is not undertaken, the disease is generally endemic. Commercial farmers will often undertake routine vaccination of their herds and practise some level of isolation of their animals from neighbouring livestock. Typically, occasional outbreaks of disease occur and some level of effort is made to limit spread by movement control and ring vaccination. Less commonly, perhaps every five to seven years, dwindling national herd immunity will lead to the occurrence of a major epidemic of FMD, which has more substantial implications even for farmers engaged in traditional livestock practices.

2.3 The control of FMD

2.3.1 The control of FMD in the southern Africa region

FMD control measures in many of the countries of southern Africa are targeted at the maintenance of FMD-free zones that allow export of beef and certain other products. Such measures include the construction and maintenance of fences to separate cattle from buffalo, the vaccination of cattle in buffer zones, the surveillance of cattle in buffer and surveillance zones for possible FMD infection, and the routine inspection of cattle in FMD-free areas (see Figure 2.1).

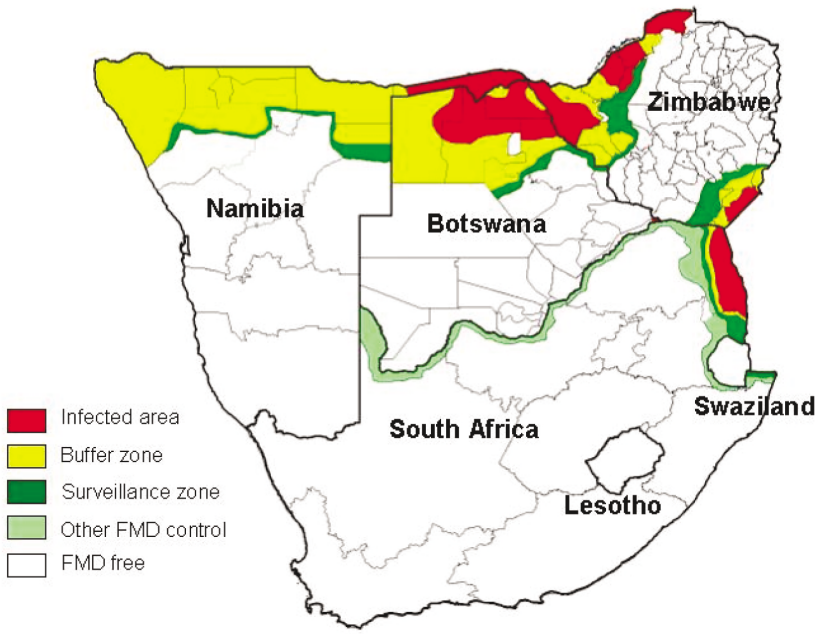

Figure 2.1 The countries of the southern Africa region, and the location of FMD-free zones, surveillance zones, buffer zones, and infected zones

South Africa has followed the same general trend as several of the other countries in the region of increasing FMD control over the last few decades. They have opted to use a zoning policy to separate areas in which African buffalo are found from cattle-raising areas from which meat can be marketed and exported. Until very recently, their last outbreak in the FMD-free zone was in 1957, and in the control area (along the border with the Kruger National Park in the east of the country) in 1983. In 1996 South Africa was accorded the status of having an FMD-free zone without vaccination by the World Organization for Animal Health (*Office International des Epizooties:* OIE). In 2000 and 2001 the country experienced three outbreaks of FMD, but these have been brought under control, and in May 2002 its OIE-recognised FMD-free zone status was reinstated.

The FMD-free zone in South Africa comprises almost the entire country. Adjacent to the infected zone of Kruger National Park, in Northern and Mpumalanga Provinces, there is a narrow vaccination zone in which twice-yearly vaccination with trivalent FMD vaccine is undertaken and surveillance is undertaken weekly. Occasional sero-monitoring is conducted to determine the immune status of herds. The areas bordering this zone, and those bordering Swaziland, Mozambique, Zimbabwe, and Botswana, are surveillance zones in which clinical surveillance is carried out every 14 days.

Active and passive surveillance is also carried out in the Kruger National Park to monitor the incidence of FMD in buffalo and impala. In FMD-free areas, routine disease surveillance activities are carried out.

The fences are clearly an important element of disease control, both in South Africa and elsewhere in the region. South Africa has a complicated system of fencing along its borders, which is regularly supervised and maintained. It is estimated that the annual personnel costs for this are 6.5 million rand (approximately US$ 600,000), and maintenance costs are between 6 and 8 million rand (DVS, Pretoria, personal communication). This does not include the capital investment in constructing fences.

In Botswana, as in South Africa, the main challenge is to maintain a functional separation between livestock and free-ranging buffalo. Fortunately, most livestock production is in the south of the country and areas containing buffalo are restricted to the Okavango Delta area in the north. Other areas in the north in which livestock are present are vaccination zones, and are separated from the southern FMD-free zone either by stock-free zones or a surveillance zone. In contrast to Zimbabwe, a large part of the FMD-free zone comprises communal grazing land, and 85% of meat exports are reportedly derived from this sector.

FMD control fences in the north of the country restrict the movement of buffalo. This has resulted in some conflict between livestock and conservation interests.

In Namibia commercial cattle production and livestock raising in communal areas are generally, but not entirely, geographically separated, with the northern communal areas being relatively undeveloped and supporting a large proportion of the Namibian population. The northern communal areas are separated from the southern commercial ranching areas by a veterinary cordon fence, which protects southern commercial farming areas from FMD and contagious bovine pleuropneumonia (CBPP). It establishes a zone north of the fence from which livestock and meat can be exported to South Africa and other markets, but not to the EU. Unfortunately the fence is also seen as a barrier to trade and development in the northern communal areas, as it largely divides the country socio-economically.

South of the veterinary cordon fence, the FMD-free zone is bordered by a surveillance zone. North of the fence most of the communal areas are designated a

buffer zone, with twice-yearly vaccination conducted in those areas considered at higher risk. Historically, Kunene has been free of FMD and no vaccination is conducted there. Caprivi Region in the east is designated an infected zone, principally because the presence of free-ranging buffalo renders it impracticable to eliminate the FMD virus in the area. Vaccination of livestock is also undertaken in the infected zone. The threat of FMD introduction into the buffer zone is both from Caprivi Region and from Angola to the north.

Namibia has certain geographical features that augment the infrastructural barriers to FMD. The Caprivi Strip infected zone is an eastward protrusion of the country separating Angola and Botswana, and separated from the buffer zone by the River Okavango. The buffer zone is a large section of the northern part of the country, extending along the Angolan border. FMD vaccination is carried out annually in this zone. It is bordered to the south by a surveillance zone, in which FMD vaccination is not permitted, and strict movement controls are enforced. A double stock- and game-proof fence separates the buffer zone from the surveillance zone, and there is also similar fencing down the eastern border with Botswana. There are seven official crossing-points on the northerly veterinary cordon fence, each manned 24 hours a day. FMD occurs irregularly in the infected zone: there have been outbreaks in 1991, 1994, and 2000. There was an outbreak in the buffer zone in 1993, the first there for 30 years.

To redress the imbalance of trading opportunities between the north and the south, the government would ultimately like to move the veterinary cordon fence to the Angolan border, excluding from the FMD-free area only Caprivi Region (FAO 1990). It is recognised, however, that this is not achievable in the short term, so other objectives are being pursued in the meantime to improve livestock marketing opportunities in the north. They include:

- Establishing an effective community animal health support strategy
- The development of new markets
- Minimising quarantine costs
- Improving infrastructure in the informal meat marketing system
- Improving livestock production extension services
- Encouraging the adoption of appropriate herd management practices
- Developing appropriate practices for environmental and rangeland management.

2.3.2 The control of FMD in Zimbabwe

Zimbabwe has a comprehensive series of control measures in place for the prevention and control of FMD in the country, and these are documented in detail in Appendix 2. They very much follow the principles adopted by the other meat-exporting countries of the region.

Over recent years, the capability of the DVS to maintain the previously established level of FMD control has clearly been reduced. In December 2000,

FMD Outbreak: August 2001–October 2002

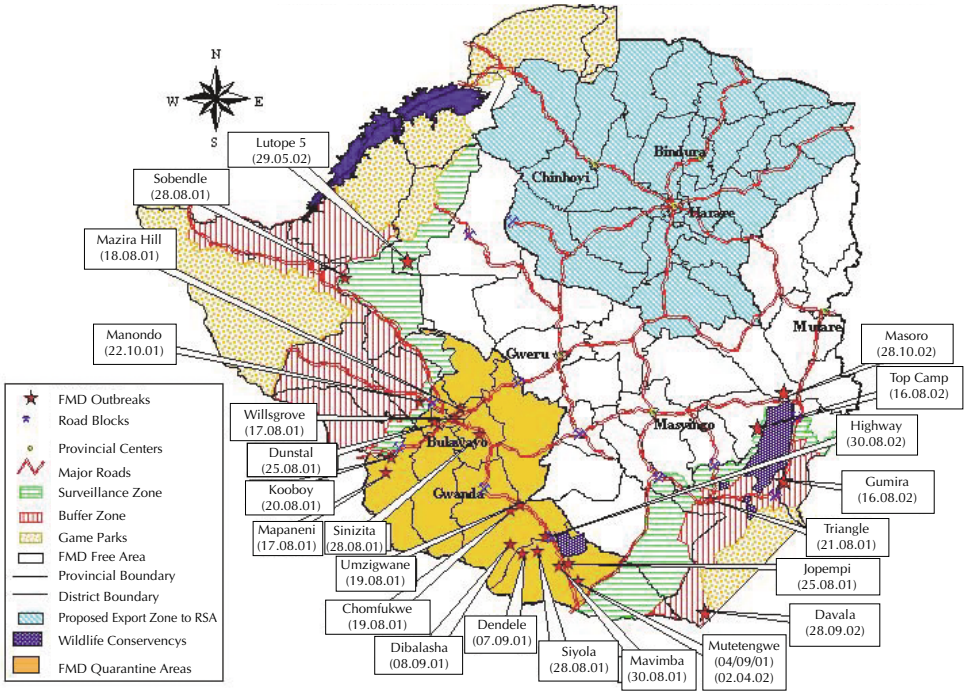

Figure 2.2 The distribution of recent cases of FMD in Zimbabwe (from the DVS website http://www.africaonline.co.zw/vet/fieldhtml/diseasecontrol.html)

there was a 30% staff vacancy rate in the department. In April 2002, 78% of departmental vehicles were reportedly out of service. Budget constraints are compounded by a shortage of foreign exchange, which is a particular problem for the purchase of FMD vaccine (mainly from Botswana). The result is that many livestock in the buffer zone have not been vaccinated for two years. Many fences have been vandalised and some have suffered a general deterioration, surveillance activities have been reduced, and there is an ever-increasing risk of illegal livestock movement. In common with other routine FMD control activities, financial stringencies have led to a reduction in regular inspections. In the commercial sector, only 1.5 inspections per farm were carried out in 1999. This frequency further decreased to 0.6 inspections per farm in 2000. In the communal areas only 7.7 inspections per dip-tank were conducted in 1999, while a slight increase to 8.9 inspections was recorded in 2000.

It is not unreasonable to conclude that the outbreaks in 2001 and 2002 (Figure 2.2) have been associated with these deficiencies and that, in the absence of a substantial increase in expenditure directed to FMD control, an increased incidence of FMD outbreaks is likely.

2.4 FMD control and access to international markets for meat and other livestock products

Much of the stimulus for effective control of FMD comes from the opportunities that recognised FMD freedom provides for the export of meat and other livestock products to high-priced markets in countries free of the disease. The requirements for such export are determined by negotiation between importing and exporting countries, but generally there is an increasing trend that they should meet the rules of the World Trade Organisation (WTO). For livestock and livestock products, these rules are contained in the Sanitary and Phytosanitary (SPS) Agreement of the WTO, and are determined by OIE. The different categories of FMD status, the FMD control and eradication procedures to achieve FMD-free status, and the implications for the export of meat are summarised in Table 2.1. The details are contained in the OIE International Animal Health Code, Chapter 2.1.1 (http://www.oie.int).

The FMD-free zones in Namibia, South Africa, and Swaziland meet OIE requirements for status category 4 in Table 2.1. It is anticipated that those in Botswana will regain their FMD-free status shortly. The FMD-free zone in Zimbabwe has never yet achieved recognition as such from OIE, although it has negotiated a meat export trade with the EU despite this. The lack of OIE recognition of Zimbabwe's FMD-free zone is stated to be due to the inadequacies of some of the boundaries with infected zones or infected neighbouring countries. Generally, the conditions of Zimbabwe's free zone have been considered to at least meet the requirements of an FMD-infected zone that has an official FMD control programme, although this requirement is addressed by means other than compulsory systematic vaccination of cattle.

Trading partners negotiate importation conditions that generally comply with OIE rules. The EU is the most important export market for beef from Namibia, Botswana, Swaziland, and Zimbabwe, taking advantage of their privileged access under the Cotonou Agreement for the African, Caribbean and Pacific (ACP) countries (see Section 1.5 and Chapter 4). The EU currently requires all of these countries to meet the conditions of export from FMD-free zones where vaccination is practised (status category 3 in Table 2.1), even though they are in fact FMD-free zones where vaccination is not practised (status category 4 in Table 2.1), and those of Namibia and Botswana (until the latter's recent temporary suspension) are recognised by OIE.

Outbreaks of FMD in 2001 and 2002 in the case study country Zimbabwe have resulted in the closure of the beef market to the EU. Zimbabwe has revised its export catchment zone to a smaller area in the north-east of the country, in which FMD has not been reported for many years, but it has not applied to the EU to export beef from this reduced zone. However, it is understood that it has entered into an agreement with Libya to export 5,000 tonnes of boneless beef per year from this reduced zone.

Table 2.1 Summary of OIE guidelines for meat export with respect to FMD status

	Status	Description of FMD control	Meat export requirements
1.	Infected country or zone with no FMD control	No official control programme (private vaccination may be undertaken to protect herds)	Export of processed (canned) product only to any country from an approved abattoir Ante- and post-mortem inspection Avoid FMD contamination of product
2.	Infected country or zone with official control programme	Compulsory systematic vaccination of cattle Cattle residency requirements Cattle sourced from areas with no FMD within 10 km for 30 days	Export of de-boned beef to FMD-clean or infected countries from an approved abattoir Ante- and post-mortem inspection Carcase maturation, removal of bone and lymph nodes
3.	FMD-free country or zone where vaccination is practised	Cattle vaccinated Effective disease surveillance and reporting No outbreak of FMD for 1-2 years	Residency requirements Slaughter at approved abattoir Export of de-boned beef to all markets Unrestricted meat export to infected markets or those with similar FMD virus strains Export of fresh pork and other meats from animals that have not been vaccinated
4.	FMD-free country or zone where vaccination is not practised	No vaccination permitted in free zone Free zone separated from others by surveillance zone or other barriers Measures to prevent FMD entry Effective disease surveillance & reporting No outbreak of FMD for 3 months	Residency requirements Slaughter at approved abattoir Unrestricted meat exports

2.5 The development of future FMD control scenarios for Zimbabwe for the purposes of benefit-cost analysis (BCA)

For the case study country of Zimbabwe, a BCA has been undertaken to evaluate the costs invested in or associated with FMD control, and compare them with the benefits attributable to different FMD control options. This has necessitated the development of a series of scenarios of future FMD control in the country.

The scenarios are based on varying assumptions about the level of FMD control implemented and the evolution of prices in export markets. With respect to FMD control, maintaining the *status quo* is compared with three other scenarios. The first assumes that the level of investment in FMD control remains unchanged, but the FMD-free zone is redefined and limited to the area of lowest risk in the north-eastern part of the country. The second is an optimistic scenario with increased investment in FMD control resulting in the creation of an OIE-recognised FMD-free zone. The third is a pessimistic scenario with relaxed control resulting in the spread of FMD in the country, and the loss of all export markets of boneless beef.

The scenarios were developed based on an analysis of different future options for FMD control in Zimbabwe, and the implications (epidemiological and economic) of these options. They are presented below.

Baseline FMD Control Scenario. In such an analysis, the choice of a baseline scenario can be critical since it becomes the standard for comparison for the other proposed scenarios. In the present instance, we assume that the baseline is represented by a continuation of the *status quo*, but in the dynamic times that Zimbabwe is experiencing, defining the *status quo* is not as simple as it sounds. This scenario assumes that beef exports resume in 2003[8] without any significant change in FMD control efforts,[9] and the FMD control zones return in 2003 to their pre-outbreak boundaries (as per Figure 2.3).

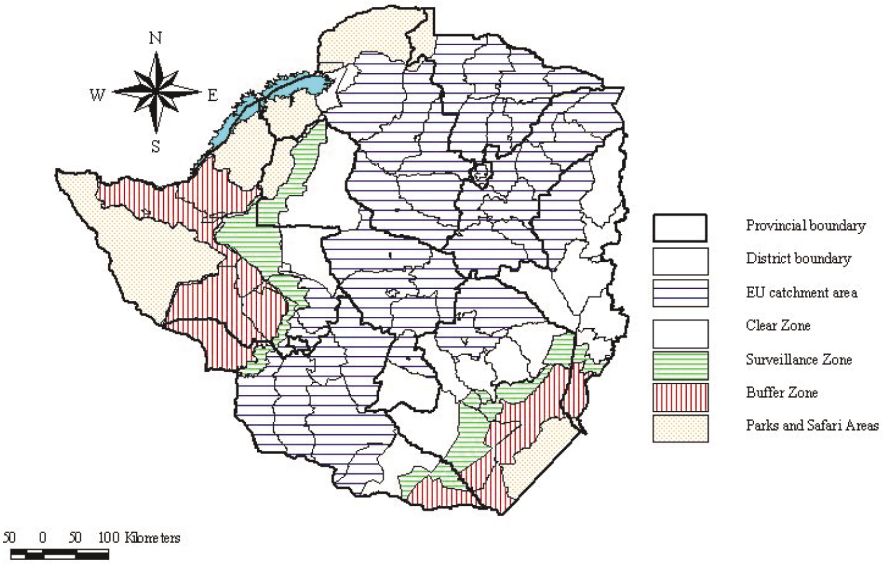

Figure 2.3. Location of catchment zone for beef export in the Baseline Scenario

[8]This date was arrived at from discussion with the DVS. It does not reflect official or unofficial estimates by the EU or other current or potential beef importers, and scenarios can be assessed by sensitivity analysis against a baseline that achieves this status at later dates.
[9]A *status quo* implies that there are no major additional investments. This was the presumption at the time these scenarios were developed based on the opinion of the DVS, but it was clearly acknowledged that certain limited strategic maintenance repairs to fences would be necessary.

It can be argued that the Baseline Scenario described above is unrealistic; importing countries, and in particular the EU, may not be willing to simply return to the pre-outbreak *status quo.* Alternative baseline scenarios could be proposed that would assume no change in current FMD control efforts, but entail the permanent loss of EU markets and possibly others. From this perspective, the selected Baseline Scenario is a conservative one in the sense that it does not allow for the added benefit of reopening lost export markets (since no export markets are lost) and so possibly underestimates the future benefits of improving FMD control. By the inclusion of sub-scenarios that evaluate different prices received for boneless beef exported, this scenario does include consideration that the resumed international trade may be to markets that do not offer the premium price that has been paid by the EU.[10]

FMD Control Scenario 1: reduced FMD-free zone. Historically, FMD outbreaks have tended to occur in the south of the country. Rather than attempt to improve FMD control to protect the security of the full FMD-free area in Figure 2.3, an alternative would be to simply reduce the FMD-free zone to the area in the north-eastern part of the country with a history of very low FMD risk and no outbreaks for over 10 years. The area in the south-west that has been part of the FMD-free zone in the past (the current quarantine zone) would be converted to a surveillance zone. This scenario would not imply any major change in the current level of control efforts or reduce the risk of outbreaks *vis-à-vis* the Baseline Scenario, but it is assumed that it would greatly reduce the risk of outbreaks occurring in areas that would trigger a suspension of trade. This is the current temporary *de facto* situation as depicted in Figure 2.4, though some areas along

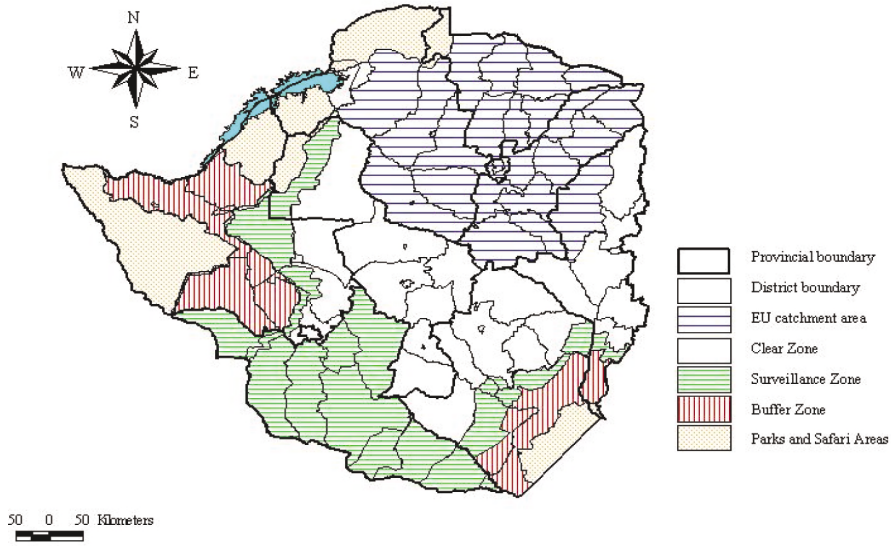

Figure 2.4 Reduced size catchment zone for beef export in Scenario 1

[10]See Chapter 4 for a full explanation. Three trade sub-scenarios are run for each of the FMD control scenarios to evaluate the impact that different prices received by Zimbabwe may have. These sub-scenarios are based on an analysis of future international trends in beef prices, and the evolution of the Cotonou Agreement.

the northern and eastern borders would need to be reclassified as infected buffer areas to ensure adequate protection from neighbouring countries.

Since there is no significant investment made under this scenario, BCA as such cannot be performed, so a simple comparison is made of the total costs of FMD associated with Scenario 1 *vis-à-vis* the Baseline Scenario, as well as the distributional impacts in terms of livestock marketing opportunities. This scenario portrays what might happen with beef exports planned for Libya and South Africa from a reduced export zone, and also for eventual restoration of an EU market from this catchment area only.

FMD Control Scenario 2: improved control. This is the optimistic scenario in which a substantial investment in fences and veterinary service infrastructure allows Zimbabwe to create effective and sustained buffers from all sources of infection, in particular buffalo populations, leading to international recognition of an FMD-free zone in the country (see Figure 2.5). FMD would be eliminated in the catchment zone, the size and location of which would be based on optimal disease security, cattle supply, and poverty impact factors. It is assumed that this status would be achieved in five years (i.e. by January 2007).

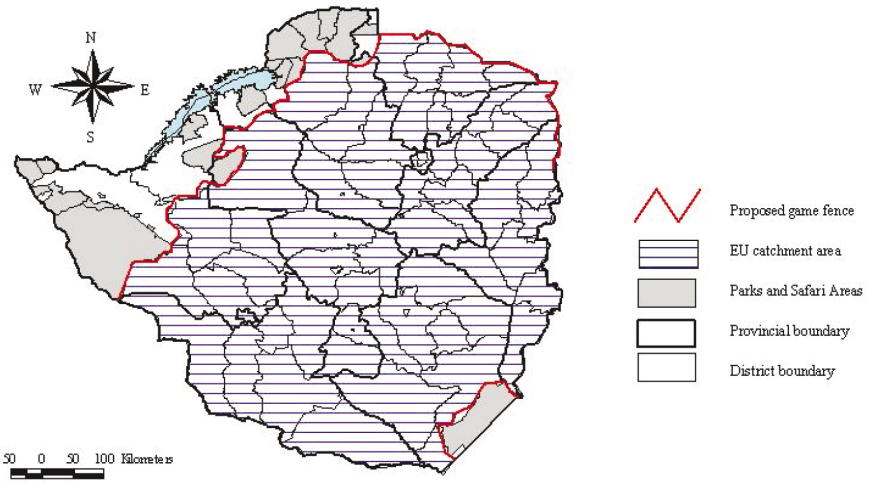

Figure 2.5 Expanded catchment zone for beef export in Scenario 2

FMD Control Scenario 3: relaxed control. This is the pessimistic scenario in which veterinary services to control FMD continue to decline, and the disease recurs in various zones. It assumes that as a result Zimbabwe loses all its export markets in boneless beef, and the disease becomes endemic. With higher disease risk, commercial livestock producers adopt regular vaccination of their herds, and public-supported vaccination continues in the current vaccination zones of particularly high risk, but at a reduced coverage. It is assumed that this occurs in two years (i.e. by January 2004).

These scenarios form the basis for the BCA in Zimbabwe, and they also represent a range of situations regarding the control and impact of FMD that could prevail in other countries.

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Chapter 3

Poverty, livestock, livelihoods, and foot and mouth disease (FMD) control in southern Africa

3.1 Introduction

The southern African region is among the more prosperous regions of Africa. The economies have been relatively stable, and the region has a relatively strong infrastructure, although the last few years have seen difficulties in some countries. Table 3.1 illustrates this point, showing that the annual growth in gross domestic product (GDP) over the final decade of the last century ranged from 1.9 to 4.4% for the countries in the region.

Table 3.1 Average annual growth in GDP (%) for the period 1990 to 1999 for selected countries of southern and eastern Africa. Source: World Bank 2001

	Botswana	Lesotho	Namibia	South Africa	Zimbabwe	Tanzania	Kenya
Average annual growth of GDP (%)	4.3	4.4	3.4	1.9	2.4	3.1	2.2

The region also has comparatively strong and active livestock industries, including good-quality—but often drought-prone—grazing land, plentiful and high-quality beef, strong sheep and goat industries, the major global share of the Angora goat market, and outstanding leather goods.

Despite the apparent relative strengths of the economies and livestock industries, the region has high levels of poverty. The data from the World Development Report 2000/2001 presented in Table 3.2 show that, of the southern African region countries listed, all but South Africa have higher proportions of the population earning less that US$ 1 per day than Kenya and Tanzania, for example.

It is this combination of relatively strong economies, successful livestock industries, and unacceptably high levels of poverty that provides the broader framework of this study.

This chapter, and the appendices supporting it, examine poverty in Zimbabwe, the case study country, and in the wider southern African region, and review the ways in which livestock contribute to the livelihoods of the poor. It then describes livestock marketing in the communal areas of Zimbabwe. The chapter goes on to provide a breakdown of different groups of poor livestock keepers and their livelihood strategies in relation to livestock, which helps put the different roles of

Table 3.2 Percentage of total population below the poverty line in selected countries of southern and eastern Africa. Source: Thornton et al. 2002

Poverty Indicator	Botswana	Lesotho	Namibia	South Africa	Zimbabwe	Tanzania	Kenya
Population below US$ 1 per day[a] (%)	33	43	35	12	36	20	27
Population below US$ 2 per day[b] (%)	61	66	56	36	64	60	62
Survey year	1985/86	1993	1993	1993	1990/91	1993	1994

[a]Estimated by the World Bank based on the median poverty line of the 10 countries with the lowest poverty line estimates (World Bank 2001).
[b]Estimated by the World Bank by doubling the US$ 1 poverty line, which reflects poverty lines used in lower-middle-income countries (World Bank 2001).

livestock for the poor in a national context. It provides an analysis of animal health problems, access to veterinary services, and the effects of FMD and FMD controls in the communal areas, both in and outside the export catchment zone. Finally, conclusions and policy implications are presented.

3.2 Methodological approach to the evaluation of poverty, livelihoods, and the links with livestock and FMD control

3.2.1 Livelihoods analysis

A livelihoods analysis was conducted to provide a qualitative and quantitative assessment of the direct and indirect impacts of FMD control on a cross-section of Zimbabwe's poor in the communal lands and resettlement areas. The central research question of the livelihoods component of this study is:

Who are the poor, how are their livelihoods organised around cattle and small stock, and to what extent do they benefit from investments in FMD controls?

The main objectives of the livelihoods study were therefore to:

- Identify different groups of poor people, why they are poor, and how their livelihoods are organised
- Identify their main livelihood strategies in relation to cattle and small stock
- Identify productive and quantifiable contributions of livestock to livelihoods, as well as those contributions that are not immediately recognised as economic
- Establish how the poor are engaged in marketing of cattle for domestic and export markets
- Identify the main opportunities and constraints in the marketing of cattle by the poor

- Evaluate the effects of FMD and its control on the livelihoods of the poor
- Establish whether veterinary services fulfil the needs of the poor, and discuss how those needs might be better addressed through an improved understanding of the ways in which livestock contribute to livelihoods.

Each of these analyses provides inputs to the benefit-cost analysis (BCA) of different FMD control scenarios.

3.2.2 Underlying methodological framework

Much has been written about poverty, its causes, its characteristics, and its measurement (see for example Henninger 1998; DFID 2000; World Bank 2001; Robinson 2002). In this study, poverty is taken to be multidimensional and to include not only measures of income and consumption, but also other indicators, such as the ability to make human capital investments (for example in education and health) and the ability to cope with shocks and stresses, also termed 'vulnerability'.[11] Vulnerability is a key component of poverty.

Livestock holdings have been taken as a primary indicator of poverty,[12] not only because livestock are central to this study, but also because livestock are an important indicator of these multidimensional aspects of poverty (See Appendix 3).

Case study methods are the most appropriate tools for investigating multidimensional aspects of poverty and livelihoods. They combine collection of quantitative and qualitative data of a localised nature. The poverty/livelihoods groups identified here have been drawn from prior case study research on livelihoods in Zimbabwe, including participatory research on poverty indicators (Scoones 1995a), as well as participatory research undertaken specifically for this study.

The challenge has been to integrate effectively localised findings into the broader level BCA, so that a fuller understanding of the poverty impacts of FMD and its controls can be assessed at the national level. This entailed drawing up a national poverty/livelihoods profile, scaling up the micro-level findings, and integrating them with existing macro-level data on livestock holdings (see Section 3.5 below).

The original research design envisaged primary data collection on the livelihoods of groups of poor people in three study areas in Zimbabwe, following Participatory Rural Appraisals (PRAs) in those areas. Unfortunately, constraints on travel associated with the elections in March 2002 meant that our research team

[11]Stresses are long-term trends that undermine livelihood potential, e.g. economic decline or environmental degradation, and shocks are sudden events impacting on livelihood security negatively, e.g. floods or outbreaks of FMD. Stresses and shocks are largely external and beyond the control of vulnerable people. However, there are shocks, such as the untimely death of a breadwinner, which stem directly from within the household.

[12]See Appendix 3A for a discussion of defining and measuring poverty in relation to livestock.

was only able to complete the survey in Matabeleland South, the site of the 2001 FMD outbreak. The poverty and livelihoods profile was therefore developed from this survey combined with a series of studies from secondary sources (summarised in Appendix 3C).

These studies were used to establish a profile of the livelihood strategies of different groups of poor people in relation to livestock throughout the communal and resettlement areas of the country. They allowed evaluation of differences in livelihoods across provinces and agro-ecological zones, within and outside the historical catchment areas for beef export. They also provided information about some of the main opportunities and constraints that the poor might face in relation to FMD controls and related policies, including their knowledge and experience of marketing meat for export.

The procedures for drawing up the livestock and livelihoods profiles were as follows. From the case studies, six different groups emerged (see Section 3.5 below). Each group exercised a distinct set of livelihood strategies in relation to livestock. Using household statistics from the communal and resettlement areas, the numbers and proportion of households in each group were identified. From these data, it was possible to evaluate the potential impacts of FMD controls on the livelihoods of different groups of poor people in both quantitative and qualitative terms, including whether and how the poor access animal health services; whether these are appropriate to their needs; and how the poor fare under existing livestock marketing arrangements.

Qualitative data emanating from the studies elaborate further on issues that cannot be captured in the BCA.

3.3 Poverty profile of Zimbabwe and the wider region of southern Africa

3.3.1 Poverty and vulnerability

A number of shocks and stresses have contributed to the vulnerability of many communal area farmers in Zimbabwe. The drought of 1992 left its mark on many cattle keepers in southern Zimbabwe. Between 1992 and 1993 the number of cattle in the smallholder sector fell by almost 25%, from 4,259,000 to 3,400,000 (Ministry of Lands and Agriculture 1996).[13] Despite restocking efforts by government, some areas in Masvingo Province have not fully recovered from the effects of this drought. This has resulted in a restructuring of people's livelihoods in relation to livestock, including an increase in the numbers of donkeys and small stock in some parts of Masvingo Province (Wolmer et al. 2002).

[13]The Zimbabwe Farmers' Union (ZFU) estimated that 1.5 million head of cattle perished in the droughts of 1991/92 and 1993/94. Government restocking exercises and other schemes provided only 18,000 head of cattle to ZFU's 20,000 members (ZFU 1999).

The economic crisis in Zimbabwe has further severely affected the lives of the poor. In 2001, inflation was hovering at around 50 to 60%, with 72% average fuel price increases (EIU 2001:23). By early 2002, the rate of inflation had reached 100%. Increasing costs of food, agricultural inputs, transport, and services such as health and education are putting a severe strain on the livelihoods of the poor. Health, educational, and extension service delivery is weakening due to budgetary constraints.

HIV/AIDS has compounded the limited capacity of rural people to respond to shocks and stresses. HIV/AIDS-related deaths escalated in the 1990s, reaching an estimated 200,000 in 2001, with the 25-40-year-old age group being the most affected (UNAIDS 2002).[14] This is leading to a decline in the quality and quantity of agricultural labour, and to new reproductive responsibilities being placed on the elderly. The financial costs of caring for the dying is shifting resources away from productive areas, increasing the vulnerability of the majority of smallholder farmers (Chimedza et al. 2001).

3.3.2 The distribution of poverty in Zimbabwe

Characterising the extent of poverty in Zimbabwe can be a confusing exercise given the range of different indicators used, the varying survey methodologies for generating the underlying data, and the rapidly changing context in the country. Most of this type of information comes from national consumption surveys conducted in the early and mid-1990s that have provided the comprehensive pictures of both the extent and distribution of poverty in Zimbabwe (Table 3.3). Clear patterns emerge from these survey results and related analyses (World Bank 1996; CSO 1998; Alwang et al. 2002).[15]

- A significant proportion of Zimbabweans are poor, and that proportion has been growing dramatically since the early 1990s.

Alwang et al. (2002) have re-analysed the data from 1990/91 and 1995/96 national income, consumption, and expenditure surveys (ICES 2 and ICES 3 in the tables), providing the only comparable results across the two surveys (Table 3.4). They report that 26% of all Zimbabweans were in households that fell under the total consumption poverty line in 1990, and that this proportion increased by over a third to 35% only five years later.[16] Given Zimbabwe's economic problems, there is every reason to believe that this trend of increasing poverty has continued.

[14]Prevalence of HIV/AIDS among adults (aged 15-49) is currently estimated at 33.7%. Surveys of antenatal clinics have found particularly high prevalence in the commercial farming areas (44%) and in growth points within rural areas (38%) (UNAIDS 2002).
[15]The patterns cited in this section are based on those described in World Bank (1996).
[16]A comparison of the results reported by Alwang et al. (2002) and those for ICES 3 in Table 3.3 provide an example of the confusion in poverty figures for Zimbabwe. Whereas Alwang et al. (2002) report a national poverty rate of 35%, CSO (1998) reports an estimate of 63%, over twice as large, for the same indicator and based on the same data.

Table 3.3 Poverty indicators for Zimbabwe 1990—1996, by sector

Survey	Sector	Prevalence (%) of HHs		Poverty gap index[c]	Poverty severity index[d]	Distribution (%) of	
		Poor[a]	Very poor[b]			Poor	Very poor
ICES[e] 2 (1990/91; 14,000 HHs)	All	25	7	-	-	100	100
	Rural	31	9	-	-	88	92
	Urban	10	2	-	-	12	8
PASS[f] (8-11/95; 18,797 HHs)	All	61	45	-	-	-	-
	Rural	75	60	-	-	-	-
	Urban	39	21	-	-	-	-
ICES 3 (7/95-6/96; 17,555 HHs)	All	63	36	47	27	100	100
	Rural	76	50	51	31	76	89
	Urban	41	10	35	17	24	11

Notes:
[a]Poor households are defined as those with consumption expenditures that fall below the total consumption poverty line estimated for Zimbabwe as explained in CSO 1998.
[b]Very poor households are defined as those with consumption expenditures that fall below the food poverty line estimated for Zimbabwe as explained in CSO 1998.
[c]The poverty gap index is a measure of the 'depth' of poverty based on the aggregate poverty deficit of the poor relative to the poverty line.
[d]The poverty severity index captures the inequalities among the poor. It is the square of the coefficient of variation of expenditure distribution below the poverty line. The poverty gap and severity indexes are the Foster, Greer, and Thorbecke α=1 and α=2 measures, respectively (CSO 1998).
[e]Income, consumption, and expenditure survey.
[f]Poverty Assessment Study Survey.

Sources:
ICES 2: World Bank 1996, Table 2.1
PASS: Sehlin and Bodin 1997, Appendix 2, Table 4.2.
ICES 3: CSO 1998, Table 2.2.1

- Poverty in Zimbabwe remains predominantly rural, though urban poverty has been increasing at a much faster rate in recent years.

In 1995, the rural poverty rate was an estimated 48% *versus* a much lower 8% for urban populations (Table 3.4). As a result, well over three-quarters of the poor in Zimbabwe are found in the rural areas.

- Poverty is most prevalent in communal and resettlement areas.

Within the rural population, those located in resettlement areas have displayed the highest poverty rates, followed by communal lands households. The commercial farm sectors tend to exhibit much lower rates, although there appears to be a higher degree of inequity among these households, and many are in fact more vulnerable than the landed households in the communal and resettlement areas.

Table 3.4 Poverty indicators for Zimbabwe 1990-1995, by sector. Source: Alwang et al. 2002.

Survey	Sector	Prevalence (%) of poor[a]	Poverty gap index[b]	Poverty severity index[b]
ICES[c] 2	All	25.8	8.8	4.2
	Rural	35.8	12.4	5.9
	Urban	3.4	0.8	0.3
ICES 3	All	34.9	11.8	5.4
	Rural	48.0	16.6	7.7
	Urban	7.9	1.9	0.7
Percent change from 1990 to 1995	All	35.4	34.0	29.4
	Rural	34.1	33.9	30.1
	Urban	133.2	144.9	150.0

[a]Percentage of people in households whose consumption expenditures per capita fall below the poverty line as a proportion of total population.
[b]See definition in notes in preceding Table 3.3.
[c]Income, consumption, and expenditure survey.

- Poverty is more concentrated in the drier provinces.

The driest regions—Matebeleland North, Matebeleland South, and Masvingo—exhibit among the highest provincial poverty rates in both income, consumption and expenditure surveys (ICES). These are also the regions with the highest shares of the disadvantageous FMD control zones.

The majority of Zimbabwe's poor live in the communal areas, which are characterised by marked social and economic differentiation (Cousins 1989; Jackson 1989; Scoones 1995a; Scoones et al. 1996; Cavendish 1999). Although these areas suffer from a general shortage of land both for communal grazing and for crop production, the distribution of land for crop production is not considered a significant factor in accounting for social differences in the communal areas (CSO 1998).

More significant than the size of landholdings is the actual extent of areas under cultivation, which points to the strong correlation between crop production and direct access to draught power (Barrett 1992; Scoones 1995a; Wolmer et al. 2002).

Existing material (Scoones 1995a; and case studies presented in Appendix 3C) shows that key indicators of poverty and wealth within the communal areas are:

- Cash incomes (off-farm and urban remittances).
- Ownership of cattle and other draught animals; in most areas, ownership of draught animals is also positively correlated with ownership of greater numbers of other types of livestock.

- Ownership of equipment, especially ploughs and scotch-carts.
- Output from crop production.
- Human capital (principally through investments in both health and education).
- Access to markets, health services, vet services, schools.

3.3.3 Gender dimensions of poverty in relation to livestock

Existing data show that female-headed households are generally poorer than male-headed households, and that a larger proportion of rural households are female-headed than are urban households (CSO 1998; Hamdok 1999). Their restricted access to assets, particularly to draught animals, is a critical factor in explaining the poverty of female-headed households in communal areas (see case studies in Appendix 3C).

Gender interests in livestock vary across the region. Men generally own more cattle and dominate in the general management of cattle acquisition, use, and disposal. However, women are not excluded from this.[17] In many households, women own and manage their own flock of goats. Goats constitute the largest number of small ruminants, with over 97% of them found in the smallholder sector (see Table 3.6). People generally acquire goats through purchase, reproduction, and marriage-related cultural practices. Women normally purchase goats using their private income from sales of poultry products and special crops, such as groundnuts and sweet potatoes (Kusina and Kusina 1999).

Women often take the lead role in poultry keeping. Chickens provide meat, as well as manure, which is increasingly used in vegetable gardening (Wolmer et al. 2002). They also provide eggs for consumption and for sale, raising small amounts of cash for household needs. Chickens, like cattle, also play cultural roles (Kusina and Kusina 1999, 2000).

3.3.4 Poverty in the communal areas of Zimbabwe, Namibia, and Botswana

Table 3.5 presents estimates from Thornton et al. (2002) of the number of rural poor in the Southern African Development Community (SADC) region by livestock

[17]For example, in Matabeleland South (Beitbridge) in Zimbabwe, a PRA conducted in January 2002 found that Venda women were dominant at auctions. This contrasted with the dominance of men in Matabeleland North. Elsewhere, older women with married daughters own cattle that are part of their daughters' *lobola* (brideprice). These animals go directly to the mother and are never viewed as a family asset, but rather as her individual asset. These cattle (which are reproducing females) are paid to mothers by sons-in-law as a gesture of gratitude for mothers' central role in the reproduction of wives, and are known as *mombe dzoumai* in Shona ('cattle for motherhood'). They cannot be passed on to the husband or children in the event of the owner's death. They revert to her natal family. If these cows die before they reproduce, they have to be replaced. This replacement is mandatory, particularly following the death of the original owner.

Table 3.5 SADC numbers of rural poor by country and livestock production system. Source: World Bank 2001[a]; Thornton et al. 2002

Country	Rural poor[b] %	Livestock systems[c]						Other	Total rural poor	Total population
		Livestock only, rangeland based Total	Mixed irrigated Total	Mixed rainfed Total	Mixed rainfed Arid/ Semi-arid	Mixed rainfed Humid/ Semi-humid	Mixed rainfed Highland/ Temperate			
Angola	45.0*	984,940		2,359,069	587,587	977,252	794,230	2,444,831	5,788,840	12,864,090
Botswana	45.0*	267,912		292,624	292,624		4,735	565,271	1,256,159	
Democratic Rep. of Congo	45.0*	860,084		11,302,798	519,788	8,210,369	2,572,641	11,251,915	23,414,797	52,032,883
Lesotho	53.9	93,629		1,094,643	29,423		1,065,220	375	1,188,647	2,205,283
Malawi	45.0*	75,859		4,175,905	3,112,599	830,720	232,586	588,230	4,839,994	10,755,545
Mozambique	45.0*	642,943		5,009,446	3,224,031	1,762,839	22,576	2,453,461	8,105,850	18,012,999
Namibia	45.0*	424,764		298,249	298,202	47		62,440	785,453	1,745,450
South Africa	45.0*	2,862,925	1,343,480	11,683,520	4,696,472	1,730,103	5,256,945	1,580,903	17,470,828	38,824,066
Swaziland	45.0*	12,888		339,490	169,159	82,043	88,288	104,165	456,543	1,014,541
Tanzania	45.0*	407,321		10,799,807	3,038,328	6,124,770	1,636,709	3,614,916	14,822,044	32,937,874
Zambia	88.0	1,138,955		6,102,340	5,917,638	108,017	76,685	833,992	8,075,287	9,176,462
Zimbabwe	31.0	228,301		3,058,023	2,347,902	37,620	672,501	277,206	3,563,530	11,495,261
System totals		8,000,521	1,343,480	56,515,914	24,233,753	19,863,780	12,418,381	23,217,169	89,077,084	192,320,613
Percent of SADC rural poor		9.0%	1.5%	63.4%	27.2%	22.3%	13.9%	26.1%	100.0%	

Notes:

*Estimates based on the weighted average poverty rate (Pwi) for each region as below: Pwi=Sum(Poverty Rate (Pi)*Population (popi))/Sum(popi).

[a]Missing data for Mauritius and the Seychelles.

[b]World Bank 2001.

[c]See Thornton et al. 2002 for a detailed account of the livestock production classification system.

production system based on yet a different poverty measure compiled by the World Bank from national poverty rate estimates. Country-specific rural poverty rates are lacking for a number of the countries in the region, and for these countries, Thornton et al. (2002) have used weighted averages from the rest of the continent. Though probably overestimated, these numbers indicate that much of the rural poverty in Zimbabwe, and in the region more generally, is found in agro-pastoral systems (mixed livestock/crop rainfed), especially in drier ecological zones. For the other beef-exporting countries of Botswana and Namibia, nearly all rural poverty is found in the pastoralist (livestock only, rangeland based) and arid/semi-arid agro-pastoral (mixed livestock/crop rainfed) systems, which characterise the communal areas in those countries.

According to Table 3.2, the other beef-exporting countries of Namibia and Botswana have national poverty rates (based on the US$ 1 per day measure) comparable to those of Zimbabwe.[18] As suggested by the preceding paragraph, much of the poverty in the other two countries appears to be concentrated in their communal areas, as we have seen is the case for Zimbabwe. In the northern communal areas of Namibia, 37% of households were said to spend more than 60% of their income on food, a strong indicator of poverty. The inequality in distribution of wealth within Namibia between the poorest behind the veterinary cordon fence in the north, and their wealthier counterparts to the south, is one of the highest in the world (Vigne and Whiteside 1997). In Botswana, roughly 47% of the rural population are considered to be living in poverty (Whiteside 1997:12).

Thus, in Zimbabwe, Namibia, and Botswana, many of the poorest are found in the so-called communal areas, in which they combine livestock keeping and arable farming in some of the driest and most inhospitable conditions in southern Africa. The main constraints on their livelihoods are unfavourable climatic and agro-ecological conditions, lack of services (notably for human and animal health), poor access to affordable transport, and poorly developed off-farm economic opportunities, including limited opportunities for rural investment (see below and case studies in Appendix 3C.

In Botswana and Namibia, the communal areas tend to be concentrated in large blocks outside the main catchment area for beef exports to the European Union (EU). In Zimbabwe, communal farming and resettlement areas are scattered throughout the country, although the majority lie outside the catchment area for beef exports.

[18]The poverty rate for Zimbabwe presented in Table 3.2 is based on the 1990/91 ICES data. Given the dramatic increase in poverty in Zimbabwe since then (see Tables 3.3 and 3.4), and the reasonable economic growth achieved in the other countries, it is likely that the poverty rate for Zimbabwe is now substantially higher than those for Namibia and Botswana.

3.3.5 Poverty and livestock holdings in Zimbabwe

Smallholder farmers own over 68% of all cattle, 98% of goats, 84% of sheep, and 60% of pigs in Zimbabwe. There is a variety of poultry found in the smallholder sector that includes ducks, turkeys, guineafowl, and pigeons, but chickens are the most abundant. Almost every rural household, including the very poor, owns some chickens. Matabeleland South Province has the largest donkey population, accounting for about 35% of the nation's donkeys (Agrisystems 2000) and the highest goat population in the country.

Although goats significantly outnumber cattle in the communal area households of many areas of the country, this is not the case in the high rainfall, high population density areas of Mashonaland East, West, and Central (Table 3.6).

Table 3.7 presents data on cattle ownership and distribution across smallholder farming households by province. From these data it is clear that smallholder farmers in Masvingo Province are the most disadvantaged in terms of access to cattle. While over 68% of households did not hold cattle at all in 1997, those that did had small herds relative to other provinces. There was not a single smallholder farmer who owned 16 cattle or more. The effects of the drought of 1991/92 largely explain the high number of households with no cattle and the relatively small per capita herd size for households. In south-east Masvingo a cattle population of 57,000 was reduced to about 2,300. It has since recovered to almost half of the original number, with assistance from a number of restocking programmes (Agrisystems 2000).

Mashonaland West, which largely falls under natural regions II and III, is the high rainfall province that has a large cattle population and relatively large herd sizes per household. As shown in Table 3.7, in 1997 approximately 96% of households owned cattle—the highest proportion of all the provinces—and 14% of its smallholder farming households owned 16 cattle or more. This province also had three of its six districts falling into the category with the least poverty, while only one of the remaining three districts was classified in those with the most severe poverty. These findings suggest a positive correlation between cattle ownership and wealth.

Midlands Province, which has the largest cattle population, also has high cattle ownership (94% of households). About 54% of households have herd sizes ranging from 6 to 15 cattle while 13% of households owned more than 15 cattle. Again, there appears to be a positive correlation at provincial level between livestock ownership and wealth.

Table 3.6 Numbers of livestock by year, by province and land tenure system in Zimbabwe. Source: CSO 2000

Species, tenure type, and date	Manicaland	Mash. Central	Mash. East	Mash. West	Mat. North	Mat. South	Midlands	Masvingo	Total
CATTLE									
LSC[a] (1999)	70,596	120,101	240,402	315,560	70,346	189,356	199,050	134,816	1,340,227
SSC[b] (1997)	12,49	21,458	59,069	31,550	3,094	12,061	15,408	29,896	185,013
Resettlement (1997)	61,157	25,259	54,407	46,513	16,194	21,162	62,719	34,276	323,607
Communal (1998)	568,936	336,540	563,418	287,864	420,422	392,918	604,415	403,568	3,588,081
SHEEP									
LSC (1999)	6,376	6,505	7,237	17,559	3,925	9,010	4,645	4,689	59,946
SSC (1997)	936	2,384	2,933	2,815	44	2,006	1,240	3,118	15,476
Resettlement (1997)	2,196	1,659	1,812	2,351	327	1,938	2,495	1,543	14,321
Communal (1998)	48,493	16,730	13,653	12,576	21,227	93,396	16,642	32,655	259,372
GOAT									
LSC (1999)	1,800	1,461	2,120	5,293	2,109	5,182	3,324	2,994	24,283
SSC (1997)	7,763	5,055	10,527	9,088	2,108	7,068	5,470	16,172	62,981
Resettlement (1997)	30,711	4,634	11,565	23,405	7,047	15,766	28,250	23,842	145,220
Communal (1998)	748,566	210,732	339,230	264,511	503,016	1,157,027	614,529	718,812	4,556,483
PIG									
LSC (1999)	2,187	14,469	31,820	38,173	11,955	706	3,317	1,514	104,141
SSC (1997)	1,248	462	1,885	707	17	81	196	433	5,029
Resettlement (1997)	850	121	886	1,059	463	401	765	1,285	5,830
Communal (1998)	27,302	13,416	16,441	38,508	10,751	3,262	53,243	29,060	191,983

[a]LSC = Large-scale commercial
[b]SSC = Small-scale commercial

Table 3.7 Cattle holdings in communal and resettlement areas of Zimbabwe. Source: Zhou 1997

PROVINCE	No. of households with no cattle	% (no.) of households with 1-5 cattle	% (no.) of households with 6-10 cattle	% (no.) of households with 11-15 cattle	% (no.) of households with 16+ cattle	% (no.) of households
Manicaland	284,385	16.3% (46,355)	62.5% (177,740)	21.2% (60,290)	0	0
Mashonaland Central	136,216	16.5% (22,475)	44.3% (60,344)	27.8% (37,868)	8.9% (12,124)	2.5% (3,405)
Mashonaland East	191,057	15.4% (29,423)	30.8% (58,845)	28.5% (54,452)	15.4% (29,422)	9.9% (18,915)
Mashonaland West	118,229	4.2% (4,965)	45.2% (53,440)	28.0% (33,105)	8.6% (10,167)	14.0% (16,552)
Masvingo	236,218	68.5% (161,810)	18.0% (42,519)	10.1% (23,858)	3.4% (8,031)	0
Matabeleland North	107,858	35.8% (38,613)	29.6% (31,926)	18.6% (20,062)	7.5% (8,090)	8.5% (9,167)
Matabeleland South	108,098	19.4% (20,972)	17.2% (18,592)	25.8% (27,890)	16.1% (17,403)	21.5% (23,241)
Midlands	214,628	5.8% (12,449)	27.2% (58,379)	33.0% (70,827)	21.4% (45,930)	12.6% (27,043)
Total % (no.) of households	1,396,689	24.1% (337,062)	36.0% (501,785)	23.5% (328,352)	9.4% (131,167)	7% (98,323)

Note: Province-level household numbers were estimated based on an allocation of the projected 2002 district-level human populations by sector (communal and resettlement) using the 1995 numbers of households by district and sector in each province, together with the 1995 average household size in each sector by province.'

3.4 Poverty and livestock marketing in the communal areas of Zimbabwe

3.4.1 The marketing of cattle

Since cattle are more highly valued for their multiple functions than for the cash they can realise, cattle offtake rates for sale in the communal areas are not high. They have been estimated to be between 1 and 3%, rising to between 6 and 8% in some areas of Zimbabwe (Sandford 1982; Cousins 1989; Barrett 1992; Scoones 1992), and between 3 and 7% in neighbouring Zambia (Perry et al. 1984), while those in the commercial sector of Zimbabwe are much higher, at between 15 and 26% (Cousins 1989; Barrett 1992). In 1987, Scoones found that 45% of sales were for raising money to pay school fees. Most sales were of oxen from larger herds, and most of these were nearing the end of their productive working life (Scoones 1992).

There is a major contrast in cattle marketing between the smallholder and large-scale commercial (LSC) sectors. While livestock from the commercial farming sector are marketed through a well-organised system of auctions in which market information is readily available, marketing in the smallholder sector is somewhat fragmented and less organised.[19] Communal farmers have a number of options for marketing cattle. They can sell at the formal sales pens, to local butchers, to local people, or to buyers who come to the communal areas to make purchases (Sandford 1982; PRA interviews Matabeleland South and Manicaland 2002). Sales of goats, sheep, and chickens are more likely to occur locally and on an informal basis. The main way for cattle to be marketed from the smallholder sector is through commercial sales operated by auctioneers at the formal sales pens. Some estimates suggest that 10 to 20% of cattle at commercial sales come from the smallholder sector (Agrisystems 2000). Prices offered at the communal area cattle sales are significantly lower than those offered at commercial sector cattle sales. Differences of 25 to 30% seem to be common between prices paid for slaughter cattle from the smallholder sector and those from LSC areas (Agrisystems 2000). It is argued by auctioneers that this is due to the lower weight and quality of animals sold from the communal sector.[20]

The following observations suggest that communal livestock keepers cannot compete on equal terms in the market:

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[19] Livestock sales pens formerly operated by the Cold Storage Company (CSC) have been taken over in some communal areas by the Livestock Development Trust (LDT). In the two provinces of Matabeleland, they have been taken over by rural district councils (RDCs) primarily because they are a valuable source of revenue.

[20] During the PRA conducted in Beitbridge, a comparison of two sales in the two subsectors during the same period was observed, revealing differences of up to 35%. The differences in the quality of animals from the commercial sector and those from the smallholder sector were reportedly not significant. Some smallholder farmers who were able to take their animals to commercial sales reported doubling their prices.

- In Matabeleland South, livestock keepers lacked information about export markets and prices.[21] Commercial producers buy up quality stock from communal farmers at lower than market rates for their own feeder programmes.
- Communal farmers often need to make quick sales, sometimes in desperate circumstances. This limits their bargaining power.
- There is evidence of price fixing at auctions in the communal areas; the small numbers of buyers are able to collude to keep prices low.
- Access to markets is not evenly distributed around the country. Transport costs to reach markets are significant in some more remote areas, and are borne by the seller, a difficulty encountered in the remote areas of Matabeleland North (SCF 2001).

Informal markets also exist for cattle. However, in PRA interviews, farmers from Matabeleland North and South and Manicaland said that they achieved higher prices from the formal market than from the informal market. They also receive full cash payment on the day of the sale. In response to the needs of smallholder farmers, most cattle sales are timed to coincide with the beginning of school terms, which are the peak selling periods.[22] While informal sales bring in lower returns, they are more responsive to the often urgent needs of many smallholders. Informal sales are normally direct from the livestock keeper to the buyer. This tends to keep transaction costs to a minimum, unless a difficulty is encountered in collecting payments. This does not necessarily pose a problem, as buyers and sellers often belong to the same clan or are members of the same community, and therefore peer pressure prevails. However, due to increasing pressures from shocks and stresses, such as the impacts of HIV/AIDS and the economic decline, the risks involved in recovering payments are increasing.

3.4.2 The marketing of small stock

One of the important functions of the large goat population is to raise cash for smaller expenses than those required from the sale of cattle. Normally the periodic needs of smallholders are not large enough to require the proceeds from a whole bovine animal. Peak periods for goat sales are associated with specific demands for cash. The months during which school terms start (January, May, and September), when parents are mobilising funds for school fees, are relatively busy goat-trading times. In October, when farmers are buying agricultural inputs, goat sales also go up (Kusina and Kusina 2000).

[21]Results from a survey conducted in Matabeleland South in 2002, summarised in Appendix 3C.
[22]Despite this, a number of informal cattle sales take place between households. Many transactions are made on behalf of those who are absent in wage employment. These cattle are put under the custodianship of the household head, who normally has decision-making power in terms of their use as draught animals. Many parents with sons in wage employment encourage them to buy cattle. It is quite common to find homesteads where none of the residents owns cattle but where cattle are kept on behalf of offspring or relatives.

The marketing of goats and sheep in the smallholder sector is not as organised as the marketing of cattle. Organised sales are largely confined to the southern and south-western parts of the country, in Matabeleland and Masvingo Provinces. Elsewhere, traders buy directly from producers, using buyers in the field and then moving the purchased stock to the main centres for slaughter or export. It is difficult to measure offtake rates of goats, given the localised nature of many sales.[23]

Private abattoirs currently dominate the slaughter of goats and sheep. Sheep meat is a luxury high-priced product supplied to the hotel and restaurant trade and to some supermarkets serving the urban low-density areas. Goat meat is mainly sold through supermarkets in the urban high-density areas. There is a live export trade of about 10,000 goats per year, dominated by smallholder producers (Agrisystems 2000).

3.4.3 Comparisons with Botswana and Namibia

Case studies from Namibia and Botswana show important similarities and differences when compared with the Zimbabwe case (see case studies in Appendix 3). In the more remote areas of the northern communal areas of Namibia, the degree of integration into the cash economy and wider markets is significantly lower than in Zimbabwe. Livestock is the main source of income in these areas—large stock for the more wealthy and poultry for the poor. In the North Central Region market integration is much higher, but here households are heavily dependent on remittances and do not have diversified livelihood options. Livestock sales here are important for operating in the cash economy. In one area, where there has been heavy investment in marketing structures, offtake rates of up to 15% have been reported (Meat Corporation of Namibia, unpublished).

As in Zimbabwe, animals from the communal areas are usually marketed in Namibia when they are old and in poor body condition. Access to markets is not evenly distributed around the country and transaction costs, such as transportation and quarantine, are high and passed on to the communal farmer, who is frequently dissatisfied with prices (FAO 2000).

In Botswana, 80% of export beef reportedly comes from the communal areas (Department of Veterinary Services (DVS), unpublished), though it is unclear from which section of the communal farming population it is mainly derived. Offtake rates are estimated at 8% in the traditional sector and 17% in the commercial sector (Oarabile 1994). As in both Zimbabwe and Namibia, the poor cattle keepers do not appear to benefit directly from increased prices for beef under existing

[23]A study from Masvingo found that actual offtake rates (sales only) for goats were 14% in 1987 (Scoones 1992:348). This contrasts sharply with estimated levels of offtake in 2000, which were estimated to be less than 2% per annum (Agrisystems 2000). This discrepancy may be explained by the very localised nature of goat sales, which are only captured by micro-level studies.

export policy (Whiteside 1997:6). The price paid to communal farmers for their cattle by the Botswana Meat Commission (BMC) is substantially lower than the average BMC price, reflecting the different quality and age of animals sold (Arntzen 1998:11). According to one source, the BMC overvalues high-grade animals and undervalues the lower grades. The higher grades (super and grade 1) are 19 and 9% overpaid while the lower grades (3 and 4) are underpaid by 8 and 10% respectively. This pricing policy is an attempt to improve beef quality but constitutes a cross-subsidisation of large farmers by smaller ones (Fidzani et al. 1996, cited by Arntzen 1998:11). As in Namibia and Botswana, the communal farmer is at a significant disadvantage when marketing cattle. Recent price analysis for Zimbabwe reported in Chapter 5 suggests that poor livestock keepers may nonetheless benefit indirectly to some degree from the more general upward pressure on cattle prices associated with the export trade.

3.5 Livestock keepers and their livelihood strategies in Zimbabwe

Livestock contribute to the livelihoods of the poor in multiple ways in the southern African region. Conventionally, these contributions have been measured in terms of productive outputs, such as meat, milk, and commercial production through breeding, and inputs to farming, such as use of manure and animal traction.

The economic values accrued from less directly productive functions or social functions of livestock, such as social networking and wealth storing, have often been downplayed in terms of their contributions to livelihoods because they are not easily measurable (Scoones 1992). These functions often provide security for poor households and can be as important as productive functions, as this and other studies show (e.g. Ferguson 1994).

Cattle are the most multifunctional of livestock, as they provide for all these functions. They generate incomes in many ways, and provide households with the means to make different kinds of investments. As a result, it is frequently wealthier households who are cattle owners. Small livestock are also multifunctional, though to a lesser extent than cattle. Goats provide meat, manure, and milk, but clearly do not have the power of large stock for traction purposes. Chickens provide meat and eggs, and their manure is also used on small horticultural plots. The sales of goats and chickens and their products are an important source of income with which to purchase household needs, with goats being used to pay school fees (see case studies in Appendix 3C and below). Most importantly perhaps, small ruminants and chickens also provide a critical wealth-storing function in the absence of cattle, and may also be used to store wealth in order to trade up for cattle. The wealth-storing role of goats and chickens has been documented in areas where the majority of households also own cattle (e.g. Kusina et al. 1998; Kusina and Kusina 1999).

3.5.1 A categorisation of livelihoods and livestock

In order to answer the livelihoods questions raised by the study, and in particular to integrate the livelihoods issues into the different FMD control scenarios of the BCA, a countrywide understanding of the livestock holdings and livelihood strategies of different groups of people in the communal areas of Zimbabwe was required.[24]

There are limited disaggregated data on the livestock holdings of different groups of poor people, in particular the distribution of small stock. Table 3.8 summarises findings from a number of small studies presented in Appendix 3C carried out between 1996/7 and 2001. Using cattle holding data from Zhou (1997) (Table 3.7), estimated population shares in each income category of each province were calculated and are also presented in Table 3.8.[25]

Table 3.8 shows that livestock distributions are very different among different groups of poor people around the country. The findings also tend to confirm that ownership of cattle and other draught animals is strongly correlated with ownership of other types of livestock (see also Wolmer et al. 2002).

The next stage in compiling the countrywide livelihoods profile was to summarise the ways in which different groups of people structure and organise their livelihoods around their livestock holdings, and the different strategies that they pursue in order to fulfil their livelihood goals in different agro-ecological and economic (and potential meat export) zones around the country. From material presented in Appendix 3C, six categories of people were identified by level of poverty and livelihood strategy:

- Group 1: Small stock accumulators, unable to acquire cattle, crop production severely constrained by inadequate access to draught animals (in and outside the historical catchment zone for meat exports)
- Group 2: Small-stock accumulators in low rainfall areas, unable to acquire cattle, can access draught animals (outside historical catchment zone for meat exports)

[24] For a review of case studies from Botswana and Namibia, see Appendix 3D.

[25] In order to compile this livelihoods profile of Zimbabwe, it has been necessary at times to make generalisations and draw certain kinds of conclusions that are indicated by existing data but may not be fully supported by it. In Table 3.8, the figures on small stock are mainly sourced from 1997/98 and 2001 micro-studies presented in Appendix 3C (Mathys 2001; SCF 2001; Wolmer et al. 2002; and survey material from this study). In order to scale up figures on small stock ownership across different types of households from the case studies to the national level, we have assumed that the proportions of people owning small stock is lower among poor households and higher among wealthier households. The macro data on cattle holdings is sourced from provincial figures from 1997 (Zhou 1997; Table 3.7). The 1997 macro-statistics on cattle holdings are generally consistent with micro-level findings from the same year and 2001 (see case studies in Appendix 3). Further, the relationship between cattle and goat holdings by household are also consistent at a very general level with aggregate provincial statistics on cattle and goat numbers by province (Table 3.6).

Table 3.8 Livestock holdings by wealth category in Zimbabwe's communal areas

HH wealth category	Cattle	Donkeys	Goats (Sheep)	Chickens
Masvingo Province, southern Zimbabwe				
Poor (53.5%)	0	0	0-2	0-4
Lower middle (20%) (Draught borrowers)	0-2	0	Average 2	Average 5
Middle (23.1%)	3-9	0-2	Average 10	Average 15
Wealthy (3.4%)	10-15 up to 30	2 up to 6	Up to 20	Up to 30
Average per household	2.35			
	Based on 1997/98 figures in Wolmer et al. 2002; Zhou 1997, supported by SAFIRE 2001.			
Matabeleland North				
Poor (35.8%)	0	0	1-5	10-15
Lower middle (19.2%) (Draught borrowers)	1-2	0	5-10	10-15
Middle (30%)	5-10	0	10-15 (<5)	15-20
Wealthy (15%)	15-25	0	15-20 (10-15)	15-25
	From Zhou 1997; supported by SCF 2001.			
Northern parts of Mashonaland East and Central				
Poor (20%)	0	0	0-5	0-4
Lower middle (46%)	0-2	0-5	2-12	2-7
Middle (32%)	2-10	0-6	6-12	10-30
Wealthy (2%)	12+	Up to 15	10-15	20+
Average per household	4.5			
	Based on Nyaminyani data: Mathys 2001.			
Mashonaland East and Central[a]				
Poor (15%-25%)	0	0-2	0-1	10-15
Middle (50-70%)	Average 6	0	1-2	15-20
Wealthy (15-20%)	11+	0	2 up to 7	20-25
Very wealthy (1-5%)[b]	Farm with tractors, invest in trade, and may have limited stockholdings			
Average	6.3+	0-1	1-2	15-20
	Based on 1997/98 figures from Wolmer et al., 2002; Zhou 1997.			
Matabeleland South				
Poor (23%)	0-2	0-2	0-10	25
Middle (61%)	3-20	2-6	0-45 (average 20)	25
Wealthy (16%)	20+ (up to 78)	2-6	0-72 (average 25)	25
Average per household	15	4	20	25
	From Zhou 1997 and Survey Findings 2002 (see Appendix 3C)			

Notes:
[a]Mashonaland West has a significantly smaller number of non-cattle owners at 4.2%, and a much higher number of large cattle owners with over 16 head of cattle at 14% (see Table 2).
[b]This is an estimate based on Wolmer et al. 2002 and PRA work carried out for this study in Mashonaland Central, within an hour of Harare. We did not investigate this class of farmers further, except to discover that some have no cattle holdings.

- Group 3: Small stock accumulators in low rainfall areas, enough cattle or donkeys for own draught, rarely sell crops, unwilling to sell cattle except in emergencies (mainly outside historical catchment zone for meat exports)
- Group 4: Cattle-owning crop producers, unwilling to sell cattle except in emergencies (inside catchment zone for meat exports)
- Group 5: Cattle-owning crop producers, sell cattle to make occasional investments (inside catchment zone for meat exports)
- Group 6: Cattle and small stock accumulators, breed and regularly market stock, have limited other investment opportunities (in historical catchment zone for beef exports; currently quarantine zone)

This categorisation has been overlaid onto the actual numbers of households in different categories of poor around the country, identified and presented in Table 3.8.[26] Thus, for example, group 1 includes people from all provinces identified as 'poor' in Table 3.8, as their livelihood strategies demonstrate similarities. Group 6 includes only those from Matabeleland South who were identified as 'wealthy', since the livelihood strategies of this group have little in common with any other group.

Tables 3.10a-3.10f provide details of the numbers of people from each province in each group. Table 3.9 below summarises these findings .[27]

3.5.2 Poor and highly vulnerable small stock accumulators (groups 1, 2, and 3)

Groups 1, 2, and 3 are poor and highly vulnerable to shocks. Almost 40% of all communal and resettlement farming households in Zimbabwe are in this category. They amount to an estimated 526,000 out of a total of 1,397,000 households in the communal and resettlement areas of Zimbabwe (See Table 3.9).

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[26]The proportions of people were calculated according to how they are presented in Table 3.8 for Matabeleland North, South, and Masvingo. For the Mashonaland group, Manicaland, and Midlands, proportions of people were calculated according to Zhou 1997 (see Table 3.7).

[27]There are some limitations to the data. The livelihoods material was compiled using case studies from Masvingo, Matabeleland North and South, and Mashonaland West and Central (Appendix 3C). Provincial level figures for holdings of livestock other than cattle were also compiled from these data. Figures on donkeys and small stock by household groups, especially goats, are not only difficult to find, they also display significant differences across areas (unlike chickens, for example). As a result, the figures used in the study should only be seen as indicative of existing holdings. This is particularly the case for Manicaland, Midlands, and Mashonaland East, for which case study material was not gathered. Despite having a smaller number of non-cattle-owning households and a higher number of large cattle owners, the livelihoods systems of Mashonaland West are likely to display similarities to those in Mashonaland East and Central. We have therefore grouped these three provinces together into one Mashonaland group.

Manicaland Province, on the other hand, is likely to have a diverse range of livelihood activities and systems as it is situated across all natural regions. Midlands is largely a mixed farming province. Parts of it are similar to Masvingo, but other parts are not. The drought of 1992 reduced the livestock population in Masvingo more dramatically than it did in such provinces as Midlands. The livelihoods strategies of groups found in these two provinces are therefore largely invisible in the study, although aspects of them will be similar to those found in other areas. As a result of the lack of data for these areas, we have computed small stock populations for Manicaland and Midlands in line with those in the Mashonaland group.

Table 3.9 Different groups of livestock keepers and their livelihood strategies in Zimbabwe (summary table)

Groups by type of livelihood	Marketing zone	Relative level of poverty	% (no.) of total households	% (no.) owning cattle	% (no.) owning donkeysa	% (no.) owning goats	% (no.) owning chickens
Group 1: Small stock accumulators, unable to acquire cattle, crop production restricted by inadequate access to draught animals	In and outside export zone	Income and asset poor, food insecure, highly vulnerable to shocks	20.1% (280,657)	0	0	71% (199,327)	78% (220,137)
Group 2: Small stock accumulators in low rainfall areas, unable to acquire cattle, can access draught animals	Outside export zone	Income and asset poor, food insecure, highly vulnerable to shocks	6.8% (92,815)	39% (36,400)	-	61% (56,972)	76% (76,654)
Group 3: Small stock accumulators in low rainfall areas, enough cattle or donkeys for own draught, rarely sell crops, unwilling to sell cattle except in emergencies	Mainly outside export zone	Low income, limited assets, highly vulnerable to shocks	10.9% (152,863)	100% (152,863)	57% (86,629)	76% (116,055)	86% (131,071)
Group 4: Cattle-owning crop producers, unwilling to sell cattle except in emergencies	Inside export zone	Limited assets, higher income than group 3, but still vulnerable to shocks	47.6% (665,290)	100% (665,290)	-	96% (638,679)	80% (532,232)
Group 5: Cattle-owning crop producers, sell cattle to make occasional investments	Inside export zone	Non-poor households, with assets, relatively high income, make regular investments	13.4% (187,768)	100% (187,768)	-	93% (174,771)	80% (150,621)
Group 6: Cattle and small stock accumulators, breed and regularly market stock, limited other investment opportunities	Currently in quarantine zone	Non-poor households, with significant livestock assets, cannot make investments other than in cattle	1.2% (17,296)	100% (17,296)	95% (16,431)	95% (16,431)	100% (17,296)
Total number of all households of all groups			100% (1,396,689)	75.9% (1,059,617)	7% (103,060)	85% (1,182,345)	80% (1,128,011)

[a]Data missing, especially for northern parts of Mashonaland East and Central

- Roughly 60% of groups 1, 2, and 3 have no cattle (and conversely 40% have).
- The remainder have an average of between one and four cattle; they can usually assemble a work span using their own or others' animals (Wolmer et al. 2002).
- Their livelihood strategies are geared towards accumulating small stock; roughly 70% have goats and over 80% have chickens.
- Small stock are essential to their livelihoods, and ability to escape poverty.
- Over 40% of this group are from Masvingo Province in southern Zimbabwe, where in some parts an estimated 62% are practising hoe agriculture (Wolmer et al. 2002:248).

Recent evidence suggests that the number of non-cattle owners may be higher than these figures suggest. All groups of poor people are increasingly selling their stock of assets to support themselves through the current economic crisis. This includes selling livestock to buy food and cover school fees in the absence of other sources of income; and to pay healthcare fees that are increasingly associated with HIV/AIDS (e.g. Chimedza et al. 2001; SAFIRE 2001:53).

Group 1 households are poor and food insecure because they are severely constrained in their crop production. In low rainfall areas, these are the people practising hoe agriculture. In high rainfall areas, it includes people who gain access to draught animals but normally hire them on unfavourable terms. Their field sizes are up to an eighth of those of large cattle keepers (Wolmer et al. 2002:299). The main strategy in relation to livestock of both groups is to accumulate small stock, but they have limited holdings (Table 3.10a).

Group 2 households are draught borrowers in low rainfall areas such as Masvingo, Matabeleland North and South, and in the more northern areas of Mashonaland West and Central. They usually borrow or access draught animals on more favourable terms than their counterparts in high rainfall areas, and cultivate significantly more than hoe cultivators. They are nonetheless food insecure. Their livestock strategies are geared towards accumulating small stock, as they are unable to acquire cattle (Table 3.10b).

Group 3 households have just enough draught power of their own, including some cattle. Their livestock strategies are geared towards accumulating small stock and not losing their existing cattle holdings. They tend to sell small stock for a variety of purposes, including food and school fees, rather than consume them (Table 3.10c).

3.5.3 Poor cattle keepers (groups 3 and 4)

Group 3 and group 4 are also classified as poor cattle keepers. Group 4 households are poor but less vulnerable than those in group 3 because they have larger cattle and small stock holdings (Table 3.10d).

Table 3.10a Group 1: Small stock accumulators, unable to acquire cattle, crop production restricted by inadequate access to draft animals (in and outside export zone)

Level of poverty	Livelihood strategies of group 1 households Livelihood opportunities and constraints	% (no.) of group 1 HHs Zimbabwe	% (no.) of group 1 HHs by province		% (no.) of HHs with cattle	% (no.) of HHs with donkeys	% (no.) of HHs with goats	% (no.) of HHs with chickens
Income and asset poor, food insecure, highly vulnerable to shocks	Crop production is restricted by inadequate access to draft animals Cultivate with hoes (Mat. North, Masvingo) Hire draught (high rainfall areas) Cannot meet own food needs Lack of income-earning opportunities Access to markets limited (esp. outside export zone) Casual labour to acquire food Collect and sell or consume gathered products Gold panning (Masvingo) Difficulties in accumulating stock Purchase of small stock as an accumulation strategy; but also need to sell small stock to meet cash needs Generally do not consume own livestock or livestock products	20.1% (280,657)	Mat. South	-	-	-	-	-
			Mash. East, West, Central	20.3% (56,863)	0	0	96% (54,588)	80% (45,490)
			Mat. North	13.8% (38,613)	0	0	65% (25,098)	85% (32,821)
			Masvingo	45.0% (126,377)	0	0	50% (63,188)	75% (94,782)
			Manicaland	16.5% (46,355)	0	0	96% (44,501)	80% (37,084)
			Midlands	4.4% (12,449)	0	0	96% (11,951)	80% (9,959)
			TOTAL % (no.) of households	100% (280,657)	0	0	71% (199,327)	78% (220,137)

Table 3.10b Group 2 Small stock accumulators, in low rainfall areas, unable to acquire cattle, can access draught animals (outside export zone)

Level of poverty	Livelihood strategies of group 2 households Livelihood opportunities and constraints	% (no.) of group 2 HHs Zimbabwe	% (no.) of group 2 HHs by province		% (no.) of HHs with cattle	% (no.) of HHs with donkeys	% (no.) of HHs with goats	% (no.) of HHs with chickens
Income and asset poor, food insecure, highly vulnerable to shocks	Need to borrow some or all draught power Dependent on cattle owners for draught Cannot meet own food needs Limited income-earning opportunities and access to markets Casual labour to acquire food Small-scale production and sale of cotton (Mat. North, Northern Mash. Central and West Collect and sell or consume gathered products, beer brewing Gold panning (Masvingo) Difficulties in accumulating cattle Accumulate small stock through purchase and breeding Sell small ruminants for school fees, small household items, food, may try to trade up for cattle Difficulties in purchasing cattle Generally do not consume own livestock or livestock products	6.8% (92,815	Mat. South	26.8% (24,863)	16% (3,891)	-	80% (19,890))	
			Mash. East, West, Central	Unknown number in northern areas[a]	-	-	-	
			Mat. North	22.3% (20,709)	100% (20,709)	-	65% (13,461)	
			Masvingo	50.9% (47,243)	25% (11,811)	-	50% (23,622)	
			Manicaland	0	-	-	-	
			Midlands	0	-	-	-	
			TOTAL % (no.) of households	100% (92,815)	39% (36,400)	-	61% (56,972)	

[a]These households are counted within those of group 4

Table 3.10c Group 3: Small stock accumulators in low rainfall areas, enough cattle or donkeys for own draught, rarely sell crops, unwilling to sell cattle except in emergencies (mainly outside export zone)

Level of poverty	Livelihood strategies of group 3 households Livelihood opportunities and constraints	% (no.) of group 3 HHs Zimbabwe	% (no.) of group 3 HHs by province		% (no.) of HHs with cattle	% (no.) of HHs with donkeys	% (no.) of HHs with goats	% (no.) of HHs with chickens
Limited assets, higher income than group 2, but still vulnerable to shocks	Crop production regularly falls below minimum food requirements Can use own draught animals for crop production Restricted access to markets but income-earning opportunities more diversified than groups 1 and 2 Collect and sell or consume gathered products; sell horticultural crops (Masvingo); sell cotton (Mat. North) Trading and small business activities Sell craft and artisan goods Some remittances or formal employment Cattle holdings average 3 or 4 (except Mat. South) Breed and sell small stock for household items, school fees, food purchases (esp. Mat. North) Unwilling to sell cattle except in emergencies Mat. South: Cattle holdings average 10-12 but crop production regularly fails Regularly sell small stock and even cattle to meet food needs Consume own small stock and other livestock products	10.9% (152,863)	Mat. South	43.1% (65,940)	100% (65,940)	90% (59,346)	92% (60,665)	95% (62,643)
			Mash. East, West, Central	Unknown number in northern areas	-	-	-	-
			Mat. North	21.2% (32,357)	100% (32,357)	0	70% (22,650)	75% (27,504)
			Masvingo	35.7% (54,566)	100% (54,566)	50% (27,283)	60% (32,740)	75% (40,925)
			Manicaland	0	-	-	-	-
			Midlands	0	-	-	-	-
			TOTAL % (no.) of households	100% (152,863)	100% (152,863)	57% (86,629)	76% (116,055)	86% (131,072)

Table 3.10d Group 4: High-value cash crop producers in high rainfall areas, enough cattle for own draught, unwilling to sell cattle except in emergencies

Level of poverty	Livelihood strategies of group 4 households Livelihood opportunities and constraints	% (no.) of group 4 HHs Zimbabwe	% (no.) of group 4 HHs by province		% (no.) of HHs with cattle	% (no.) of HHs with donkeys	% (no.) of HHs with goats	% (no.) of HHs with chickens
Limited assets, higher income than group 3, so less vulnerable to shocks	Crop production can usually meet minimum food requirements in a year of normal rainfall Use own draught animals for crop production Better access to markets than places outside export zone Cultivate and sell high-value cash crops Likely to be receiving remittances and/or have some members in formal employment (limited data available) Cattle holdings average of 5 to 6. Lack of pasture may limit size of holdings Breed and sell small stock for household items, school fees, food Increases in cattle herd mainly through breeding Unwilling to sell cattle except in emergencies Consume own small stock and other livestock products	47.6% (665,290)	Mat. South	0	-	-	-	-
			Mash. East, West, Central	44.8% (298,054)	100% (298,054)	-	96% (286,132)	80% (238,443)
			Mat. North	0	-	-	-	-
			Masvingo	0	-	-	-	-
			Manicaland	35.8% (238,030)	100% (238,030)	0	96% (228,509)	80% (190,424)
			Midlands	19.4% (129,206)	100% (129,206)	0	96% (124,038)	80% (103,365)
			TOTAL % (no.) of households	100% (665,290)	100% (665,290)	0	96% (638,679)	80% (532,232)

Table 3.10e Group 5: Cattle-owning crop producers, sell cattle to make occasional investments (inside export zone)

Level of poverty	Livelihood strategies of group 5 households Livelihood opportunities and constraints	% (no.) of group 5 HHs Zimbabwe	% (no.) of group 5 HHs by province		% (no.) of HHs with cattle	% (no.) of HHs with donkeys	% (no.) of HHs with goats	% (no.) of HHs with chickens
Non-poor households, with assets, relatively high income, make regular investments	Crop production can meet minimum food requirements Own draught animals for crop production Variable access to markets but better in high rainfall areas Cultivate and sell high-value cash crops, horticultural crops Likely to be receiving remittances and have some members in formal employment (limited data available) Cattle holdings above 10. Lack of pasture may limit size of holdings Breed and sell small stock for household items, school fees, food Increases in cattle herd mainly through breeding Prepared to sell cattle to make large purchases as well as in emergencies Consume own livestock and products	13.4% (187,768)	Mat. South	0	-	-	-	-
			Mash. East, West, Central	48.2% (90,585)	100% (90,585)	-	96% (86,962)	80% (72,468)
			Mat. North	9% (16,179)	100% (16,179)	0	75% (12,134)	85% (13,752)
			Masvingo	4.3% (8,031)	100% (8,031)	100% (8,031)	70% (5,621)	75% (6,024)
			Manicaland	0	-	-	-	-
			Midlands	38.9% (72,973)	100% (72,973)	-	96% (70,054)	80% (58,378)
			TOTAL % (no.) of households	100% (187,768)	100% (187,768)	0	93% (174,771)	80% (150,621)

Table 3.10f Group 6: Cattle and small stock accumulators, breed and regularly market stck, limited other investment opportunities (in export (quarantine) zone)

Level of poverty	Livelihood strategies of group 6 households Livelihood opportunities and constraints	% (no.) of group 6 HHs Zimbabwe	% (no.) of group 6 HHs by province		% (no.) of HHs with cattle	% (no.) of HHs with donkeys	% (no.) of HHs with goats	% (no.) of HHs with chickens
Non-poor households, with significant livestock assets, cannot make investments other than in cattle	Crops regularly fail and are almost always insufficient to meet annual food needs Continue to produce maize and some small grains using donkeys Poor access to markets (with exception of livestock) Variety of cash income activities Collect and sell or consume gathered products, especially *mopane* worms Sale of craft and artisan goods Remittances from household members in South Africa Trading and small business activities Regularly market cattle but lack investment opportunities Breeding and selling of both small stock and cattle to meet food needs and to pay school fees Sell cattle to make large household purchases as well as to cover emergency expenses Consume own livestock and products	1.2% (17,296)	Mat. South	100% (17,296)	100% (17,296)	100% (17,296)	95% (16,431)	100% (17,296)
			Mash. East, West, Central	0	-	-	-	-
			Mat. North	0	-	-	-	-
			Masvingo	0	-	-	-	-
			Manicaland	0	-	-	-	-
			Midlands	0	-	-	-	-
			TOTAL % (no.) of households	100% (17,296)	100% (17,296)	95% (16,431)	95% (16,431)	100% (17,296)

- At almost 48%, group 4 is the largest group of all households in the communal and resettlement areas. The majority are found in the higher rainfall areas of Mashonaland East, West, and Central, as well as Manicaland.
- Their principal livelihood activity is crop production, for which they have their own draught power.

Although this group are all cattle holders, small stock are very important to overall livelihood strategies. Men and women keep separate and joint stock of chickens and goats. Goats are kept in lower proportions than cattle in higher rainfall areas around Mashonaland West and Central (See Table 3.4). Women rank poultry first out of all livestock species as making the greatest contribution to their livelihoods (Kusina and Kusina 1999:16).

- 96% of these households keep some goats. The main reasons for keeping goats are for cash, meat, milk, and manure. Most sales are driven by the desire to earn cash for school fees and for purchasing agricultural inputs (Kusina and Kusina 1999:23).
- 80% of these households keep some chickens (mostly indigenous) as a source of meat, eggs, cash, and manure (Kusina and Kusina 1999:23, 2000).
- The average number of chickens per household is roughly 20 (Kusina and Mhlanga 2000).
- Small stock manure is important in this area for improved soil fertility in horticultural activities (Kusina and Kusina 1999:23; Wolmer et al. 2002).

3.5.4 The non-poor (groups 5 and 6)

Group 5 and 6 are both in the non-poor group (Tables 3.10e and 3.10f). Group 6 have the largest herds of cattle, numbering 20 up to more than 70. They are all found in Matabeleland South. Group 5 have cattle holdings of over 10. Group 5 is not necessarily poorer than group 6, despite having fewer cattle. Those in higher rainfall areas, where investment opportunities are greater, would probably be classed as wealthier.

- The majority of farmers in group 5 are found in Midlands and the Mashonaland group, inside the historical catchment zone for beef exports.
- Only about 4% and 9% of this group are found in Masvingo and Matabeleland North respectively, both of which lie outside the export zone.

Livestock keepers in groups 5 and 6 accumulate cattle, though their ability to do so in the high rainfall higher density areas is more restricted by lack of access to grazing. The main difference between these two groups is in the ways in which cattle support wider livelihoods. Group 5 stores wealth in cattle to make large purchases and investments. They are seen as a longer-term store of wealth and are more likely to be sold when they are old. They also use cattle for draught power, milk, manure, transport, hides, and a range of other social functions (Kusina and Kusina 1999). Goats and chickens are also kept in similar proportions (93% and 80% respectively) to support a range of functions (see group 4 above).

Group 6 are all in Matabeleland South. They are the only group with the potential to commercialise. They make up just 1.2% of the total communal and resettlement farming population.

In Matabeleland South donkeys, rather than cattle, are widely used for draught-powered crop production. Large livestock keepers breed and regularly market cattle and goats, mainly to buy food and cover schooling costs. The only other investments of significance that they make with proceeds from these sales appear to be in building construction.[28]

- Cattle are principally kept as a short-term store of wealth and are sold on a regular basis to meet food needs and cover costs of schooling; they are also kept as a long-term store of wealth.
- Goats are also kept in large herds by 95% of these households and are also sold regularly to meet food needs and cover costs of schooling.

The strategy of large livestock keepers in Matabeleland South is to commercialise. According to survey findings, large livestock-keepers consider 20 to 30 head of cattle to be necessary for this purpose. This contrasts sharply with conventional wisdom that communal farmers can commercialise with roughly 10 head of cattle (GFA 1987). The latter figure does not take into account all the other functions that cattle fulfil, such as, particularly in this case, their critical function as a store of wealth.

Large livestock keepers in Matabeleland South do not fully commercialise their herds. Rainfall here is the lowest in the country, and livelihoods are highly risky. Cattle keeping is suited to the conditions of this area, and although not an entirely safe form of investment in such a drought-prone area, it does mitigate some of the risks of existing livelihoods, such as crop failure. More significantly, there are limited alternative opportunities for investment in this area.

3.6 The costs of FMD and FMD control

No cases of FMD were reported among the cattle keepers interviewed for this study in Matabeleland South, so no direct information was collected regarding their experience with the impact of the disease (see Appendix 3C). As a proxy for FMD, questions were asked about the impact of general sickness of cattle in the province. As might be expected, sickness was found to cause production losses, mainly in terms of income losses from sales and loss of draught power.

The numbers of households with draught animals, and the large size of herds in Matabeleland South, suggest that households would find no difficulty in gaining access to draught should their own animals become infected with FMD. Indeed, when asked what would happen if animals were sick, most households said that they would borrow or hire draught power or reduce their cultivated acreages.

[28]See summary of survey findings in Appendix 3C.

The groups most at risk from being unable to replace sick draught animals are those in groups 2 and 3 in Masvingo and Matabeleland North. The proportion 'at risk' from losing access to draught as a result of FMD infection in these two provinces is roughly 11%. There are also other unexpected costs of FMD controls. The main cost to households during the 2001 outbreak were the restrictions imposed on movement of cattle which prevented people from reaching markets, and acquiring necessary cash to buy food and to pay school fees.[29]

Perhaps the most important cost to livestock keepers comes in terms of movement restrictions in the infected (so-called red) zone that constrain the operation of grazing and cattle-loaning strategies, particularly those where animals need to be moved to reduce the risks associated with drought (See Scoones 1995b; Wolmer et al. 2002:294). It has been suggested that the FMD-related movement controls were a major reason why the cattle losses in the Masvingo and Matabeleland Provinces were particularly high during the droughts of the early 1990s. This issue has become increasingly important during 2002.

3.7 Animal health service delivery

There was a stark contrast between reports of animal health service quality in Matabeleland South and other areas. Matabeleland South was, until recently, in the export zone. At the time of writing it is in the quarantine zone. It is a large cattle-owning area. In the province, households experienced little difficulty in obtaining animal health services when required, but economic constraints on the Department of Veterinary Services (DVS) are affecting service delivery. Some livestock keepers referred to the poor availability of drugs and lack of veterinary staff.

In areas outside the export zone, service delivery appears to be weak and in some places virtually non-existent. In Binga, for example, the high costs of drugs and the costs of transportation to reach animal management and health centres were provided as evidence of the constraints on livestock keepers obtaining treatment for their animals. Farmers reported rarely seeing veterinary staff in the area (SCF 2001). In Nyaminyani dipping is said to be sporadic, and even though veterinary services are present in Kanyati ward, actual service availability was limited due to the temporary absence of DVS staff (Mathys 2001:29).

The findings also indicate that animal health services for small stock are limited. Poultry, for example, are kept in the largest quantities and by the largest number of households in Zimbabwe. Poultry keepers reportedly experience significant losses due to disease and management inadequacies. Health service delivery to small stock by the DVS and Department of Agricultural Extension and Technical Services (AGRITEX) has been identified as lacking in Mashonaland Central (Kusina and Kusina 1999).

[29]In Matabeleland South, following the last FMD outbreak, the (DVS) negotiated with the Provincial Education Office for the rescheduling of the payment of school fees for those who could not raise the cash, until after the suspension of livestock sales was lifted.

3.8 Consumption effects of FMD controls and export policy

The livelihoods data suggest that consumption of own livestock and livestock products is relatively low among poor households and among smallholder households in general (Tables 3.10a to 3.10f). As is shown in this study, a key livelihood strategy of the poor is to accumulate small stock, and to sell them for specific purposes, rather than to consume them.

Although meat consumption may be relatively low among poor and rural households, meat appears nonetheless to represent an important expenditure item. Data from the 1995 Poverty Assessment Study Survey (PASS: Ministry of Public Service, Labour and Social Welfare 1997) indicate that the rural poor devote 8% of their total cash and in-kind income to meat (beef, goat meat, pig meat, mutton) and another 5% to poultry meat, *versus* 29% allocated to the main staple, maize (Table 3.11). The urban poor devote an even higher share to meat, but a smaller share to poultry meat. The change in consumption of meat, whether in cash or in kind, follows the expected pattern for a luxury good, with its share declining as income falls. Even the very poor in rural areas continue to devote 5% of their total consumption to meat.

Table 3.11 Household consumption shares for meat and maize, 1995, by type of expenditure. Source: PASS Tables 14.14, 14.16, 14.18.

Type of Expenditure	Communal			All rural			Urban		
	Non-poor	Poor	Very poor	Non-poor	Poor	Very poor	Non-poor	Poor	Very poor
From consumption expenditure	Percent of total expenditure category								
Meat	9.9	6.5	4.2	9.7	6.4	4.4	12.0	9.6	9.0
Poultry	3.1	2.1	1.8	3.2	2.7	2.2	3.9	2.9	2.6
Maize	14.3	24.4	33.5	15.8	25.7	32.8	7.5	12.5	14.7
From own production									
Meat	39.4	18.0	8.0	31.4	14.3	7.5	1.6	2.1	2.1
Poultry	12.8	15.6	13.7	13.4	15.5	13.4	12.4	6.4	5.9
Maize	16.3	19.7	29.8	15.3	19.0	30.4	6.0	6.1	15.6
Household total consumption									
Meat	15.7	8.7	5.1	12.9	7.8	5.1	11.7	9.4	8.7
Poultry	4.9	5.2	4.6	4.7	5.1	4.6	4.1	3.0	2.7
Maize	20.6	30.8	35.8	19.1	29.2	34.9	7.7	12.8	15.3

Note:
Meat includes beef and veal, goat meat, mutton, and pig meat.

Consumption data by province show much higher levels of meat consumption, especially among wealthier households, in those provinces (Matabeleland North, Midlands, and Matabeleland South) where livestock contribute significantly more to food security in the form of cash sales as a means of making grain purchases (CSO 1998; see Appendix 3C). Interestingly, own consumption of meat (almost certainly goat meat) in Matabeleland North is almost double that of Matabeleland South, where average goat herds are much larger and cattle herds are relatively small. This apparent inconsistency is probably explained by the improved marketing arrangements for cattle in Matabeleland South, which mean that cattle keepers are more likely to sell stock and buy food rather than consume their own animals.

The urban market for meat is segmented. High-density urban areas, where most of the poor are found, demand lower-priced products that are often of lower quality. The demand for lower-grade meat, particularly cheaper cuts and offal, is very high. Demand for perceived inferior products such as goat meat is also highest in the urban high-density areas. With the exception of dairy products, chicken, and eggs, a significant proportion of livestock products sold in high-density urban areas are derived from the smallholder sector.

Low-density urban areas are the major consumers of high-grade and more expensive products, which largely originate from the commercial sector. These are mostly export quality. This segment of the market would be expected to absorb a large portion of the immediate, direct impacts of price transmission arising from exporting. As suggested by the analysis of prices presented in Chapter 5, general meat prices, including those for lower-quality products, will probably reflect changes in the export market after a several-month lag period.

3.9 Conclusions of the livelihoods study

3.9.1 The need for poverty reduction policies and strategies

The southern African region has high levels of poverty. Although some countries have relatively strong economies, there remains a great divide between the ‘haves’ and ‘have-nots’ throughout the region, and further stratification within the group of have-nots. Having said that, the diverse nature of the economies, the wealth of different agricultural and industrial enterprises, and the significant human resources at the disposal of the region give reason for long-term optimism for poverty reduction programmes. The key to a workable poverty reduction strategy probably lies in learning more about the accumulation strategies of the poor, especially in relation to livestock, the role of which is central in supporting livelihoods, and determining ways of promoting these strategies. The various case studies reviewed or undertaken by the present study clearly show that the majority of the poor in Zimbabwe are accumulators of small stock, and that small stock are critical to their survival and their ability to move out of poverty.

3.9.2 The role of livestock in poverty reduction

This study highlights the importance of livestock to the poor. It shows that livestock are not only important to those who own them, but also to those who do not, as the vast majority of people aspire to livestock ownership. The study also demonstrates, at least for Zimbabwe, that livestock ownership levels by the poor are very high. Poultry and goats are viewed as the first rungs on the 'livestock ladder', and almost seem to constitute a national currency for the poor in their endeavours to obtain education, medical services, and food, and so climb to the next rungs on the ladder. Women play a key role in the ownership and management of poultry and goats, and in the benefits derived from their use.

When it comes to the role of cattle, the picture seems to be rather more complicated. The proportion of poor households owning or having access to cattle is also high at some 75%, but there is considerable geographical variation, both in Zimbabwe and in the region as a whole. There is even more variation in the numbers of cattle owned, with the proportion of households in communal and resettlement areas owning five or fewer head of cattle in Zimbabwe standing at over 60% in 1997. The majority of households in poverty/livelihood groups 1, 2, and 3 (see above) are in this category. They are more heavily concentrated in areas outside the historical catchment for beef, particularly in the southern dryland areas of Masvingo. A significant proportion of groups 1,2, and 3 are also found in Matabeleland North and South, which are excluded from the catchment zone under Scenario 1.

The results suggest, in Zimbabwe at least, that despite the high levels of cattle ownership, the vast majority of owners use cattle as a store of wealth, and lack the capacity to actively engage in cattle marketing for commercial purposes. Indeed, it is suggested that, given the heavy demands on cattle for draught and for other social and less directly productive uses, herd sizes of 20-30 are necessary before communal farmers can effectively engage in regular marketing of cattle in either domestic or export beef markets.

The poverty and livelihoods analysis presented in this chapter thus suggests that there might be important differences in the distributions of direct benefits to the poor, dependent on the size of the export catchment zone.

3.9.3 Livestock marketing and poverty reduction

Livestock in southern Africa are highly tradable items, particularly for the poor, whose livelihood strategies are broadened by the multitude of functions livestock perform. Having said that, direct sale of cattle for beef appears to be, at least in the case study country of Zimbabwe, close to the bottom of the list of current uses of this important asset by the poor. Other priority demands such as wealth storing, traction, and social functions mean that engaging in direct sales of prime animals can in fact contribute to vulnerability and increase risk.

Is this true in the other countries of southern Africa? Anecdotal evidence from Botswana and Namibia suggest that in these countries there might be different forces at work that promote offtake into the commercial beef-marketing sector, and this needs further study. It is reported that over 80% of the beef exported from Botswana to the EU comes from the communal livestock sector, suggesting that marketing of animals for the beef market is possible alongside other livelihoods needs for cattle. And in Namibia, offtakes of up to 15% from the area north of the cordon fence are reported. What might make these areas differ from Zimbabwe? It is suggested that the relative wealth and strong economy of Botswana has allowed the public sector to invest more heavily in supporting livestock enterprises and marketing, in an environment in which livestock play a much more central role to society than in the very mixed agriculture found in much of Zimbabwe. In the case of Namibia, strong political pressure to support the more disadvantaged communities to the north of the cordon fence has led to considerable investment in marketing, quarantine, and export abattoir facilities, which has reportedly encouraged smallholders to sell more cattle for the beef market. Both of these claims deserve further investigation.

3.9.4 The price effects of export market access on poverty reduction

Based on general economic principles, and on the results of the price effects of external markets reported in Chapters 4 and 5, it appears that the existence of a beef export market results in higher domestic prices for beef in all sectors and regions of the country, and that changes in the export price are transmitted to domestic prices, albeit with a lag period. The implications of this differ with the different groups of poor. For all who are purchasers of beef, regardless of whether livestock owners or not, it reduces their purchasing power. For those who are intent on purchasing cattle for wealth storing and other functions, it limits their options to progress. For those owning cattle, even if at herd sizes insufficient to allow them to market their animals regularly, it increases the value of their livestock assets. And for those very few who regularly market cattle, it brings substantial benefits.

3.9.5 The impacts of FMD on the poor, and the direct impacts of FMD control measures on poverty reduction

FMD has had minimal direct impact on communal area livestock. The greatest potential impact is on traction, affecting those who own and access cattle for draught purposes (estimated to be 75% of communal area farmers), and it is assumed that with a scenario of reduced FMD control, such losses would increase. However, by far the greatest impact of FMD on communal area farmers is that of the control measures put into operation when outbreaks occur. This limits severely the options of farmers to move or sell their animals as and when they need to do so, and these limitations extend to non-cattle owners.

3.9.6 Animal health service delivery and poverty reduction

The ownership and use of poultry and goats by the poor far exceed that of cattle, and thus services to provide greater support to the health, use and marketing of these species are likely to be more pro-poor than a service primarily devoted to the cattle industry.

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Chapter 4

International markets in livestock and livestock products

4.1 Introduction

The aggressive foot and mouth disease (FMD) control policies pursued in southern Africa have been motivated not only by the need to protect domestic livestock production from losses due to the disease, but also to meet the sanitary conditions required to maintain the export trade of beef and other products to lucrative markets, especially those in the European Union (EU) countries. The most lucrative markets tend to be found in countries with heavily protected commercial livestock sectors, which are also among the most demanding in terms of sanitary requirements for imported supplies. As discussed in Chapter 2, these countries accept imports of livestock and livestock products only if FMD freedom has been maintained within the exporting country or zone, if it is convincingly protected from incursions, and if the export marketing chain meets the highest sanitary standards. A considerable portion of the substantial past investment in FMD control in southern Africa has been devoted to meeting these expectations, which has been more than adequately rewarded by the attractive price premiums earned from these lucrative markets.

But the beef export trade is subject to a combination of internal and external pressures that will likely temper in the medium to longer term these price incentives enjoyed by the southern African beef exporters, and thereby reduce one of the major benefits that have justified a high degree of FMD control. In this chapter, we review the major trends affecting export price incentives for southern Africa, with a particular focus on Zimbabwe, and develop a range of scenarios to illustrate how these price incentives are likely to evolve over the coming quarter of a century. The chapter provides a synthesis of the much more detailed version found in Appendix 5.

4.2 Trends in global livestock trade

4.2.1 The global context

Until the Uruguay Round trade negotiations, which were concluded in 1994 and led to the creation of the World Trade Organization (WTO), multilateral rules on trade and production policies for temperate agriculture were weak. Many countries intervened heavily to support their domestic farmers in ways that distorted world trade through the erection of very high tariffs and other barriers to imports, and the direct or indirect subsidisation of exports. Because of their substantial financial resources, the distortions imposed by the industrialised

countries tended to have a particularly marked effect on world trade and production patterns.

Beef trade has been a case in point. Import restrictions on beef to the Organisation of Economic Cooperation and Development (OECD) countries have tended to be high. In 1996, for example, the *ad valorem* tariff[30] equivalent of import restrictions on beef meat was 128% for the EU, 344% for Norway, and 737% for Switzerland.[31] Through the mid-1990s, high tariffs contributed to surplus production in the EU, leading to exports to world markets at subsidised prices and causing considerable dislocation in some of these markets. Between 1993 and 1995, for example, EU beef exports to South Africa increased by 600%, displacing Namibian exports to its neighbour (Stevens et al. 1998:19).

This complex set of distortions has had numerous differential effects, and has contributed to artificially low prices in world markets. Four general categories of countries can be distinguished according to their beef trading position:

I. Protecting states: have experienced higher levels of domestic production, higher prices and, consequently, lower consumption than would otherwise have been the case. Their surplus exports have tended to depress world prices, further widening the price gap between the world and the domestic markets.

II. Net beef-importing states: have enjoyed lower prices and higher consumption due to artificially depressed world prices, but this has reduced incentives to develop their domestic beef production.

III. More competitive net exporters: have tended to lose due to the artificial stimulus to production in the protecting states. This loss occurred both directly (because exports to the protecting states were limited) and indirectly (since prices on other markets were artificially depressed). Such losses were offset to a certain extent if the countries concerned had preferential access to the markets of the industrialised countries.

IV. Less competitive net exporters with significant preferences: may have gained from the system. Although their exports to the industrialised country markets were limited to the volumes set out in the preference arrangements, the prices obtained for each tonne exported were artificially inflated. Moreover, competition with more efficient suppliers was constrained by the volume limitations in the latter's own preference arrangements.

Whether exporting states fall into category III or IV has important implications regarding the expected effects of future trade liberalisation. Whilst all states will have to undergo adjustments to take account of the more competitive markets, the group III countries can be expected to gain more (in terms of greater opportunities to benefit from their comparative advantage) than they lose (in terms of lower

[30]An *ad valorem* tax is based on the value rather than quantity of an item.
[31]OECD 2001: Annex Table 1.3.

prices for preferential exports to the protected markets). By contrast, group IV countries can be expected to lose more than they gain. The critical issue for the exporting countries of southern Africa is to determine whether they are, or can become, group III rather than group IV states.

4.2.2 Current trends

The task of securing agreement on more binding rules for international agricultural trade, and subsequently of opening distorted markets, was begun during the Uruguay Round negotiations. More emphasis was given in the 1994 Agreement on Agriculture (part of the Uruguay Round text) to establishing a framework of rules than to removing the distortions that had grown up over previous decades. Hence, the impact of the agreement on world agricultural trade has so far been modest. However, negotiations have now begun on a successor agreement that is expected to have a more substantial liberalising effect.

The situation that has applied since 1996 is therefore, in a sense, an interlude between the old regime of highly distorted production and trade, and a future regime of more liberal markets. The current and future situation in the EU is of particular relevance. This is because the EU is one of the most substantial of the heavily protected markets, and furthermore is a major producer. Hence any global liberalisation is likely to have a particularly marked impact on its demand for imports and supply of exports. In addition, it has been the main export market for Zimbabwe, Botswana, Namibia, and Swaziland.

The EU, which is the second-largest producer of beef and veal in the world, has already introduced under its Common Agricultural Policy (CAP) domestic agricultural reforms designed to adjust to the Uruguay Round and prepare for further change. But whether or not further reforms will be required to the beef regime in future—and their form—will depend partly on the outcome of the Agreement on Agriculture negotiations (begun in the year 2000, and confirmed in Doha, Qatar, in November 2001), and partly on the negotiations with the EU's eastern neighbours over their future membership. The European Commission's stated aim is to make domestic production of beef competitive with other meats and to enable it to be exported without a subsidy.

The EU currently provides stringent border protection for its producers in the form of a two-part import duty. For the fresh, chilled, and frozen boneless beef products exported by Zimbabwe, Botswana, Namibia, and Swaziland to the EU, the bound most-favoured-nation (MFN) rate applied has been set at a 12.8% ad valorem duty, plus a specific duty of 2,211 or 3,041 €/tonne, depending on the specific product. The bound rate is the tariff that applies to all countries without a special preferential agreement with effect from July 2000 under the EU's Uruguay Round commitments. In addition, the EU has reserved 'special safeguards' on beef products based on Article 5 of the WTO Agreement on Agriculture. It allows the EU to impose additional duties (under certain conditions) if the volume of imports exceeds a trigger level or the price of imports falls below a trigger value.

There are two gaps in this protective armour through which imports flow. One is provided under the Cotonou Agreement, discussed in more detail below, to which Zimbabwe, Botswana, Namibia, and Swaziland, and 72 other states in Africa, the Caribbean, and the Pacific are parties. The other is the WTO Agreement on Agriculture that covers imports from other supplying states. In both cases the regimes offer reduced tariffs for fixed quantities of imports that are known as 'tariff quotas' (TQs) in the jargon.

4.2.3 Future change

The effect of any new WTO reforms may be to lower still further the prices prevailing on the EU market. The Doha Declaration set a deadline of 31 March 2003 to agree modalities for further liberalisation commitments, and November 2003 for the submission of comprehensive draft schedules based on these modalities, so it is still premature to forecast what might be in the final package, beyond the broad conclusion that some level of concession is to be expected that will lower tariffs, domestic subsidies, and export subsidies.

Within the EU, the common expectation is that CAP reforms such as those being implemented under the EU's Agenda 2000 will continue to gradually lower EU domestic market prices and discourage subsidised exports, and thereby contribute to rising world market prices.

4.3 The southern African region

The countries of southern Africa have been affected by distortions in the world market in ways that depend on their trade position. In broad terms, the countries fall into three groups.

- The Cotonou beneficiaries of Zimbabwe, Botswana, Namibia, and, to a limited extent, Swaziland are all net beef-exporting states with preferential quotas in the high-priced EU market which represent a large proportion of their total exports.
- South Africa has a large FMD-free zone, and hence is able to export onto the world market, but does not have preferential access to the EU and hence experiences the adverse effects of surplus production in the industrialised countries. The EU-South Africa Agreement on Trade, Development and Co-operation does not commit either side to liberalise its beef import regime with respect to the other.
- The other, FMD-endemic countries of the region which, because they are not able to export (except to other FMD-endemic countries), are affected by the world market only to the extent that it has depressed the price they pay for any imports.

4.3.1 The Cotonou beneficiaries

The Cotonou Agreement came into force in 2000 and extends for seven years the trade provisions of the Lomé Convention, of which Botswana and Swaziland were founder members in 1975, and to which Zimbabwe acceded formally in 1985 and Namibia in 1992. During the last years of the IVth Lomé Convention, the EU expressed its intention of replacing the regime with a new one that, it claimed, would be more appropriate to the 21st century and the demands of the WTO. In the event Zimbabwe, together with its other African, Caribbean, and Pacific (ACP) partners, successfully avoided any change to the Lomé trade regime—for the moment. The Cotonou Agreement continues unchanged the Lomé trade regime, but with the proviso that the period up to 2007 be used to negotiate a successor regime more consonant with current European thinking. Other provisions have been added to the Cotonou Agreement, however, including political conditionality.

Under Lomé/Cotonou (Protocol 7), Zimbabwe, Botswana, Namibia, and Swaziland (together with Kenya and Madagascar, which are unable to meet FMD status requirements) are exempted from the ad valorem duty and benefit from a reduction in the specific duty element of the EU tariff for boneless beef. This reduction applies to the following TQs:

- Zimbabwe - 9,100 tonnes
- Botswana - 18,916 tonnes
- Namibia - 13,000 tonnes
- Swaziland - 3,363 tonnes

The Protocol contains flexibility provisions that allow quantities to be shifted between years to deal with fluctuations in supply. It also allows for quotas unused by one state to be used by another. Hence the TQ is not an absolute ceiling that cannot be exceeded under any circumstances.

In practice, however, none of the countries met its quota over a period of years (Table 4.1). Over the six years covered by Table 4.1 only Zimbabwe exceeded its annual quota, and in only one year.

Table 4.1 EU imports from southern Africa 1995-2000 (all beef items, by volume). Sources: Eurostat 1998, 1999, 2000, and 2001.

Supplier	Metric tonnes						
	1995	1996	1997	1998	1999	2000	Quota
Botswana	11,966	10,373	11,851	13,012	11,518	11,140	18,916
Madagascar	3,533	1,759	696	13	0	0	7,579
Namibia	10,177	8,546	7,143	8,898	10,365	8,641	13,000
Swaziland	379	520	326	303	417	728	3,363
Zimbabwe	10,766	6,266	7,120	6,797	6,762	7,047	9,100

The southern African share of EU imports tends to be highest in lower-value products. The southern African states account for approximately one-fifth of imports to the highest-priced EU market—that for fresh/chilled de-boned beef (known by its combined nomenclature code CN 02013000 in trade circles; Table 4.2)—but a much higher share of the substantially smaller market for lower-value frozen boneless chuck, blade, and brisket (CN 02023050). Zimbabwe and Namibia both have trivial shares of the import market for frozen boned beef excluding forequarters (CN 02023090), but Namibia accounts for over one-third of EU imports for the other frozen beef category (not shown).

Table 4.2. Composition of EU beef imports from Southern Africa (1998-2000 average volumes). Sources: Eurostat 1998, 1999, 2000, and 2001.

CN		Zimbabwe	Botswana	Namibia
02013000	Fresh/chilled bovine meat, boneless	7%	7%	8%
02023050	Frozen bovine boned crop, chuck and blade and brisket cuts	11%	18%	36%
02023090	Frozen bovine meat	1%	6%	0.4%

The prices that Zimbabwe, Botswana, Namibia, and Swaziland receive for their exports to the EU are determined by the two policies noted above—the CAP and the Cotonou Beef Protocol—in combination with the world market price. Currently, the net effect of these two policies is that elements in the southern African supply chain earn artificially high returns on exports to the EU for beef that falls within the quota. This 'economic rent' could disappear as a result either of reform to the CAP (leading to freer imports) or of change to the Cotonou Agreement, or a combination of both. The changes resulting from CAP reform have been sketched in the previous section, and translate into gradual downward pressure on EU domestic beef prices and upward pressure on world market prices. In addition, the competitive position specifically of the southern African exporters in the European market could be adversely affected by any combination of the following possible WTO-related changes to the EU CAP:

- A reduction in MFN tariff levels
- An enlargement of the TQ available to countries other than those in southern Africa
- A reduction of the tariff payable within the TQ

It would be very optimistic to assume that there will not be any change in one or more of these directions. Starting possibly as early as 2006, the result will very likely be a decline in the prices received by the Cotonou beneficiaries for exports to the EU and an increase in competition for market share.

Any change to the Cotonou Beef Protocol itself is likely to be more dramatic. There are three reasons why it might be discontinued at some point in the future.

- The EU might suspend the protocol's provisions to a country (or countries) under Cotonou's political conditionality provisions.
- The beneficiaries may fail to reach agreement with the EU on a post-Cotonou preferential trade regime. Since negotiations are not due to commence formally until September 2002, it is premature to take a view on how likely this is to happen. However, the current position of the EU is that it wishes Cotonou to be replaced by a set of Economic Partnership Agreements (EPAs) which are likely to require reciprocity. In other words, the ACP members will have to offer trade preferences to Europe in return for a continuation of their favourable access to the EU market. Zimbabwe, Botswana, Namibia, and Swaziland might object to this and decide that the costs of continuing preferential access to Europe outweigh the gains. This is less likely in the case of Botswana, Namibia, and Swaziland, though, because as members of the Southern African Customs Union (SACU) they are already committed to such reciprocity under the EU-South Africa Trade, Development and Cooperation Agreement. Zimbabwe is not a member of SACU.[32]
- The third potential threat to preferences on the EU market for beef is a challenge in the WTO. A preference for southern Africa means, by definition, discrimination against other beef suppliers. Since a cardinal provision of the WTO is non-discrimination, such treatment requires special dispensation. Under Article 9, the WTO members can relieve any member of any obligation if they deem it desirable to do so. Many of the preferences offered by OECD states to developing countries are justified in the WTO via such a waiver. After 18 months of wrangling, the Cotonou Agreement was finally accorded a waiver by the WTO at the Doha ministerial meeting. Although the waiver reduces the danger of the Cotonou Agreement being challenged through the WTO's dispute settlement mechanism, it does not rule out completely any such challenge.

Again, a post-Cotonou agreement might also enlarge the Beef Protocol TQs, or remove the quantitative limits on preferences altogether. This would pit the exporting countries against each other; it is easy to envisage a situation in which one or more state could increase exports and take over the market share of another. Could Zimbabwe increase supply to take advantage of such an enlarged TQ? Similar questions need to be asked of Botswana, Namibia, and Swaziland.

4.3.2 South Africa

South Africa is the largest meat producer in the region, but has limited scope to increase output because the carrying capacity of natural pastures is fully utilised (FAO 1996:4). As part of the economic changes following the end of apartheid, South Africa has liberalised both its domestic and international trade regimes. Its extraregional imports of bovine meat have turned the region into a net importer (FAO 1996:6). Though a net importer, it exports small quantities of beef to a

[32]Although Zimbabwe is not a member of SACU, it will have similar status to Botswana, Namibia, and Swaziland when South Africa reduces its duty on imports to 0% by 2006 under the SADC Trade Protocol. See Section 4.3.2.

number of external markets. Given that it has no significant preferential access to any of the high-priced, protected industrialised countries, South Africa would benefit from multilateral liberalisation (although such gains would have to be set against possible increases in import costs).

The country's trade position has two implications for the Cotonou beneficiary countries in the region. On the one hand, South Africa could become an increasingly important market for exports from its neighbours. On the other, South Africa's active search for new markets provides an indication of those countries, apart from Europe and the region, to which the Cotonou beneficiaries might turn their attention for export diversification. Addressing this last point, recent trade data indicate that prices earned by South Africa align closely to the average world market price for boneless beef and veal (Appendix 5). There is no evidence, therefore, from the South African experience so far to indicate that they have been able to enter major new, high-priced markets that would be a significant alternative to the EU.

Most of South Africa's demand for beef products sourced in the region currently come from Botswana and Namibia, whose imports enter duty free as members of the customs union (SACU) with South Africa. In the mid-1990s Zimbabwe renegotiated a lapsed TQ under which it was able to export 5,000 tonnes a year duty free. Otherwise, South Africa has had an import duty that is sufficiently high (40%) to have discouraged imports outside these arrangements. Under the Southern African Development Community (SADC) Trade Protocol, South Africa is reducing its duty on imports from SADC to 0% by 2006, and has already cut it to 16%. Given that most SADC states are FMD endemic, and that Botswana and Namibia are SACU members, Zimbabwe is likely to be the main beneficiary of this change. The removal of import duty might feed through to higher prices paid to Zimbabwean exporters, which would narrow the gap between returns from South Africa and the EU.

4.3.3 FMD-endemic countries

Following the EU's 'Everything but Arms' (EBA) initiative of 2001, several of Zimbabwe's neighbours have highly preferential access into the European market. Under EBA, all least-developed countries (which include Mozambique and Zambia) have completely unrestricted, tariff-free access to the European market for beef (and all other products other than armaments). In other words, there are now no TQ limitations on beef. Unfortunately for these countries, they cannot export beef to the EU due to their FMD status, and inability to meet the World Organization for Animal Health (*Office International des Epizooties*: OIE) requirements for the export of safe products from an FMD-infected zone. The assumption made in this report is that this situation is unlikely to change in the medium term. Hence, an expansion of production in these countries to take account of their theoretical access to the European market is not anticipated.

If WTO and CAP reform were to result in an increase in world prices (and, especially, in a sharp fall in EU export subsidies), there could be increased

opportunities for imports from the other countries of the region. In other words, Mozambique, Zambia, Angola, etc. could become increasingly important markets for Zimbabwe, Botswana, Namibia, Swaziland, or South Africa. The regional exporters would have a transport cost advantage over extraregional suppliers. But, this apart, prices could not rise much above world market levels.

4.4 Internal pressures and trade outlook: the case of Zimbabwe

4.4.1 The domestic market

According to official figures, beef and veal production in Zimbabwe in 1998 totalled 66,300 tonnes (Agrisystems 2000, Table 6). The high slaughter rate in the early part of the decade was partly due to the severe drought of 1992/3. Since the official production figures appear to ignore unofficial and informal slaughter, a more realistic figure for 1998 would probably be of the order of 100,000 tonnes of cold dressed weight on the assumption that the annual number of animals slaughtered is over 500,000 head (Agrisystems 2000:37).

The bulk of production is, of course, consumed domestically. Even on the official figure for production, 85% is domestically consumed (Agrisystems 2000, Tables 6 and 7). For meat passing through the export abattoirs of the Cold Storage Company (CSC), over half is consumed domestically. According to CSC officials, for every carcass slaughtered, 40% is exported to the EU, 6% to the region, and the remaining 54% consumed on the domestic market.

Until 1993 CSC had a domestic monopoly of beef processing, but the market was liberalised in that year. There has been a subsequent growth of private abattoirs and CSC has seen a steady loss of its domestic market share, down to 40% in 1998, with a further fall in 1999 (Agrisystems 2000:43). CSC still retains an export monopoly. Its three abattoirs supply both the domestic and the export markets.

In the days in which it had a domestic monopoly, there was a deliberate policy of cross-subsidising prices. This meant that the market premium obtainable on exports to the EU was used to maintain lower prices to consumers in domestic markets and importers in non-EU markets than would otherwise have been possible. This is no longer official policy, but in practice it remains the case. This is because the private abattoirs, which supply only the domestic market, appear to be price leaders. For whatever reason, CSC is not able to obtain adequate supplies either to fulfil its EU quota or to keep its abattoirs working at full capacity. It follows that the prices it pays are not considered by farmers to be sufficiently attractive relative to those available for sale on the domestic market. The apparent difficulty of CSC to compete as a buyer in domestic markets is likely to handicap its ability to compete as a supplier in international markets.

4.4.2 Exports

It is widely accepted that the EU is Zimbabwe's most important beef export market, although attempts to elaborate on this general proposition quickly run into problems of data (as reviewed in detail in Appendix 5). According to the National Livestock Development Study, the EU accounts for 95% of beef exports (Agrisystems 2000, para. 5.2.3). This high share is confirmed in both volume and value terms by Tables 4.3 and 4.4, based on CSC and Central Statistics Office (CSO) data. (Values in Table 4.3 are reported in current Z$, Zimbabwe dollars. Exchange rates for Z$ to US$ are reported in the note on the end page).

Table 4.3 The EU's share of Zimbabwe beef exports by value, 1995-98 (national data). Source: Linds Agricultural Services.

Year	Total bovine exports to the EU (CSC) (Z$, f.o.b.)	Total bovine exports to non-EU markets (CSO) (Z$, f.o.b.)	Importance of EU market by value (% of total exports)
1995	689,000,000	15,269,848	98
1996	503,000,000	32,692,371	94
1997	402,000,000	10,702,598	97
1998	687,000,000	71,746,514	91

Detailed data for Zimbabwe indicate that exports to the EU generally earn the highest average prices per unit among its export destinations (see Appendix 5). For example, the unit value of fresh/chilled boneless beef was almost twice as high for imports into the EU in 1998 as into South Africa, and in 1996 the EU value had been over four times higher.

Table 4.4 The EU's share of Zimbabwe beef exports by volume, 1986–2001. Source: CSC Annual Reports and Balance of Payments Forecasts.

Year	Exports to EU (tonnes)	Total exports (tonnes)	EU share (%)
1986	4,416	4,621	96
1987	9,810	10,422	94
1988	8,367	8,492	99
1989	3,873	1,645	n.a.
1990	715	3,698	19
1991	2,367	4,082	58
1992	6,640	9,576	69
1993	14,503	14,907	97
1994	13,810	14,506	95
1995	11,668	11,800	99
1996	7,000	7,550	93
1997	6,560	6,957	94
1998	7,653	8,523	90
1999	6,746	8,074	84
2000	9,184	11,317	81
2001 est.	11,100	14,519	76

The benefits to Zimbabwe provided by the current combination of CAP protectionist policies and the Cotonou Agreement on exports to the EU are made clear by a comparison of the cash equivalents yielded by the tariff structures under the Cotonou Agreement, under the Agreement on Agriculture (which apply primarily to non-ACP countries), and under MFN (see Appendix 5 for details about the tariff structures). The comparison reveals that Zimbabwe (and probably the other exporting southern African states) gains a significant preference even over the 'in-quota' exports of their American and Antipodean competitors (Table 4.5). In the case of fresh or chilled beef, for example, the tariff paid by Zimbabwe on exports within the TQ is € 242 per tonne. The tariff paid by its non-ACP competitors ranges from € 963 (for Brazil) up to € 1,414 (for Argentina).

Table 4.5 Preferential tariff paid by Zimbabwe and non-ACP states (€/tonne). Sources: Eurostat 2000; UK Tariff 2002.

Tariff item	Supplier	Tariff (€/tonne)	
		In quota[a]	Out of quota
Fresh or chilled beef (CN 02013000)	Zimbabwe	242	3,587
	Argentina	1,414	3,939
	Brazil	963	3,650
	Uruguay	1,187	3,794
	Australia	1,030	3,693
	USA	976	3,658
	Canada	1,012	3,682
	New Zealand	1,018	3,686
Frozen beef (CN 02023050)	Zimbabwe	176	2,424
	Other suppliers[b]	343-537	2,430-2,555
Frozen beef (CN 02023090)	Zimbabwe	243	3,310
	Other suppliers[b]	218-1,600	3,174-4,058

Notes:
[a]The preferential tariff for non-ACP TQ beneficiaries is an *ad valorem* rate of 20%. These €/tonne figures have been obtained by applying the 2002 preferential tariff to the unit value of imports made in 1999. There were no imports of fresh/chilled beef from Paraguay in 1999.
[b]There is a global TQ for frozen beef. The ranges of tariffs shown are for all non-ACP suppliers of these items.

For all suppliers the out-of-quota tariff is substantially higher than the in-quota level. Whereas Zimbabwe is not able to consistently fill its very lucrative TQ, many of Zimbabwe's competitors often fill their less lucrative TQs and even export substantial quantities out of quota. Only 62% of Brazil's exports to the EU, for example, fell within the TQ; the rest paid the full MFN tariff of € 3,650/tonne.

4.4.3 Inferences about competitiveness

This part of the team's work cannot establish definitively the competitiveness of Zimbabwe compared with other suppliers, but it can throw up pertinent questions that need to be answered in this respect. The principal question arising from the comparative analysis of tariffs faced by Zimbabwe and its competitors is: *Why is it*

that Zimbabwe does not fulfil its TQ when its competitors pay a substantially higher tariff on in-quota sales and are also able, mostly, to export competitively out of quota? A similar question can be asked of the other southern African exporters, since they also fail to fill their quota regularly.

The reason why the question is important is that in future countries exporting to the EU are likely to export larger volumes at lower unit values. How likely is it that Zimbabwe (and the other southern African exporting countries) could increase the volume of its exports at a future, lower EU price? If, at present prices, Zimbabwe has a comfortable price margin, then it would be reasonable to expect it to be able to weather a fall in prices and increased competition from the South American beef exporters. If, by contrast, Zimbabwe can cover its supply costs only at present EU prices, the outlook is bleak (unless the supply side can be made more efficient).

The volume of exports to the EU is not limited by an absolute restriction: the Cotonou quota (see below) applies only to the volume of exports that receive preferential treatment. Zimbabwe is allowed to export a larger volume than this, but it would have to pay MFN tariffs. Table 4.6 shows the utilisation of the Lomé/ Cotonou beef quota over the period 1990-2000. In 7 of the 11 years covered, utilisation has been below quota.[33]

Table 4.6 Zimbabwe's utilisation of EU beef quota[a], 1990–2000. Source: CSC

Year	Beef exports (tonnes)	Quota utilisation (%)
1990	715	8
1991	2,367	26
1992	6,640	73
1993	14,503	159
1994	13,810	152
1995	11,668	128
1996	7,000	77
1997	6,560	72
1998	7,653	84
1999	6,746	74
2000	9,184	101

Note:
[a]Quota = 9,100 tonnes

There appear to be different explanations for the low quota utilisation rates in different years. In 1990, the country was still experiencing the tail end of an 18-month ban on exports to the EU as a result of an FMD outbreak that began in 1989, and this carried over into supply during the following year as well. Then, in

[33]The above-quota levels in 1993-95 are permitted by the provisions of the Beef Protocol—see below.

1992, there was a drought. The following three years see overfulfilment of the quota, drawing upon carry-overs from the previous underutilised years (and from other protocol beneficiaries). This process of overfulfilling came to an end in 1996, however, and until the year 2000 the country was unable to fulfil its quota. This is attributed to the financial difficulties of CSC, which have restricted its ability to purchase in the market. If the problems of CSC are overcome, does Zimbabwe have the capacity to supply a larger volume of exports to the EU than it has done in the past?

4.4.4 How might the trends in the EU market affect Zimbabwe?

The trends associated with anticipated WTO agreements and CAP reforms are very likely to erode Zimbabwe's current preference over the EU's principal suppliers in South America. The impact of any erosion will be influenced by the extent to which the current preferences feed through into higher price incentives for Zimbabwean farmers.

Zimbabwe (and more generally southern Africa) might be expected to respond in several ways to a reduction in these incentives when the preferential margin is eroded:

- One or two of the southern African Cotonou beneficiaries could increase their supply to take over, first, the quotas of the others and, later, compete head on with the South American beef exporters.
- All the southern African beneficiaries might find themselves unable to compete in a liberalised EU market and redirect their exports to other markets where lower prices are partly offset by lower supply cost.
- All, or most, of the southern African states might maintain their present exports, albeit at lower prices, until there has been a substantial opening of the EU market (which will probably not occur this decade).

4.4.5 The extent of the preferential margin

A key question in determining which of these possibilities is the most likely concerns the extent to which the EU preferential price feeds through to Zimbabwean suppliers. The answer will heavily influence our judgement on:

- Why the supply of beef for export to Europe has not been higher
- Whether Zimbabwe could cope with a fall in EU prices.

If a large part of the EU preferential price accrues to producers and processors, any fall in export market prices will tend to reduce their income. But, if a large part accrues to importers, there will not necessarily be any large direct impact on Zimbabwean incomes. The effect in this case would be on the willingness of importers to buy Zimbabwean beef given that their profits have fallen. They might seek to recoup their losses by offering lower prices, thus indirectly affecting Zimbabwean incomes (the effects of which are described in the next chapter), or cease to import from the country at all.

To try to address these questions, unit values of Zimbabwean exports to various destinations were compared to get a sense of the portion of the EU preferential price representing production costs (captured by the commodity chain in Zimbabwe) *versus* marketing margin (captured by exporters/importers). The poor quality of the data permit only limited analysis, but two results are yielded:

- CSC f.o.b. returns from exports to the EU in 1998 were roughly twice as high as the f.o.b. value of exports to South Africa, and two-and-a-half times higher than exports to other markets.
- The unit value of exports to non-EU destinations is significantly lower than the Food and Agriculture Organisation of the United Nations (FAO) average global figure for boneless beef and veal exports in 1998—a finding that might be explained by Zimbabwe's exporting a large proportion of its higher-value cuts to the EU, leaving lower-value cuts for other markets.

It seems likely, therefore, that CSC has indeed received premium prices for exports to the EU. However, this finding must be viewed in the light of two suggestive pieces of information:

- When unit values for EU beef imports are examined over a wider range of countries and suppliers, Zimbabwe's imports are seen to consistently receive the lowest prices of the various suppliers.
- The unit values for Zimbabwe's beef imports into the EU declined steadily over the period 1996-2000, while those for other suppliers remained unchanged.

It would appear, therefore, that the prices received by Zimbabwe for its exports to the EU are high by international standards, but low and declining in comparison with the prices received by other suppliers. Evidence collected by CSC indicates that Zimbabwe is not supplying a lower quality of meat than the other suppliers; on the contrary, its quality appears to be high.

Several explanations have been provided by CSC for the low (and declining) unit values, but their potential influence could not be evaluated. They are that:

- Zimbabwe exports primarily to the lower-priced UK market, whilst its competitors also tap higher-priced European markets.
- Zimbabwe's exports are concentrated in a short period during the European summer.
- Zimbabwe is unable to negotiate forward contracts (which attract higher prices) because it cannot guarantee its ability to purchase cattle on the market.
- Problems with acquisition of cattle have caused it to increase the proportion of lower-value forequarter cuts in its sales to Europe.

The first two of these explanations do not appear to be confirmed by EU import data; the other two, whilst very plausible, cannot be checked against any information available to the study team. But, to the extent that they are valid, they

are both problems that arise from the operating difficulties of CSC. If the financial and practical difficulties that Zimbabwe has experienced in exporting to the EU can be overcome, the declining price trend might be reversed. Further research into the reasons for the low prices obtained by Zimbabwe is strongly recommended. This is because successful efforts to remove the causes could offset the expected fall in EU prices. It would strengthen, therefore, the commercial case for the retention of FMD controls.

4.5 Trade scenarios for future revenue from beef exports

The possibility of continuing exporting beef is one of the driving forces for promoting further investment in FMD control in southern Africa. To evaluate whether such investment is justified in the case of Zimbabwe, the potential future returns from the beef trade need to be estimated. It is evident from the foregoing that there is a wide range of possible outcomes for the future, with far too many unpredictable variables to allow any one path to be selected as the most likely. For this reason, a limited number of scenarios are considered. Three potential future trade scenarios are described in this section, representing a wide range of possible outcomes.

The trade scenarios described take a demand-side focus, depicting potential trends for the prices that southern African countries could face for their higher-quality beef exports. Volume constraints in terms of TQs are also identified where they apply, but otherwise the scenarios do not directly address the issues of Zimbabwe's long-term supply capacity. Evidently, the country's export supply in the future will be heavily determined by the size of the extraction zone (which is one dimension of the FMD control scenarios presented in Chapter 2, and analysed in Chapter 6). In addition, however, supply capacity will also be influenced by production intensity, the demands of the domestic market that cannot be met from imports, and the relative attractions of selling abroad compared with the alternatives (which could be sale of beef onto the domestic market or a shift by producers from beef production to other economic activities). In the absence of a major analysis of the commercial viability of livestock production in Zimbabwe (which has not been the subject of the present report), it is possible only to make the hypothetical assumption that the volume of exports that Zimbabwe would be able to supply at different international prices will largely remain at recent trend levels.

4.5.1 Trade Scenario 1: world market competitiveness

The first scenario assumes that Zimbabwe no longer has access to the higher EU prices, whether due to sudden changes in EU policies or due to Zimbabwe's inability to meet EU import requirements. In this case, Zimbabwe would need to continue exporting competitively at world market prices to non-EU markets.

At what price is it reasonable to expect such sales to be made? As described above, continuing liberalisation of international trade will tend to raise world prices. Most economic simulations of global liberalisation tend to assume that the

decline in production in heavily protected states would be substantially offset by increased production in those countries that do not subsidise heavily (such as Australia and Argentina). One recent FAO simulation of the impact on beef of a complete phase-out of producer supports in both developed and developing countries foresees the border price rising by 13% (in real terms) over the period to 2030 (FAO 2002). If this increase is applied to the average global import unit value for boneless beef and veal in 1997 (Appendix 5 Table App5.10), it suggests a figure of US$ 3,212 per tonne by 2030.

It could be argued that the FAO average figure is misleading, because Zimbabwe would tend to export only higher-value cuts. It is understood that the sales to Libya under the recently concluded agreement will be made at US$ 3,300 per tonne c.i.f. If this figure is taken as representative of the premium world price and is increased similarly by 13%, it results in a figure of US$ 3,729 by 2030. Assuming the price trend to be gradual and steady over the study period yields the prices in the table below.

Table 4.7 Trade Scenario 1 prices, 2002-30 (constant US$/tonne)

	2002	2010	2020	2030
Average world price[a]	2,900	2,989	3,100	3,212
Premium world price[b]	3,300	3,423	3,576	3,729

Notes:
[a]Based on FAO average figures: see Table App5.11 in Appendix 5.
[b]Based on reported figure for exports to Libya.

4.5.2 Trade Scenario 2: moderate change in the EU

The other two trade scenarios assume that Zimbabwe continues to have access to the EU premium prices, but that liberalisation and/or changes to the Cotonou Agreement act to compress and eventually eliminate the price advantage of the EU markets *vis-à-vis* the world price. In Scenario 2, change to the EU policy regime is moderate. This means that prices fall slowly, and the scope for Zimbabwe to increase exports is limited.

Under this scenario, the Cotonou Agreement is not abruptly discontinued and CAP reform rumbles on slowly. Moreover, it is assumed that the Cotonou Agreement is replaced by a mutually acceptable trade regime and, hence, the preferences continue to 2020 and beyond.

In essence it is assumed that:

- The Agenda 2000 decision to reduce the intervention price by 1 July 2002 is implemented, but there is no further change until 2005 (which is the deadline for the Doha Round to reach agreement)

- Thereafter, it is assumed that MFN tariffs are reduced initially by the same level and over the same time period as during the Uruguay Round, i.e. by 36% over six years; this would still leave MFN tariffs prohibitively high, and so most imports would continue to enter via TQs
- But, at the same time, the post-Cotonou EPA reduces the duty on Zimbabwe's TQ to zero
- And the EU would aim to align its prices to world market levels by 2020, by which time MFN rates would have fallen to a non-prohibitive level.

Table 4.8 sets out the predicted prices for Scenario 2. In addition to figures for the current year, 2010, 2020, and 2030, an intermediate figure is used for 2005 - which is the assumed starting period for the Doha implementation.

Table 4.8 Trade Scenario 2 prices and volumes, 2002-2030 (constant US$/tonne and tonnes)

	2002	2005	2010	2020	2030
Base price[a]	3,764	3,764	3,432	3,100	3,212
Tariff cut[b]	0	0	213	213	0
Total	3,764	3,764	3,645	3,313	3,212
Export volume limit	9,100	9,100	9,100	20,000	unlimited

Notes:
[a]Based on CSC data—see Table App5.19 in Appendix 5.
[b]Reduction of tariff from level in 2002 —see Table App5.13 in Appendix 5.

The row labelled 'Base price' takes the CSC-reported value of exports to the EU in 2000 in euros, and converts it into US dollars at the end-2001 exchange rate. No change in this price is anticipated until after 2005.[34] Between 2005 and 2020 the EU price is assumed to be reduced to fall to the world market level (given by row 1 in Table 4.8).

The second row of Table 4.8, labelled 'Tariff cut', takes account of the assumed improvement in the Cotonou preference after 2007. Zimbabwe currently pays an import duty of € 242 per tonne (equivalent to US$ 213 at end-2001 exchange rates) (Appendix 5). The assumption made for this scenario is that Zimbabwean exporters are able to capture all of the gain that results from the removal of this tariff, with the result that prices are higher than they otherwise would be. But it is also assumed that between 2020 and 2030, the EU's MFN tariff falls to a sufficiently low level that it no longer provides TQs for the favoured few, and that this premium disappears.

The maximum volume of Zimbabwean exports is assumed to be limited to the current TQ of 9,100 tonnes until after 2010. However, it is also assumed that at some point after Doha the EU agrees to a significant increase in TQs (possibly as

[34]Any further fall in EU prices is assumed to be offset by improvements in the supply chain to overcome the problems that have resulted in Zimbabwe's receiving lower prices than its competitors.

part of a follow-up round of liberalisation), and this is indicated by increasing the maximum potential export volume to 20,000 tonnes by 2020. By 2030, when the EU's trade regime for beef is assumed to be relatively liberal, the quotas have been removed (or are no longer constraining), and so export volumes are limited only by Zimbabwe's supply capacity.

4.5.3 Trade Scenario 3: radical EU change

It is considered unnecessary to provide a trade scenario in which Zimbabwe's access to the Beef Protocol is summarily suspended under political conditionalities. It is also considered unlikely that a challenge to the Beef Protocol under dispute settlement would result in its suspension in the very short term. The delay over a similar dispute about bananas indicates that a challenge made within the next year could easily rumble on until 2005/06 before being finally resolved.

Hence, this scenario is limited to two elements:

- In respect of market access, it is assumed that:
  - Zimbabwe does not reach an agreement with the EU on a preferential regime after the Cotonou Agreement expires in 2007
  - *But* that, if Zimbabwe fails to agree a successor to Cotonou, it obtains access to the EU's Agreement on Agriculture TQs
  - *Or* that the country does agree a post-Cotonou EPA, but subquotas of the Beef Protocol are removed and the total is increased to a level that is not constraining.
- And in relation to EU prices and competition, it is assumed that the pace of change for the CAP is relatively fast, but that the first changes will be further reductions in the intervention price rather than substantial market access liberalisation.

This combination of changes means that Zimbabwe's TQ for its preferential exports until 2007 would not change, but it would just get a lower price for every tonne exported. From 2007 onwards it would face greater competition in the EU market, either just from the other southern African states or from these countries plus South America/Australasia; like these states it would have to pay the full MFN tariff (albeit at a level set lower than at present following CAP/WTO reform), but would continue to obtain a reduced-duty TQ (either under an EPA or under the Agreement on Agriculture) substantially above the current volume.

The figures for Trade Scenario 3 are set out in Table 4.9. As for Trade Scenario 2, the price in 2002 and 2005 is set by the current US dollar equivalent of the prices actually obtained by Zimbabwe in the year 2000. Similarly, EU prices are expected to fall after Doha in order to reach world market levels by 2020.

The main difference between Tables 4.8 and 4.9 is that the sign on the second row has changed from positive to negative. Under Scenario 3 it is assumed:

Table 4.9 Trade Scenario 3 prices and volumes, 2002-2030 (constant US$/tonne and tonnes)

	2002	2005	2010	2020	2030
Price	3,764	3,764	3,432	3,100	3,212
Tariff increase or competitive effect[a]	0	0	-473	-407	0
Total	3,764	3,764	2,959	2,693	3,212
Export volume limit	9,100	9,100	13,650	20,000	unlimited

Note:
[a]Effect of shifting from Cotonou to Agreement on Agriculture preferential tariffs—see Table App5.13 in Appendix 5.

- *Either* that Zimbabwe ceases to benefit from the Cotonou preference but, instead, receives the same preferential arrangements as the South American and Australasian suppliers
- *Or* that the Cotonou TQ is globalised and that there is competition between the southern African countries.

In the first case, the increased import duty that Zimbabwe would have to pay can be quantified (see Appendix 5 Table App5.13). In the second case, there would be an unquantifiable reduction in price in order to maintain market share, but for the sake of simplicity it is assumed in Table 4.9 that this is identical to the effect of an increased tariff. Hence, row 1 shows that the price received by Zimbabwe in 2010 would be US$ 3,432. If it had to pay the preferential tariff under the Agreement on Agriculture (20%), the import duty would be US$ 686 per tonne. This is US$ 473 higher than is payable at present under the Cotonou preferential regime. It is assumed that the price received by Zimbabwe falls by the difference between the present Cotonou tariff and the future Agreement on Agriculture tariff. The reduction is smaller in 2020 (because the Agreement on Agriculture TQs face an *ad valorem* tariff which, naturally, declines as the unit value of imports falls). By 2030 the price has dropped to the world market level and tariffs have been reduced to either zero or very low levels, and so the figure in row 2 returns to zero.

Zimbabwe's exports would be constrained to 9,100 tonnes only until 2007, when Cotonou expires. The table assumes that as part of the Doha Round the EU agrees to increase by 50% all of its TQs, and that it then increases them further by 2020.

4.5.4 Synthesis of trade scenarios

A summary of the price levels resulting from the different trade scenarios is given in Figure 4.1. This takes the two 'world prices' given in Trade Scenario 1, together with the net prices under Scenarios 2 and 3. An important point in the figure is when the EU price under Trade Scenarios 2 and 3 equals or falls below one of the two 'world market' prices. From this point on it is no longer important

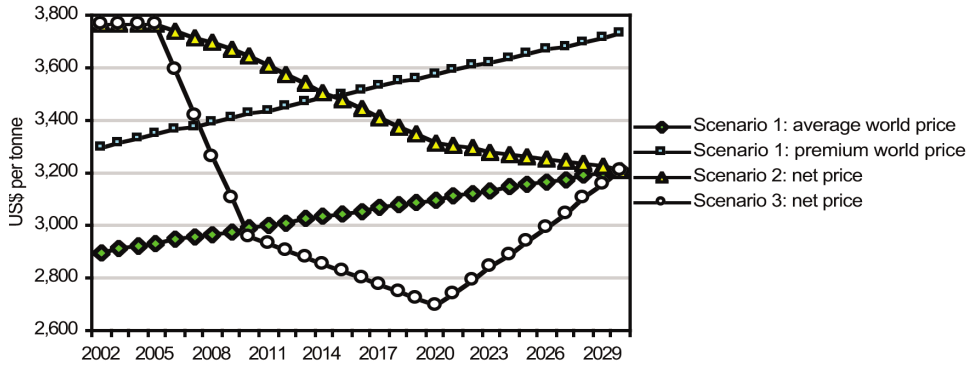

Figure 4.1 Summary of price levels in Trade Scenarios 1–3

what happens in the EU market, since it is equally/more profitable to export onto the world market.

Under the assumptions of the trade scenarios, the premium world price begins to exceed the EU price in about 2008 for Trade Scenario 3 and about 2015 for Trade Scenario 2. Since the Libyan order for beef is understood to be for a quality of meat and slaughter arrangements equivalent to those required by the EU, it is reasonable to assume that Zimbabwe,s current supply capacity is of the order of 9,000-10,000 tonnes.

It needs to be recognised that the three scenarios represent Zimbabwe as a price-taker in international markets, targeting its exports to the highest value prices. This simplified view of the world ignores the possible dynamics that determine Zimbabwe,s ability and willingness to supply at those prices, and its ability to successfully compete for market shares. In particular, if Zimbabwe continues to lower import tariffs in implementing its agreed liberalisation under SADC, it is likely that its cattle industry will suffer on the price front through two reinforcing trends. Not only will export prices fall (as set out in Tables 4.7-4.9), but also the domestic market price will decline as imports create increased competition. If the country is currently not able to meet both domestic demand and its export quotas, it is clearly necessary to give serious thought to the ways in which costs or the structure of the sector (i.e., increasing the production orientation of the communal sector by compensating for the other livelihood functions of cattle) could be altered in order to lead to a substantial increase in domestic production. Without this, one would normally expect the result of lower export and domestic prices to be that production would fall rather than rise.

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Chapter 5

The costs of foot and mouth disease (FMD) and its control

5.1 Introduction

The epidemiological impacts of FMD in southern Africa and the measures taken to control the disease have been described in Chapter 2. As noted, the strictly veterinary impacts of FMD, given the particular environment and production systems characterising the region, have tended to be modest compared to corresponding impacts in Europe. Though smaller in veterinary significance, the presence or risk of the disease nonetheless has substantial socio-economic implications. These are summarised in Figure 5.1. Based on the framework presented in Figure 5.1, this chapter explores the range of impacts associated with FMD and its control specific to the southern Africa context, and more especially that of Zimbabwe.

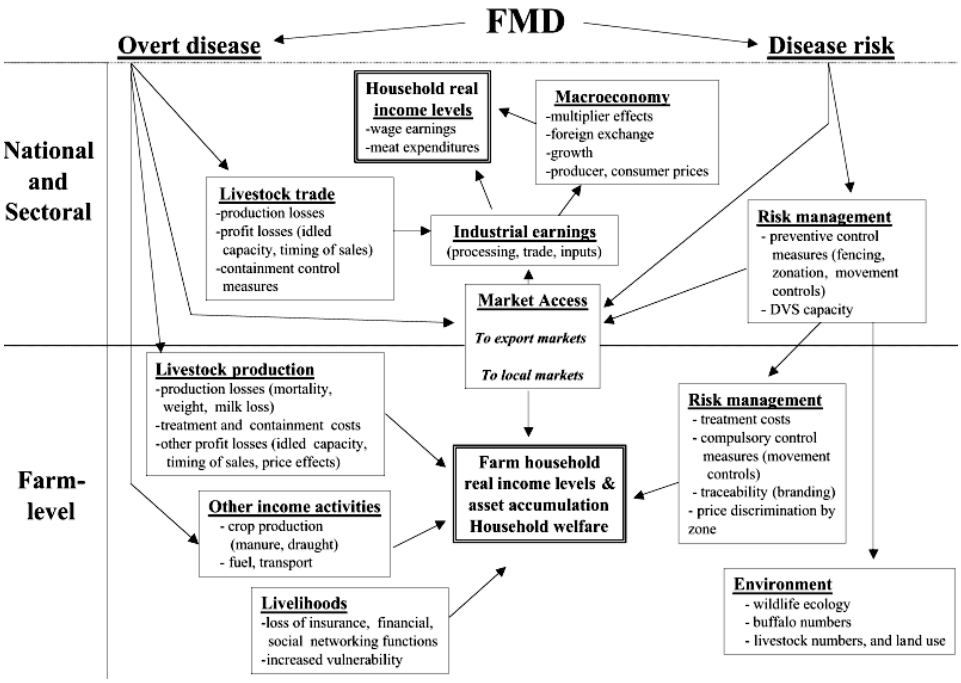

Figure 5.1 Conceptual model for FMD impacts

5.2 Pathways for disease impact

It is useful to distinguish between two different pathways by which FMD has impact. The first relates to actual outbreaks when overt clinical disease affects animals and their commodity systems, as well as access to domestic and export markets. Even if no outbreak occurs, however, the risk of FMD is also responsible for incurring costs to cattle keepers and society as a whole, both through the measures taken to prevent the disease from occurring, and through the effects of uncertainty about the success of these measures on access to export markets.

5.3 The impact of overt disease

5.3.1 Farm-level productivity

When an FMD outbreak occurs, affected animals display clinical signs that inhibit their growth and performance, and in some instances leads to death of the animal. Sick, infected animals feed less and may lose weight and, in the case of cows, produce less milk. Since the animal's hooves are also affected, draught animals may be unable to be worked for several days or weeks, depending on the severity of the case.

For the cattle keeper, these clinical signs may translate into lowered profitability and loss of income from livestock activities via several sources:

- Loss of the asset value of animals that die, usually limited to young calves
- Lost value of harvested meat or reduced sale value of an animal or its meat due to weight loss or being considered less fit
- Lost value of milk production
- Lost value of draught power, possibly requiring replacement hiring
- Cost of treatment for the animals (generally borne by the Department of Veterinary Services (DVS) in Zimbabwe)
- Cost of other containment measures to avoid further spread of the disease within the herd, including vaccination (also generally the responsibility of the DVS in much of southern Africa)

Besides these direct costs, an outbreak of FMD on a farm will lead to the farm being quarantined with restrictions on movements of animals. The livestock keeper will therefore not be able to move animals to market that are ready for sale and delay the beginning of a new production cycle, adding further to production costs for maintenance and idled capacity. All animals on the farm, whether infected or not, can only be marketed directly for slaughter, limiting the farmer's marketing options and negotiating power and contributing to lower prices for their animals.

The loss or illness of the cattle may also contribute to lower profitability and income from other income-generating activities, particularly crop production and transport, if the farmer uses the cattle for draught power or their manure as fertiliser. Manure is also used as fuel in some areas.

In Zimbabwe, these types of effects have been more important on commercial farms than in communal areas. As noted in Chapter 2, the indigenous breeds used in communal systems are generally less severely affected by FMD, and typically are not involved in a time-limited production cycle for market. Only the timing of delayed draught activities is likely to be critical. Otherwise, infected animals can be permitted to recover weight under open grazing. On commercial farms as well, infected animals in the process of being finished can be moved to open grazing until they are permitted to be moved for slaughter, minimising the maintenance costs and permitting compensatory weight gain. However, the eventual loss in price premium to commercial producers for these animals may remain substantial.

In the communal sector, FMD may lead to additional livelihood impacts, as discussed in Chapter 3. The loss or reduced market value of animals can also reduce their additional value to communal households as insurance, financial, and social networking instruments. Moll (2001) has argued that these uses can be quantified and assigned monetary value that is not reflected in market prices. Difficult to quantify, though, is the increased vulnerability and exposure of poorer households that lose income or assets due to FMD.

5.3.2 Sector-level productivity

FMD outbreaks can also occur in animals that have been sold and assembled, usually for finishing in feedlots and slaughter. In this case, the traders, feedlot operators, or processors who are holding the animals will suffer lower profits and revenue losses as they bear the cost for treatment, containment (vaccination), and any loss of animals. More significant may be the financial losses incurred in continuing to feed animals under quarantine, lacking the option of returning the animals to pasture. During the Zimbabwe outbreak of 2001, for example, private auctioneers reported incurring losses amounting to Z$ 7.2 million a month to maintain their quarantined cattle. (See the note on end page for the relevant US$ exchange rate). Such financial losses are further compounded by idling of production capacity, as well as reduced marketing options and sale value for the infected herd.

When an outbreak is identified, a number of control measures are taken to contain the spread of the disease. The DVS is largely responsible for financing, implementing, or coordinating these responses, though the private sector and commercial cattle keepers are becoming increasingly involved. These actions for Zimbabwe have been described in Chapter 2, and include farm inspections, treatment, vaccination, branding, surveillance, and movement controls (roadblocks). Botswana has also maintained a policy of paying compensation for any livestock slaughtered as a containment measure (Oarabile 1994).

5.3.3 Market disruption

An FMD outbreak affects livestock markets in southern Africa in two main ways. First, control measures taken to contain an outbreak include movement restrictions that often disrupt the regular supply of cattle to local markets, whether

for slaughter or for resale for other purposes. This reduces producer prices in the outbreak zone, but may raise prices outside that zone as auctioneers and processors seek supplies elsewhere. Traders and processors located within or near the outbreak area may also see their volumes and throughputs affected, contributing to financial losses, though others may gain from pricing shortfalls. These disruptions will also be transmitted to local meat markets and will affect retailers and consumers. Overall, the losses borne by producers, traders, processors, and consumers within the outbreak area may be offset to some degree by gains for those outside the zone. These impacts tend to be transitory.

The second market effect has much farther reaching and longer term implications. For those countries that export meat products, as do several of the countries in the region (Chapter 4), an FMD outbreak will trigger a suspension of export trade in most livestock products until the country is once again considered to be FMD free, often a year or more after the initial outbreak. The outbreak in 1989 in Zimbabwe led to a ban on beef exports to the European Union (EU) lasting 18 months. The current ban following the outbreak in August 2001 is expected to continue until at least the end of 2002.

The processing companies that export meat are immediately affected by the ban, having to quickly readjust their procurement, production, and marketing strategies. Underutilised capacity and financial losses in the export livestock processing industry are inevitable. In Zimbabwe, Cold Storage Company (CSC) supplies both the export and domestic markets and so can divert supplies intended for export to the domestic market. However, the demand for high quality cuts is relatively modest in the domestic market, so the company may incur losses selling at lower prices and in making the necessary adjustments in its processing and marketing channels. Following the outbreaks in 2001, it had to temporarily reorient much of its capacity to slaughtering out infected herds from its feedlots, and canning the meat rather than selling it at the higher price for fresh or frozen cuts. CSC estimates its financial losses to total Z$ 800 million for the last five months of 2001. The ban required CSC to curtail production during the usual peak season of the year. Pork exports were similarly affected, and COLCOM was forced to hold supplies intended for South Africa and cut back production.

The ban on meat exports may also lead to trade restrictions on other commodities. Neighbouring FMD-free countries may be apprehensive about FMD being carried by other materials or in transport that has possibly been exposed to the virus. For example, South Africa banned a thriving informal cross-border trade in thatching material following the outbreaks in Zimbabwe in 2001. The export of hunting trophies may also be considerably delayed. Whether the risk is valid or not, the perception of potential risk is sufficient for countries to impose such restrictions, or in some cases may be used as a pretext to impose restrictions on an *ad hoc* basis.

Beyond the losses suffered by the export companies themselves, the loss of the export market for beef generates a number of ripple effects in the national economy. First, the loss of export revenues is also a loss of foreign currency

needed to maintain the country's balance of payments and to finance needed imports. Currently, exporters in Zimbabwe are required to remit 40% of their foreign currency earnings to the Treasury. Availability of foreign currency is critical for importing key inputs for the livestock sector, including FMD vaccine, and has an added premium value when there are shortages, as is the case currently in Zimbabwe.

Reduced activity and financial losses in the livestock export sector also translate into lower demand for inputs and factors of production from other sectors of the economy. These income losses in other sectors then, in turn, reduce their respective input and factor demands, and so on, creating what are termed multiplier effects in the rest of the economy. Using national input-output models that describe the factor and revenue flows between sectors within the economy, the distribution of these losses can be estimated by sector. Garner and Lack (1995) included estimates of multiplier impacts on the value of output, income, and employment in both livestock and non-livestock sectors when simulating the impact of an FMD outbreak in different regions in Australia. Their results indicated that a US$ 1 loss of beef production, for example, generated an additional US$ 2.20 loss in output in other sectors. As will be discussed in the following chapter, Hayden and Williams (1981) and Townsend et al. (1998) have used a similar approach to evaluate the impact of a contagious bovine pleuropneumonia (CBPP) outbreak in Botswana, and estimate that a loss of P 1 (Botswana pula: US$ 1 = P6) of beef export revenue compounds to a cumulative P 8.3 loss to national income. As part of the present study, such an analysis has been conducted for Zimbabwe that also takes into account the expected adjustments in relative prices across the economy (see below).

Reduced national income is likely to restrict investment levels as well, contributing to lower longer-term economic growth.

The suspension of meat exports would be expected to put significant downward pressure on commodity price levels within the livestock sector. In principle, exports to the EU should command a price well above the world market, and well above domestic market prices in countries within the region. This price premium should be transmitted to the domestic market as demand for supplies for export pulls domestic prices higher than would be the case in the absence of exports. As suggested in Chapter 4, however, Zimbabwe does not appear to have been capturing much of the potential export price premium. It is also not clear to what degree export prices or fluctuations in export prices have been transmitted to the domestic market or simply absorbed by CSC, and this remains subject to analysis. A probable scenario would be that the higher price gained from exports to the EU has permitted CSC to offer higher producer prices and lower retail meat prices for its production destined for domestic markets than would have been feasible in the absence of exports. If true, then long-term suspension of beef exports would probably constrain the CSC behaviour and lead to lower producer prices, creating losses for producers, both directly on their cattle sales and in terms of the overall value of their cattle assets. The absence of pressure from export prices, and the short-term glut in the domestic market due to diverted export

supplies, might also cause retail meat prices to fall, benefiting consumers and raising real incomes. This effect could be quite substantial given the role that meat plays in household consumption and expenditures in Zimbabwe (see Section 3.8).[35] Meat accounts for 9.5% of average annual household consumption expenditures in Zimbabwe, 8.5% among the poor, and still 6.1% among the very poor (Government of Zimbabwe 1998).

However, price levels do not appear to have declined following the current suspension of exports to the EU, which some industry experts attribute to the subsequent development of a lucrative export trade to the Democratic Republic of Congo. This, combined with reduced motivation among communal sector cattle keepers to sell their cattle to finance crop inputs this season (due to a government programme to provide those inputs directly), has led instead to rising real prices.

In relative terms, the macro-economic impacts of a suspension of beef export trade-both the price effects within the livestock sector and the multiplier effects of income losses through other sectors of the economy—can be expected *a priori* to be much larger than the direct disease effects on cattle and meat processing. These economy-wide impacts affect real incomes of all households in possibly counteracting directions: reduced economic activity due to a trade ban lowers wage earnings and incomes, while downward pressure on meat prices reduces consumer expenditures and therefore increases their real income.

5.4 The impact of disease risk

5.4.1 Preventive control measures

Even in the absence of FMD outbreaks, the mere threat of the disease occurring already induces significant impacts in the form of the cost of preventive control measures. Preventive control can be seen as having two objectives. The first is to limit the probability of outbreaks and spread of the disease sufficiently to reasonably contain the potential direct impacts of the disease to producers and local markets. A second objective may be to reduce the risk yet further to achieve freedom from FMD as defined by the World Organization for Animal Health (*Office International des Epizooties:* OIE) and as required for access to higher-value export markets, as described in Chapter 2.

Due to the contagious nature of FMD, its control is generally accepted as representing a public good justifying publicly funded interventions. The design and implementation of such interventions is the primary responsibility of the DVS in each country. The types of preventive control measures undertaken in each country have been described in Chapter 2. The cost of containing FMD risk in Zimbabwe therefore includes:

[35]The 'meat' category is predominantly beef, with small shares of goat meat and mutton. Poultry and fish are separate categories.

- Public expenditures to maintain the capacity of the DVS to undertake preventive control measures on a regular basis, and to be able to respond to outbreaks and contain them, as needed. FMD is one of many diseases that justify the need for and investment in the DVS.
- Surveillance and monitoring for FMD. This includes the cost of conducting inspections of animals on farm or at dips to check for FMD and other major diseases, as well as diagnostic tests specific to FMD. FMD is also one of the diseases monitored during meat inspections in abattoirs.
- Enforcement of movement controls. Movement controls are applied in several ways:
    - Movement permits issued by the DVS to cattle keepers and traders with cost recovery.
    - Roadblocks administered by the DVS.
    - Livestock fences established between FMD control zones and on certain borders, and maintained by the DVS.
    - Branding of animals to identify their source. This cost is shared by the DVS and farmers.
- Wildlife control. The DVS and the Department of National Parks and Wildlife Management incurs expenditures for:
    - Wildlife fences established around certain wildlife areas.
    - Buffalo destruction when buffalo wander outside designated wildlife areas.
- Vaccination. Under the current control strategy, cattle in the designated vaccination buffer zones are to be vaccinated twice yearly by the DVS free of charge.
- Emergency preparedness and public awareness. The DVS maintains staff and equipment ready for rapid response to FMD outbreaks.

In addition to branding animals to identify from which FMD control zone they originate, a programme of identification by tagging has been introduced by the Livestock Identification Trust to improve traceability. Traceability is increasingly a requirement for selling livestock and their products in higher-value markets where not only disease control, but also other consumer concerns are becoming increasingly important. Tagging will benefit FMD containment efforts when outbreaks occur, but may also present an additional barrier preventing the poor from participating in formal markets.

5.4.2 Farm-level impacts of preventive control measures

Current preventive control measures are nearly all public interventions, with livestock keepers and other private actors in livestock commodity systems only bearing a small portion of the expenditure. Communal livestock keepers, for example, pay fees for dipping services (which includes veterinary inspection), movement control documents, and branding. Commercial farmers monitor their own stock.

Beyond these modest direct expenditures passed on to producers, the current FMD preventive control strategies based on zonation entail other important,

implicit impacts on producers. For many producers, zonation increases the cost of, or blocks access to, participation in higher-value markets. The result may be manifested as price discrimination, with cattle prices increasingly discounted as one moves away from the export catchment zone. Between-zone price differentials should reflect the additional costs incurred for movement permits and quarantine periods when moving animals to the more lucrative markets in the clear and export catchment zones. Evidence for such price differentials is difficult to establish from available price data given the pan-territorial pricing strategy practiced by CSC, but anecdotal reports of price fixing by private traders suggest that zonation could be a factor exploited by traders.

The current approach to FMD control can also be interpreted as having a more fundamental impact on livelihoods. On the plus side, intensive FMD prevention provides a mechanism for increasing contacts between veterinary services and less market-oriented cattle keepers in communal areas. Those who keep cattle primarily for non-commercial purposes might otherwise have little interest or opportunity to have their animals monitored.

On the negative side, from the perspective of poorer segments of rural populations, current FMD control can be viewed as servicing a commercial-oriented livestock development strategy and monopolising available scarce resources for this purpose to the detriment of other livelihood uses of cattle, and also to the detriment of the other non-cattle livestock species, which Chapter 3 shows are so important to the livelihoods of the poor and yet receive relatively little attention in Zimbabwe. It could be argued that this commercial bias of FMD control discriminates against other livelihood uses of cattle and against livestock keepers who do not have cattle, and that these could be better serviced through an alternative use of veterinary resources.

5.4.3 Market access

The role of FMD outbreaks in triggering suspension of livestock export trade has been discussed above. Conversely, to permit export trade, veterinary authorities in importing countries must be satisfied that FMD risk from the exporting country is sufficiently low to meet the importer's standards. This means FMD freedom whereby there are no clinical cases present in the country or zone, and the importing country is confident that sufficient preventive measures are taken to keep the risk of its reintroduction adequately low. Therefore, to establish and maintain access to export markets, all of the control measures already described must be fully and consistently implemented, with possible additional measures required to strengthen control. In the case of Zimbabwe, the EU may require additional fencing of the north-eastern border of the country as a condition for continued exports to their markets at some time in the future. In addition, added investments are made to maintain special export abattoirs, and cattle products destined for export must be sourced exclusively from the export catchment zone.

5.4.4 Environmental impacts

FMD control may incur three types of environmental costs, with the first two relating to wildlife movement. The construction of wildlife fences around parks and conservancies in Zimbabwe is meant to restrict the natural movement of wildlife. While this is undoubtedly inevitable given the increasing density of human population in the surrounding areas, it is not clear what long-term impacts these barriers may have on wildlife population dynamics and diversity. Wildlife survival strategies depend in part on their ability to move and search out new food sources, especially when their environment is under stress, such as during droughts. Conceivably, then, fences would limit such strategies. Could they even change breeding patterns detrimentally in some species while benefiting others? Secondly, particular measures have restricted the location and movement of buffalo. Commercial wildlife ranchers in areas where buffalo are banned have complained that this reduces the profitability of their enterprises (Jansen et al. 1992). Also, buffalo that wander outside the designated areas are destroyed, specifically reducing their numbers.

Finally, successful FMD control may encourage a substantial rise in livestock numbers which may tax the carrying capacity of marginal lands. The increase in numbers would not be the result of avoiding losses from the disease, but rather from the market incentives associated with further development of meat export markets. Given other pressures currently limiting growth of the national herd, including the self-regulating effect of periodic drought, this is not considered to be a potential problem in the medium term.

5.5 Estimating the impacts of the beef export trade

In southern Africa, FMD undoubtedly has its most extensive immediate economic impact by permitting or limiting livestock export trade. In the case of Zimbabwe, two of the main effects related to trade as outlined in the preceding sections were explored in more detail to assess their magnitude:

- The economic losses suffered by the livestock sector and other sectors in the economy when beef exports are banned and beef export revenues foregone
- The degree to which the beef export trade influences domestic cattle and meat prices

Since these issues are related more to the impact of trade rather than the impact of FMD as such, analyses to address these questions are presented here as background to the economic analysis of FMD control in the next chapter.

5.5.1 Sectoral losses

To measure the economic impact of beef exports in Zimbabwe, a simulation exercise was conducted with an economic model of the national economy, as described in full detail in Appendix 6. The model is based on the computable

general equilibrium (CGE) approach that allows the analyst to evaluate how activity and income levels across the different sectors in the economy would adjust to the loss of revenues from beef exports. Using this approach, the economy is represented as a social accounting matrix (SAM) that describes the value of flows of inputs and outputs between the various sectors (Thomas and Bautista 1999). A SAM had previously been developed for Zimbabwe based on data for the year 1991, and was adapted by creating a specific sub-sector for meat exports.[36] The quality of the national-level data underlying the model, together with a number of constraints and assumptions inherent in the model structure, require that caution be used when interpreting the results. However, the results generally appear reasonable and consistent with expectations.

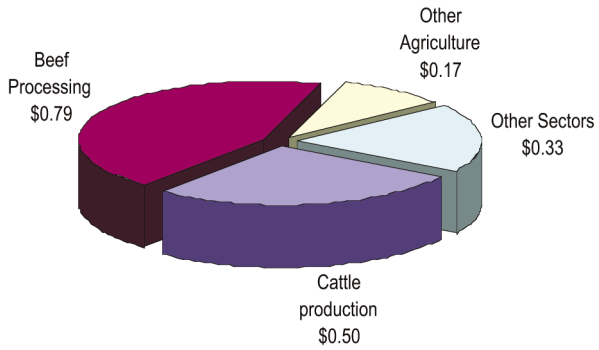

Figure 5.2 Value of increased economic activity generated by $1 of beef exports, by sector

In the base model for 1991, beef exports totalled approximately 4,000 tonnes, which is lower than the average since EU exports began in 1986. In the simulations that were considered, exports were (1) set to zero; (2) doubled to represent approximately the EU quota; and (3) trebled to represent an expansion of exports. In the discussion below, the results for the first two scenarios were combined to represent the impact of a ban on exports when the country is nearly fulfilling its EU quota, as has been the case in recent years.[37]

According to the simulation results, a dollar earned (lost) from exports contributes to a $ 1.10 nominal increase (decrease) in Zimbabwe gross domestic product (GDP). (Note that a generic ‚dollar„currency is used in this and the

[36]In 1991, beef exports were recovering from the ban following the FMD outbreak in 1989 and were beginning to be affected by supply constraints due to the drought that occurred in that year. Beef exports in the base model year were therefore lower than trend and may contribute to underestimating the full impact of a loss of beef exports.

[37]The trade ban scenario refers to those exports destined to high-value markets, mainly the EU. In the case of such a ban, some export supplies may be diverted to lower-value markets that have no FMD restrictions, or be absorbed by domestic markets. These eventualities may partially offset the losses estimated by the model, though certainly not the added price premium lost from the high-value markets.

following paragraphs when discussing price ratios since the principle expressed applies regardless of the currency used; it has the same meaning whether expressed as US$ or Z$). In current terms, if the country exports 9,100 tonnes of beef at US$ 3,764 per tonne, then the Z$ 1.9 billion (constant 2001 Z$) in revenues generated will contribute to a Z$ 2.1 billion expansion of Zimbabwe's GDP. (See the note on end page for an explanation of exchange rates and deflators used.)

Within the economy, however, exports generate proportionally an even greater increase in the value of economic activity. The overall multiplier effect of beef exports is estimated to range from 1.67 to 1.86, for a weighted average 1.79. This means that through its demands for inputs from other sectors, each dollar of revenue from beef exports creates $ 1.79 in economic activity. When there is a ban on beef exports, the Z$ 1.9 billion (constant 2001 Z$) loss in revenues from those exports is therefore associated with a total reduction of economic activity of approximately Z$ 3.4 billion. Most of this loss is suffered by the livestock sector, with the beef-processing sub-sector losing $ 0.79 per $ 1 loss in export revenues, and the cattle production sub-sector $ 0.50 (Figure 5.2). Of the $ 0.50 going to the cattle sub-sector, 61% is borne by the commercial producers, *versus* 39% by the communal sector. Crop agriculture also suffers a reduction of $ 0.17, while other sectors in the economy, particularly those related to processing of other foods, bear the remaining $ 0.33.

The results of the simulation offer additional insights into the eventual distribution of the losses in terms of incomes to those owning the various factors of production (land, labour, capital) and to the public sector. These are summarised in Table 5.1 below. Assuming that a beef trade ban results in a Z$ 3.4 billion reduction in economic activity, lower-income households lose a total Z$ 529 million (16% of the total reduction) in lost wages and returns to their land or capital.[38] These losses are equally shared by low-income households in communal areas (returns to keeping cattle) and those in urban areas (wage labour).

When the relative impacts by income group are considered (Table 5.2), it is interesting to note that a ban on beef exports finds the communal area households suffering the largest proportional loss of their income, representing an estimated 1.3% of their income *versus* 1.0% for the urban and 0.6% for the large-scale commercial farm (LSC) lower-income groups.

[38]According to Thomas and Bautista (1999), the household categories used in the simulation appear to be primarily based on the 1990/91 Income, Consumption, and Expenditure Survey Report (CSO 1994). Populations associated with each group are reported as: communal, 5,856,000; commercial upper income, 774,000; commercial lower income, 387,000; urban upper income, 1,026,000; and urban lower income, 2,053,000. The criteria used for distinguishing higher-income from lower-income groups are not explained. For the purposes of the present study, the poor are assumed to be concentrated in the lower-income groups, with some possibly falling in the higher-income groups, depending on the poverty criteria or poverty rate used (e.g. CSO 1998, which cites poverty rates that are higher than the population shares represented by the lower-income groups).

Table 5.1 Distribution of factor incomes associated with beef exports

	Factor income earned per $ 1 of beef export revenue[a]		Total factor income[b]
	($)	(%)	Z$ million
Household incomes	0.84	46.7	1,575
Communal areas	0.13	7.5	253
LSC lower income[c]	0.00	0.2	7
LSC upper income	0.30	16.9	569
Urban lower income	0.14	8.0	269
Urban upper income	0.25	14.2	477
Government	0.10	5.8	194
Other (e.g. enterprises)	0.85	47.5	1,602
Total	1.79	100.0	3,372

Based on results reported in Appendix 6.
Notes:
[a]Due to multiplier effects, $ 1 of export revenue is associated with a total $ 1.79 of factor income.
[b]Assuming 9,100 t of beef exports at US$ 3,764/t. See Note on end page regarding exchange rate assumptions.
[c]LSC = Large-scale commerical

Table 5.2 Proportional changes in income associated with beef exports

Population group	Base value[a]	Income loss with trade ban[b]	
	Z$ million		(%)
Communal areas	1,845.9	23.6	1.3
LSC lower income[c]	100.1	0.6	0.6
LSC upper income	9,292.5	54.1	0.6
Urban lower income	2,620.2	25.4	1.0
Urban upper income	12,441.2	47.4	0.4

Based on results reported in Appendix 6 Table App6.5.
Notes:
[a]Sum of base value for 4,000 tonnes of exports, plus estimated increase in income for EXPFULT scenario.
[b]Estimated as the sum of change in household incomes under EXPBANT and EXPFULT scenarios.
[c]LSC = Larg-scale commercial

Based on the simulation, then, effective FMD control contributes to expanded value of economic activity at the rate of $ 1.79 for each $ 1 of beef export revenue earned. Much of this gain is directly captured by the beef-processing industry, but gains are also passed through to cattle producers and other agricultural, industrial, and service sub-sectors in the economy. Approximately 16% ($ 0.27 of the $ 1.79) of the increased value of economic activity due to beef exports is transferred as income to low-income households in both rural and urban areas.

5.5.2 Price effects

In addition to generating economic activity and nominal income as measured in the preceding section, the beef export trade is also likely to affect real incomes in Zimbabwe through its impact on prices. As discussed above in Section 5.3.3, there has been no obvious evidence of these price effects following the ban on beef exports in 2001. To evaluate whether such price effects exist and to what degree there may be differential price effects across sub-sectors within the livestock sector, a series of prices analyses were conducted.[39]

A first exploratory analysis examined the correlation between export and domestic prices using a set of monthly data from January 1998 to December 2000. This was the only period for which monthly data were available for export prices, represented by average unit prices received in the UK for beef imports originating from Zimbabwe. These were compared to deflated average unit prices for commercial cattle sales (represented by CSC purchase prices in the CSC South zone encompassing Matebeleleland North and South, Midlands, and Masvingo), communal cattle sales (represented by communal auction prices for a subset of salespens in Matabeleland North-outside the FMD surveillance zone-and Matabeleland South-inside the FMD-free zone), and retail meat sales (represented by the meat component of the consumer price index, appropriately adjusted for seasonal effects). Since domestic prices are not expected to adjust immediately to changes in export prices, different lag periods were tested. The strength of the correlation between the different price series and the time until the correlation reaches its highest value can be interpreted as indicators of how exports affect domestic prices.

The results tell a consistent story, indicating that the prices received by Zimbabwe meat exports in the EU do indeed influence domestic prices in Zimbabwe. As shown in Figure 5.3, a change in export prices is transmitted to the sub-sectors where the exports are sourced with a lag of two months, to other cattle markets a month later, and to retail meat markets 4-5 months after the change. Producer prices for cattle in the commercial sector and in the communal sector inside the FMD-free zone follow similar strong patterns of adjustment. The pattern for prices for communal cattle outside the FMD-free zone is not as clear after the initial adjustment. Domestic retail meat prices display a remarkably smooth, but longer, adjustment. Except for low-grade commercial cattle prices, the peak correlation is positive and statistically significant (Table 5.3). The estimated correlation coefficient values are not very high, indicating that domestic prices are not strongly influenced by price trends in the export markets. This is not surprising given all of the other factors that influence domestic price dynamics. The fact,

[39]In principle, price effects should be captured as well in the macro-economic simulation described in the preceding section. The macro-economic model is not sufficiently disaggregated to generate meaningful conclusions in this respect, and in fact produced some price results inconsistent with expectations.

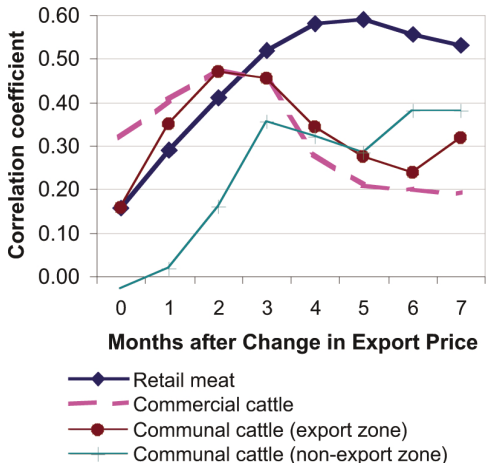

Figure 5.3 Correlation between export and domestic price series over varying lag periods, 1998–2000

though, that there is a consistent correlation across the different price series provides clear evidence that beef exports do influence domestic market prices to a certain degree. A trade ban due to FMD should act as a major export price shock that would be expected to depress domestic prices significantly unless export supplies could be diverted to other similarly priced external markets with no FMD restrictions. Unfortunately, appropriate data are not available to confirm this hypothesis (monthly price series begin only after the 1989/90 FMD outbreak and trade ban, and the current trade ban is too recent).

Access to the high prices offered by the EU market therefore appears to put upward pressure on domestic prices across the beef sub-sector. This dynamic benefits the industry as well as cattle producers, including the proportion of poor cattle-keeping households, estimated to number 850,000 (based on the livelihood groups described in Table 3.8 and the 1996 reported poverty rates (CSO 1998)), who sell cattle in a given year. But retail meat prices appear to be affected as well, which penalises consumers. Even the poorest purchase meat, and so beef exports also indirectly contribute to lowering the real income of the estimated two million poor households.

A second set of analyses focused on the issue of how far the benefits of higher prices would spread across the different types of cattle producers. The same monthly price series for domestic cattle sales described above were used, but covering the longer period 1993-2000 and a range of different quality grades. These analyses, described in detail in Appendix 7, used advanced econometric techniques to address the following three specific issues:

- Do higher prices paid to CSC suppliers (mainly commercial farmers) result in higher prices to communal farmers selling comparable quality cattle at auction in FMD-free zones?

Table 5.3 Correlation between monthly beef export and domestic price series, 1998-2000

Price series	Max correlation coefficient	Lag (months)
Commercial producer price		
High grade	0.48*	2
Low grade	0.28	3
Communal producer price		
Inside FMD-free zone		
High grade	0.47*	2
Low grade	0.30*	2
Inside surveillance zone		
High grade	0.35*	3
Low grade	0.45*	3
Retail meat price	0.59*	4-5

Notes:
Commercial producer high grade corresponds to CSC 'super' grade; low to 'commercial'.
Communal producer high grade to 'fair oxen' (FO); low to 'compound oxen (XO).
*Statistically significant at 90% confidence level.

- Do higher prices paid to communal farmers in FMD-free zones result in higher prices to those in the surveillance zones?
- Do higher prices for good quality cattle from communal farmers in the FMD-free zones result in higher prices for inferior quality animals in the same zones?

The data for communal cattle sales refer to formal market sales, which are not likely to accurately reflect price dynamics in the range of multiple alternative informal channels in which communal cattle farmers sell their animals as described in the accompanying livelihoods analysis in Chapter 3. We assume, however, that prices in these informal channels follow the general trends in the formal markets.

The analyses led to the following conclusions:

- There is clear evidence that communal sales prices respond to changes in prices paid primarily to commercial producers, albeit with quite significant lags. Thus, if increased export demand raises prices received by commercial cattle producers, those selling cattle in communal areas should (eventually) see higher prices, too.
- In the case of medium-grade cattle (FO-commercial), there is some evidence that prices in communal auctions also exert some influence on prices paid primarily to commercial producers. This could be evidence that, in setting its basic pricing policy (which then had to be adjusted to suit local demand conditions in individual markets) CSC needed to take supply and demand conditions in both commercial and communal markets into account.

- An increase in the CSC producer price for medium-grade cattle is transmitted in full to communal sellers of medium-grade (FO) cattle in the long run. By contrast, an increase in the CSC producer price for low-grade cattle (manufacturing) will not be fully transmitted to communal sellers of low-grade cattle (IO and XO).
- It can take 12 months for price increases for medium-grade cattle to fully feed through to prices paid to communal sellers of medium-grade cattle. This is consistent with field observations of price differentials in favour of commercial producers over communal auction prices for grades of similar quality. For example, where commercial prices have recently risen, they could be significantly above prices being paid to communal producers. In the case of lower-grade cattle, those price changes that are transmitted are done so rather more quickly —in 4-6 months.
- Taken together, the above points support the observation that price information does flow reasonably well, though not perfectly, across Zimbabwe's cattle markets. The length of the period for which data is available is not sufficient to make comparisons across subperiods. Hence, it is not possible to test whether price information flow has improved in recent years.
- Prices within communal areas of Matabeleland South and North (across the different FMD zones) move closely together. Thus, if communal producers within the export zone receive higher prices, others within the buffer and surveillance zones will also soon benefit. Equally, if prices within the buffer and surveillance zones rise, this will soon also be reflected in prices received by communal producers within the export zone. Price transmission is complete in all cases and occurs within 2-4 months.
- Similarly, if communal sellers of medium-grade (FO) cattle within the export zone receive higher prices, sellers of lower-grade (XO) cattle will also benefit. Here again, price transmission is complete and occurs within 2 months.

Taken together, these results (which are econometrically robust) show that the benefits of higher prices are widely shared by all sellers of cattle, commercial and communal, irrespective of the FMD control zone in which they are located or of the grade of cattle that they are selling. It could be argued that communal sellers, especially those with lower-grade animals or located in the FMD surveillance zones, do not benefit from higher prices during the lag period for price transmission from the commercial sector. However, these foregone gains are perhaps compensated by similar lags when commercial prices fall. Unfortunately, whether or not the price transmission behaves the same way when prices rise as when they fall could not be tested.

5.6 Summary

Based on the framework presented in Figure 5.1, this chapter has traced the various impacts and costs associated with FMD, due either to outbreaks of the disease or to simply the risk of such outbreaks occurring. While the direct effects of FMD on cattle and the costs that producers incur as the result are certainly not

insignificant, nor the costs undertaken to control and prevent the disease, the major economic implication of FMD in the southern Africa context is primarily related to its dramatic stop/go impact on export trade to attractive markets, especially those in Europe. According to the macro-economic simulation, beef exports generate substantial activity and income in Zimbabwe's economy, for the most part captured by the beef industry and commercial producers. Nonetheless, some 16% of the income generated does benefit the poorer segments of the population. Analysis of prices also indicates that beef exports help raise cattle and meat prices across domestic markets, thereby benefiting commercial as well as communal cattle producers, and workers in the beef industry, but at the expense of meat consumers.

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Chapter 6

A benefit-cost analysis (BCA) of foot and mouth disease (FMD) control policies in Zimbabwe

6.1 Introduction

The countries of southern Africa are committed to pursuing intensive FMD control to safeguard their beef export sectors. Though each country has its specific context—its historical influences, its structure of production, its FMD risks, and policy priorities—the approach to FMD control has been similar. This chapter assesses the impact of these FMD control strategies by considering the case of a single country, Zimbabwe.

The approach adopted is to evaluate the costs invested in or associated with FMD control and compare them to the economic benefits attributable to those control efforts. The analysis is *ex ante*—looking forward rather than back at past performance, and considering costs and benefits under possible scenarios for FMD control policy and trade opportunities. Particular attention is given to incorporating as much as possible the full range of costs and benefits identified in the preceding chapter, as well as the distribution of those costs and benefits: who pays and who gains. By definition, the economic analysis focuses on money-metric measures, but does attempt as much as possible to integrate the livelihood dimensions developed in Chapter 3.

6.2 FMD control scenarios

6.2.1 FMD control and market access scenarios

As described in Chapter 2, a series of FMD control scenarios are considered in this study based on varying assumptions about the level of FMD control implemented and the evolution of prices in export markets. With respect to FMD control, maintaining the current *status quo* is compared to three other scenarios. The first assumes that the level of investment in FMD control remains unchanged, but the FMD-free zone is redefined and limited to the area of lowest risk in the north-eastern part of the country. The second is an optimistic scenario with increased investment in FMD control resulting in the creation of an internationally recognised FMD-free zone. The third is a pessimistic scenario with relaxed control resulting in the spread of FMD in the country and the loss of all export markets of boneless beef.

In each case, three trade sub-scenarios are considered to represent the possible evolution of the export opportunities that Zimbabwe's beef industry will face based on the analysis presented in Chapter 4.

6.2.2 External trade environment

Within each of the FMD control scenarios outlined above, three subscenarios are included to represent different assumptions about the evolution of the external trade environment, represented in terms of the prices that Zimbabwe beef exporters can be expected to face in international markets:

- **European Union (EU) price premiumsflslow decline.** Under this sub-scenario, Zimbabwe maintains preferential access to the EU market (the *status quo*), but the lucrative price premium *vis-à-vis* other markets declines over time, and is finally eliminated by 2016.
- **EU price premiumsflrapid decline.** Again, Zimbabwe maintains preferential access to the EU market, but the lucrative price premium falls rapidly, and is eliminated already by 2007.
- **No EU price premium.** Assuming that Zimbabwe is not able to regain preferential access to the EU market, its beef exports are sold in other markets at the going world price for high quality products.

As seen in Figure 6.1, the premium world price estimated in Chapter 4 serves as the floor price under each trade scenario.

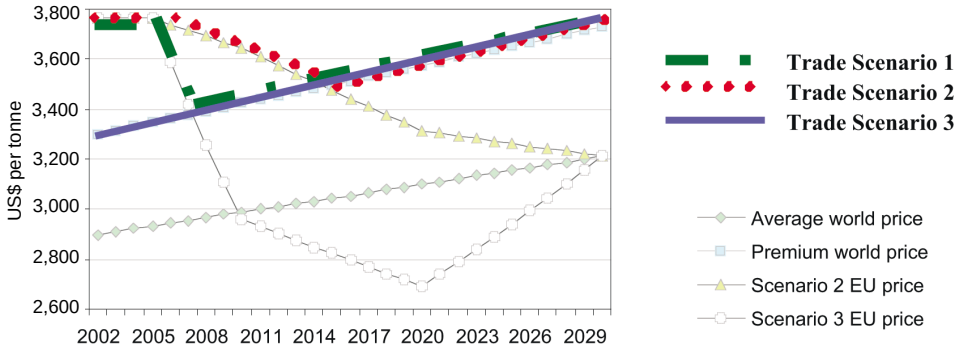

Figure 6.1 Evolution of export beef prices under each trade scenario

6.3 The benefit-cost approach

BCA provides the general framework for evaluating and comparing the FMD control policies described by the scenarios in the previous section. The BCA follows the standard approach of identifying and valuing the range of impacts described in the preceding chapter for a baseline scenario and then comparing how incremental investment costs and their benefits accrue over a given time horizon under the other proposed scenarios. The Baseline Scenario, which essentially represents the *status quo*, is taken as the baseline point of comparison. Incremental costs for each of the other scenarios then include any new costs incurred in strengthening (or relaxing) FMD control. Incremental benefits comprise avoided losses plus savings from certain control measures no longer needed (e.g.

response to outbreaks) under the different FMD control scenarios. The economic impact of the various scenarios can then be evaluated in terms of their net returns projected over a 25-year time horizon, with income streams appropriately discounted.

6.3.1 Previous analyses

BCA is a well-known and commonly accepted technique of economic analysis in animal health (see, for example, Dijkhuizen and Morris 1997), and a myriad of its applications to disease control can be found in the literature. In a recent review of the economics of FMD and its control, Perry and Randolph (2003) highlight the wide variability in how such analyses are conducted, particularly with respect to predicting the interaction between control efforts and FMD outbreaks over time, and the degree to which indirect impacts of the disease are effectively incorporated into the analysis. In developed countries, sophisticated epidemiological simulation models and elaborate econometric models have been integrated into cost comparisons or BCA to evaluate control measures in the face of FMD outbreaks (e.g. USA: McCauley et al. 1979; Canada: Krystynak and Charlebois 1987; Australia: Garner and Lack 1995; France: Mahul and Durand 2000; Netherlands: Berensten et al. 1992; UK: Power and Harris 1973, DEFRA/ DCMS 2002). Similar types of studies in developing countries evaluating FMD control or eradication policies have generally depended on more modest methodologies, reflecting both quality of available data and limited resources (e.g. The Philippines: Arámbulo 1977, Randolph et al. 2002; Thailand: Harrison and Tisdell 1999, Perry et al. 1999).

Within the region, Hayden and Williams (1981) used a social accounting matrix (SAM) developed for Botswana for 1974/75 to evaluate the losses associated with an FMD outbreak that began there in 1977. The study used the SAM to trace the impact of the outbreak's direct effect in reducing throughput of cattle slaughtered by the Botswana Meat Commission (BMC), the parastatal having the monopoly for meat exports, over three years (60% reduction in year 1, 21% in year 2, and 1% in year 3). The representation of rural incomes in the Botswana SAM was particularly appropriate for analysing the poverty impacts since rural households were categorised by livestock ownership into those with less than 10 head of cattle, with 10 to 80 head, and with more than 80 head. According to their analysis, rural households with less than 10 head of cattle-which they consider to represent poor households accounting for two-thirds of all rural households-suffer only a 0.6% loss in their total income, *versus* 13.2% for the middle-income and 52.7% for the higher-income rural households. These large differences for Botswana suggest that the income impacts estimated for the communal sector in Zimbabwe in Section 5.5.2 may mask considerable differentials among subgroups within the communal sector. Though better in its disaggregation of the rural sector, the Botswana analysis did not allow for price adjustments to be accounted for dynamically, requiring adjustments in the SAM to be reflected in quantities only.

More recently, Oarabile (1994) used BCA to evaluate the returns to different FMD control policies in Botswana. The official control policy was similar to that in

Zimbabwe, consisting of separate vaccination and export catchment zones with movement restrictions. Oarabile (1994) compared this policy to a 'without control' situation in which FMD would be endemic (similar to FMD Control Scenario 3 in the present analysis), as well as one in which a stamping-out policy is adopted. For the endemic FMD scenario, an FMD incidence of 20% is assumed based on reported incidence in extensive cattle systems in Tanzania. The principal benefits of FMD control included not only avoided production and export income losses, but also avoided losses in tourist industry revenues (although how tourism would be affected is not explained). Export income is estimated as net income from sales of beef to the EU. The analysis concludes that the official control policy is profitable when compared to the without control situation, and generates a benefit-cost ratio (BCR) of 11.3. However, if no export income benefits are included, the BCR falls to 0.5, suggesting that FMD control would not be a worthwhile public investment if the objective were only to reduce domestic production losses. A stamping-out policy is found to be more cost effective than the official control policy.

Townsend et al. (1998a, 1998b) used a SAM-based approach similar to the one adopted in the present study to estimate the impacts of an outbreak in Botswana of the other major infectious cattle disease in the region affecting beef exports: contagious bovine pleuropneumonia (CBPP). The authors evaluated the impact of a generalised outbreak of CBPP leading to a 60% reduction in beef exports, as well as smaller outbreaks contained by either slaughter or vaccination-based control options, both of which were assumed to lead to a 5% reduction in exports. The analysis indicated that every P 1 (Botswana pula: US$ 1 = P6) of lost beef export revenues generates a total of P 8.89 in losses to the economy. This is an unusually high multiplier effect—results above 2 are usually viewed with scepticism—and may reflect the fact that the simulation was derived from the SAM without reallocation of factors within the economy and without the benefit of a computable general equilibrium (CGE) model to permit full adjustments in prices and activity levels across the economy.

The studies to date have clearly shown the need to account properly for indirect as well as direct costs of FMD and its control in the southern Africa context, though the methods used to assess indirect costs have not been wholly satisfactory. Other than Hayden and Williams's (1981) early attempt, there has been little effort to describe or quantify how the impacts are distributed across different segments of the economy or population. The present study begins to address the gaps.

6.3.2 Key components of the BCA model

The following sections describe the main components in the BCA developed for the present study, including the data and key assumptions underlying the analysis.

6.3.2.1 Modelling FMD incidence

To represent the evolution of FMD under each of the scenarios, a stochastic framework was used to predict future outbreaks of the disease. Based on historical patterns, the country was divided into high- and low-risk zones, with the low-risk zone corresponding to the proposed reduced FMD-free zone. The probability of primary and secondary outbreaks occurring in each zone was estimated from historical data (0.6 probability of a primary outbreak occurring each year in the high-risk zone, and 0.04 in the low-risk zone), and modelled following a Poisson distribution.[40] When an outbreak was predicted, it was assigned at random to one of the divisions within the relevant risk zone and identified by FMD control zone. An outbreak occurring in the FMD-free zone would result in a one-year beef export ban, and all outbreaks would trigger the appropriate containment response from the Department of Veterinary Services (DVS).

The number of animals considered at risk in an outbreak is estimated based on recent trends, and depends on whether the outbreak is assumed to occur in a commercial or communal production system. Numbers of animals and farms falling in each of the different quarantine zones surrounding the focus of the outbreak are estimated based on average densities by province.

Using a Monte Carlo approach, the occurrence of outbreaks over the next 25 years and their impacts on producers and on trade are simulated, and the simulation is repeated 5,000 times. The analysis was performed in a spreadsheet-based model in Microsoft® Excel 2000©, using the add-in @ Risk© (Palisade Corporation 2002). Repeated simulation permits generating probability distributions rather than single-point estimates for key outcome parameters, such as the BCR.

6.3.2.2 Modelling the impact of a beef export ban

The economic value of a beef export ban is represented by the value of the beef export revenues foregone—assumed to be borne by the beef sub-sector—plus the additional multiplier impacts due to reduced demand for inputs and factors of production from other sectors of the economy. Export revenues are calculated as the quantity exported—assumed constant at 8,900 tonnes of fresh beef based on the recent average trend over 1996-2000—multiplied by the expected unit value dictated by the trade sub-scenarios. The multiplier losses in other sectors of the economy, estimated to represent an additional Z$ 0.79 for each Z$ 1 of export revenue lost, were derived from the auxiliary analysis (SAM/CGE approach) reported in the preceding chapter.

The analysis currently only accounts for the value of beef export trade lost, and does not include any consideration of trade losses for other meats, livestock

[40]A Poisson probability distribution is generally used to model infrequent events, as is the case for FMD outbreaks.

products, or any non-livestock products affected by the FMD outbreaks. This means that the current results of the analysis are likely to considerably underestimate the benefits to improved FMD control.

6.3.2.3 Supply constraints

The export scenarios assume that 8,900 tonnes of high-quality beef can be sourced each year from cattle production in the FMD-free export zone. The current land reforms in Zimbabwe are targeting a substantial portion of the land devoted to commercial cattle production for reallocation to smallholder farming systems, and uncertainty about property rights has contributed to a decline in the size of the commercial herd, and more importantly, in the breeding herd. This change will undoubtedly affect Zimbabwe's export capacity, at least in the short to medium term. Supply capacity would be further restricted by reducing the FMD-free export zone, as assumed under Scenario 1. To evaluate whether these changes might create serious supply constraints that would need to be reflected in the export trade scenarios, the current communal and commercial cattle populations were estimated for the export zone under each scenario, and representative offtake rates applied.[41] The results indicate that if the size of the commercial and communal herds as of 2001 is used, there would be sufficient supply of cattle for all the scenarios in which beef export is considered, including the reduced export catchment area envisaged in Scenario 1. However, if cattle were only sourced from communal areas, only in FMD Control Scenario 2 would the communal herd offtake be sufficient to meet export requirements, disregarding the issue of quality, which could probably be addressed by intensive preslaughter fattening of communal cattle. Therefore, a key assumption underlying the analysis is that a portion of the commercial herd with its higher offtake rate is maintained to ensure sufficient supplies for export.

6.3.2.4 Assessing the distribution of impacts on the poor

The study seeks to evaluate not only the economic value of FMD control, but also the distribution of its impacts on different actors in the economy, and particularly on the poor. For this purpose, the following three distributional measures were incorporated into the analysis.

- The amount of costs and benefits incurred by the public *versus* private sectors. Benefits accruing to the private sector were further broken down by communal cattle production, commercial cattle production, beef industry, and the other sectors of the economy.
- Income losses due to beef export bans. Income losses were estimated for the five population groups presented in Table 5.1: communal area (CA) households, lower- and upper-income large-scale commercial (LSC) households, and lower- and upper-income urban households.

[41]For the commercial sector, an offtake rate of 25% was used. A conservative rate of 3% was used in the case of communal cattle.

- The numbers of rural households located in each FMD control zone under each scenario. Rural households were further broken down by commercial (large-scale and small-scale) *versus* communal, and within the communal sector, by the typology of the six livelihood groups developed in Chapter 3.

6.3.3 Incremental costs and benefits

BCA compares the incremental costs and benefits associated with a move from the Baseline Scenario to each of the other scenarios. The principal changes in costs and benefits associated with each scenario are summarised in Table 6.1.

FMD Control Scenario 1: Reduced FMD-free zone. Under this scenario, redefining the FMD control zones carries no major cost implications, so incremental costs *vis-à-vis* the Baseline Scenario are zero. By reducing the FMD-free zone, a smaller portion of the FMD outbreaks triggers trade bans, so the incremental benefits of the reduced FMD-free zone derive solely from losses avoided from fewer trade suspensions occurring over the period of analysis.

FMD Control Scenario 2: Improved control. This scenario assumes that the necessary steps are taken to maintain an adequate level of FMD biosecurity required by current or potential trading partners, particularly the EU. For the purposes of the analysis, these requirements translate into:

- Construction of new wildlife and livestock fences along the northern and eastern borders of Zimbabwe
- Repair of existing, damaged fences
- Enhanced capacity of the DVS to effectively implement and enforce FMD control measures, including fence maintenance.

To quantify these investments, repair and construction costs were estimated based on information provided by the DVS, and are summarised in Table 6.2. These costs were assumed incurred across four years (2003-2006) in equal amounts of Z$ 244 million per year. (See the Note on prices used for cost estimations on end page for information on exchange rate and deflator assumptions used to express monetary values in this study).

Enhancing DVS capacity is represented by a 50% increase in the DVS budget over the 1998-2001 average requested budget, converted to constant 2001 Z$. The budget increase is assumed to return the DVS to full capacity by eliminating the 30% staff vacancy rate, permitting the DVS fleet of vehicles to return to full strength, and permit effective maintenance of existing and new control fences. (Note that maintenance of existing fences required a budget of Z$ 3.2 million in 2001.) The estimation of the budget increase, valued at Z$ 417 million per year, is presented in Table 6.3.

Incremental benefits fall into two main categories:

- Reduced trade losses from fewer trade bans
- Reduced FMD outbreak containment costs from fewer outbreaks

Table 6.1 Summary of incremental costs and benefits associated with FMD control scenarios

Scenario	Incremental costs	Incremental benefits
Baseline: Current level of FMD control		
Return to previous FMD-free zone	• Baseline situation	• Baseline situation
1 Current level of FMD control, but reduced FMD-free zone		
A reduced FMD-free zone	• No change in control measures or costs, but FMD-free zone reduced and current quarantine zone converted to surveillance zone	• Reduced risk of FMD outbreak triggering suspension of trade, meaning fewer trade, losses
2 Improved FMD control		
Expanded FMD-free zone up to fences	Investment in: • Strengthened DVS, with 50% increase in budget • Repair of existing control fences and construction of new fences in north-east	• Reduced probability of FMD outbreaks and trade bans • Reduced preventive vaccination costs and outbreak containment costs
3 Relaxed FMD control		
FMD endemic, exports discontinued	Disinvestment in: • Scaled-down DVS, with 50% reduction in budget • Reduction of specific FMD control efforts	• 'Negative' benefits: o Increased probability of FMD outbreaks and production losses o Loss of export revenues o Increased private control costs for vaccination

Table 6.2 Fence investments. Source: DVS data

Item	Distance (km)	Cost/km (constant 2001 Z$)	Total cost (constant 2001 Z$)
Repair current game fences	1005	422,000	424,110,000
Build game fence in north-east	350	1,000,000	350,000,000
Build cattle fence to run parallel to game fence	1355	150,000	203,250,000
Total			977,360,000

Table 6.3 Estimation of DVS budget increase

Year	DVS budget request (current Z$)	Consumer price index (1995 = 100)	DVS budget request (constant 2001 Z$)
1998	177,937,333	190.1	719,424,694
1999	312,542,000	301.3	797,277,734
2000	645,682,000	469.6	1,056,795,539
2001	763,200,000	768.6	763,200,000
Average 1998-2001			834,174,492
50% budget increase			417,087,246

Notes:
Budget allocations provided by DVS (vet service budgets.xls). These figures do not appear to include costs for tsetse and trypanosomiasis control activities.
1998: Based on actual budget reported for 18 months 1997/98, adjusted to 12-month period dividing by 1.5.

FMD outbreaks are assumed to continue to occur at historical rates (0.6 annual probability of an outbreak in the high-risk zone, and 0.04 in the low-risk zone) until the fence investments are completed in 2006. Beginning in 2007, the risk of outbreaks declines dramatically, and is represented by the extension of the low-risk zone (outbreak probability = 0.04) to nearly all of Zimbabwe with the exception of the vaccination zones continued behind the game fences in Hwange and Binga Districts in Matabeleland North, and the smaller areas in Kariba and Hurungwe Districts in Mashonaland West, which remain high risk (outbreak probability = 0.6). Under these assumptions, outbreaks triggering trade bans occur only rarely.

FMD Control Scenario 3: Relaxed control. To simulate a scenario of relaxed control, it is assumed that the government decides to 'disinvest' from FMD control by further cutting the DVS budget. In the BCA framework, this incremental investment 'cost' in fact represents a savings to the government in terms of reduced expenditures on FMD control. We assume that the DVS budget is cut in real terms by 50%, or Z$417 million per year (see Table 6.3). Due to reduced capacity, the DVS limits its FMD vaccination coverage to a minimum 25% in the communal herd in the current vaccination zones, and its response to outbreaks, while assumed to continue, is considered less effective, so more animals are assumed affected per outbreak.

With the breakdown of FMD freedom, commercial livestock keepers are assumed to begin vaccinating their herds on a regular basis as a preventive measure at their own expense.

The incremental 'benefits' in this scenario are obviously negative since reduced control leads to increased incidence of FMD outbreaks and new costs to commercial producers for preventive vaccination. The results therefore indicate the cost of disinvesting in FMD control from the current *status quo*, or conversely, the benefits of investing in the current level of FMD control compared to an FMD-endemic situation.

6.4 Results

6.4.1 Benefit-cost indicators

The results are presented in Table 6.4.

6.4.1.1 Baseline FMD Control Scenario

The model predicts outbreaks leading to trade bans in an average 11 of the 25 years assumed for the analysis time horizon. Total costs associated with FMD over this period are estimated to average from Z$ 17.4 to 18.5 billion (which is Z$ 695 to 741 million on average annually in constant 2001 Z$ (discounted over the 25-year period)), depending on the trade assumptions. As expected, the largest trade losses occur if Zimbabwe has access to the EU market, and the EU price premium declines gradually.

6.4.1.2 FMD Control Scenario 1: Reduced FMD-free zone

Under Scenario 1, the FMD-free zone is reduced, but otherwise no change is made in the level of FMD control. As a result, the expected number of trade bans over the 25-year period of analysis falls by 13%, yielding Z$ 3.2-3.5 billion in avoided losses.

6.4.1.3 FMD Control Scenario 2: Improved control

Under this scenario, Zimbabwe invests a total of Z$ 5.2 billion in improved FMD control over the 25-year period of analysis, representing repair and construction of control fences and a 50% increase in the overall DVS budget to ensure adequate capacity to maintain effective control. On average, 3.5 years of suspended trade due to an FMD outbreak are predicted over the study horizon, a 69% reduction from the Baseline Scenario. Most of these outbreaks occur during the period while the fences are being built. The investment in improved FMD control yields a total return of Z$ 8.1 to 8.4 billion (or on average Z$ 323 to 336 million per year). Even without access to the EU market (the third trade sub-scenario), the BCR is an average 1.5 and the net present value is Z$ 2.9 billion, indicating improved control to be a sufficiently attractive investment. The BCR falls below 1.0, which would indicate a poor investment generating inadequate returns, in less than 13% of the 5,000 simulations. Access to the EU market increases the BCR measure only slightly.

The results should be considered conservative estimates as the investment in strengthening the DVS will generate numerous additional benefits in the control of other diseases besides FMD, as well as the other reasons cited above (e.g. omission of other trade losses for other products). The focus here, however, is whether the benefits to FMD control alone justify such investments.

Table 6.4 Benefit-cost indicators for the scenarios, under varying export market assumptions

		EU price - slow decline	EU price - fast decline	No EU price premium
Baseline Scenario				
Number of trade bans over 25 years			10.8	
	Std Dev		2.4	
Total costs of FMD	Billion Z$	17.4	18.5	18.2
	Std Dev	3.5	3.8	3.7
Scenario 1 - Reduced export zone				
Number of trade bans over 25 years			9.5	
	Std Dev		2.3	
Total costs of FMD	Billion Z$	14.2	15.1	14.9
	Std Dev	3.3	3.5	3.4
Sum of discounted incremental benefits	Billion Z$	3.2	3.4	3.3
	Std Dev	2.1	2.3	2.3
Scenario 2 - Improved FMD control				
Number of trade bans over 25 years			3.5	
	Std Dev		1.3	
Total costs of FMD	Billion Z$	14.5	15.3	15.3
	Std Dev	2.5	2.8	2.8
Sum of discounted incremental benefits	Billion Z$	8.1	8.4	8.1
	Std Dev	2.6	2.7	2.6
Sum of discounted incremental costs	Billion Z$	5.2	5.2	5.2
	Std Dev	0	0	0
Net present value	Billion Z$	2.8	3.1	2.9
	Std Dev	2.6	2.7	2.6
Benefit-cost ratio	No units	1.54	1.60	1.54
	Std Dev	0.49	0.52	0.49
Scenario 3 - Relaxed FMD control				
Number of trade bans over 25 years			25.0	
	Std Dev		0.0	
Total costs of FMD	Billion Z$	41.7	46.5	46.5
	Std Dev	0.4	0.4	0.4
Sum of discounted incremental benefits	Billion Z$	-29.9	-33.5	-33.8
	Std Dev	3.6	3.9	3.8
Sum of discounted incremental costs	Billion Z$	-6.4	-6.4	-6.4
	Std Dev	0	0	0
Net present value	Billion Z$	-23.5	-27.1	-27.4
	Std Dev	3.6	3.9	3.8
Benefit-cost ratio	No units	4.68	5.24	5.29
	Std Dev	0.56	0.61	0.59

Note: All Z$ amounts represent total amount over the 25-year period of analysis discounted, in constant 2001 Z$. Standard deviations for values reported in billion Z$ are also in billion Z$.

6.4.1.4 FMD Control Scenario 3: Relaxed control

The scenario assumes that Zimbabwe continues to disinvest in FMD control, reducing the DVS budget by 50% from its 1998-2001 average. The export trade for beef is discontinued. The costs of FMD rise considerably to Z$ 42-46 billion over the study period, or Z$ 2 billion annually. The disinvestments in FMD control save Zimbabwe Z$ 6.4 billion (Z$ 256 million annually) in resources allocated to FMD control, but contribute to an increase in costs associated with the impacts of FMD in the range of Z$ 30-34 billion (Z$ 1.2-1.4 billion annually). The disinvestments in FMD therefore represent a BCR of 4.7-5.3, depending on the trade scenario assumed. For every Z$ 1 disinvested from FMD control, then, Zimbabwe suffers an additional Z$ 5 in losses due to FMD (production, control costs, trade). Disinvestment would not be a cost-effective strategy for Zimbabwe.

6.4.2 Distribution of costs and benefits

6.4.2.1 Composition

The composition of costs and benefits related to FMD and its control under the different FMD control scenarios is presented in Table 6.5 below. As noted in Table 6.4, the total present value of the costs associated with FMD over the study horizon under the *status quo* Baseline Scenario amount to Z$17 billion. As would be expected, most of these costs are borne by the private sector (86%) and are related to losses when beef exports are banned. The direct impact of the disease in terms of production losses is modest, accounting for only 0.2% of the total cost. The public sector incurs substantial costs as well, accounting for the remaining 14% of total losses, in the form of budget expenditures on FMD control and lost tax revenues when beef exports are banned. When trade bans are reduced (FMD Control Scenario 1) or FMD control is improved (FMD Control Scenario 2), the private sector is the principal beneficiary from lower export losses. Conversely, when FMD control is relaxed, the private sector bears most of the large increase in losses, not only due to the full ban on exports, but also due to the expected need to vaccinate regularly in commercial systems.

6.4.2.2 Distribution by sector

The sectoral distribution of these costs and benefits is presented in Table 6.6. Under the *status quo* (Baseline Scenario), the beef-processing industry bears Z$ 5.8 billion, the largest share of losses (34%), mainly due to FMD-related trade bans. Commercial cattle producers incur Z$ 3.5 billion, representing one-fifth of the total losses associated with FMD. Losses to the communal cattle sector account for a smaller share: 11% of the total, or Z$ 2.0 billion. Under the different FMD control scenarios, this pattern of relative shares is generally maintained with the beef-processing industry capturing the most benefits. In FMD Control Scenario 3, however, the commercial cattle sector suffers the largest losses when FMD control is relaxed, representing 46% of the additional losses generated. The communal cattle sector, on the other hand, incurs an even smaller 6% share of the incremental losses.

Table 6.5 Composition of FMD costs and benefits, by category and sector

Cost category	Total costs Baseline		Incremental benefits Scenario 1		Scenario 2		Scenario 3	
	Million Z$	%	Million Z$	%	Million Z$	%	Million Z$	%
Public sector	2,431	14.1	198	6.3	1,168	14.5	-1,659	5.5
FMD control	1,541	8.9	0	0	712	8.9	-433	1.4
Prevention	1,468		0		714		0	
Containment	73		0		-2		-433	
Indirect losses	890	5.2	198	6.3	457	5.7	-1226	4.1
Private sector	14,852	85.9	2,965	93.7	6,866	85.5	-28,291	94.5
Production losses	33	0.2	0	0	0	0	-274	0.9
FMD control	980	5.7	0	0	0	0	-7,916	26.4
Prevention	980		0		0		-7,842	
Containment	0		0		0		-74	
Indirect losses	13,839	80.1	2,695	93.7	6,865	85.5	-20,102	67.1
Total benefits			3,163	100.0	8,034	100.0	-29,950	100.0
Incremental public FMD control costs			0		5,243		-6,385	
Total FMD costs	17,283	100.0	14,202		14,531		41,748	

Note: All amounts represent sum of present values for each year over the 25-year study horizon under the 'EU price premium-slow decline' trade scenario.

Table 6.6 Distribution of FMD costs and benefits, by sector

Cost category	Total costs Baseline		Incremental benefits Scenario 1		Scenario 2		Scenario 3	
	Million Z$	%	Million Z$	%	Million Z$	%	Million Z$	%
Public sector	2,431	14.1	198	6.3	1,168	14.5	-1,659	5.6
Private sector	14,852	85.9	2,965	93.7	6,899	85.5	-28,218	94.4
Commercial cattle production	3,512	20.3	555	17.6	1,348	16.7	-13,650	45.7
Communal cattle production	1,950	11.3	317	10.0	735	9.1	-1,633	5.5
Beef-processing industry	5,804	33.6	1,293	40.9	2,977	36.9	-7,995	26.8
Other sectors	3,586	20.7	799	25.3	1,839	22.8	-4,940	16.5
Total	17,283	100.0	3,163	100.0	8,067	100.0	-29,877	100.0
Incremental public investment costs	-		-		5,243		-6,385	
Public sector net total loss	2,431		-198		4,075		-4,726	

Note: All amounts represent sum of present values for each year over the 25-year study horizon under the 'EU price premium-slow decline' trade scenario.

6.4.2.3 Income losses

As described in the CGE model simulation in the preceding chapter, the sectoral impacts related to beef export bans translate into income losses across the major population groups.[42] These income losses are estimated for each FMD control scenario in Table 6.7. The shares by group are derived from CGE simulation, and are applied as fixed constants for the baseline losses and incremental losses under each scenario. The majority of losses (and therefore the benefits as well from improved FMD control) are borne by the upper-income groups who own many of the factors of production, both agricultural and industrial. Nonetheless, lower-income groups still incur a third (33.6%) of the income losses (totalling Z$ 2.7 billion under the Baseline Scenario) and eventual income gains (totalling Z$ 1.1 billion under FMD Control Scenario 2). For lower-income urban households, these losses probably represent employment effects in beef processing and other industrial and service sectors of the economy. For communal area households, the losses are mostly related to reduced returns to their land, labour, and capital assets invested in cattle production. The employment effects for commercial farm workers appear to be negligible.

Table 6.7 Distribution of income losses by population group

Population group	Total losses		Incremental losses		
	Baseline		Scenario 1	Scenario 2	Scenario 3
	Million Z$	%	Million Z$		
Communal sector households	1,607	16.1	-238	-547	1,470
Commercial sector households	3,424	36.5	-543	-1,243	3,340
Upper income	2,397	36.1	-534	-1,229	3,302
Lower income	27	0.4	-6	-14	38
Urban household	3,140	47.4	-700	-1,611	4,325
Upper income	2,009	30.3	-448	-1,031	2,768
Lower income	1,131	17.1	-252	-580	1,558
Total income losses	6,631	100.0	-1,478	-3,401	9,134

To give the results in Tables 6.6 and 6.7 a different perspective, they are translated into per household terms in Table 6.8. When overall sectoral losses are considered, the burden of FMD is more than five times higher for urban and commercial farm households than for communal farm households. According to this calculation, the average communal farm household incurs a total loss of Z$ 1,420 (summed net present value over study horizon). Losses in the commercial farm and urban sectors, however, are borne mainly by the enterprises and owners of the factors of production, and so an average per household figure can be misleading. The second set of figures in Table 6.8 relate to the net income losses to

[42]Other losses associated with FMD such as direct production losses and FMD control costs could not be allocated by income group; the income losses reported here refer only to indirect effects of beef trade bans due to FMD outbreaks.

each population group from the beef export bans, and is a better indicator of household-level impact within each population group. As expected, the higher-income households in each sector suffer larger losses due to the trade bans than do the lower-income households. When lower-income households are compared across the sectors, poor urban households are seen to incur twice as many losses per household than communal farm households. Losses per household for commercial farm workers are, again, negligible.

Table 6.8 Estimates of per household losses, by sector

	Communal		Commercial		Urban & other	Total
	CA	RA	LSC	SSC		
Total households (no. projected for 2002)[a]	1,380,000	100,000	390,000	40,000	1,200,000	3,110,000
1996 poverty rate[b]	0.88	0.93	0.76	0.78	0.53	0.76
Poor households (no.)	1,210,000	90,000	300,000	30,000	640,000	2,270,000
Sector losses related to FMD						
Total (Z$ millions)[c]						
Baseline Scenario	2,097		3,533		10,196	15,826
Scenario 2	810		1,357		5,233	7,400
Per household (Z$)						
Baseline Scenario	1,420		8,140		8,490	5,080
Scenario 2	550		3,130		4,360	2,380

Income losses related to beef export bans						
	Communal	Commercial		Urban & other		Total
Income level:	All	Upper	Lower	Upper	Lower	All
Total (Z$ millions)[d]						
Baseline Scenario	1,073	2,410	28	2,020	1,137	6,667
Scenario 2	551	1,237	14	1,037	584	3,423
Per household (Z$)[e]						
Baseline Scenario	730	23,140	90	5,050	1,420	1,780
Scenario 2	370	11,880	40	2,590	730	910

Notes:
[a]Projected based on Central Statistics Office (CSO) district-level population projections for 2002, allocated by sector based on 1990 provincial census figures, and adjusted to household numbers based on 1992 average household sizes adjusted for intersectoral differences derived from 1996 national sector averages.
[b]Table E.3.3 (p. 119), CSO 1998.
[c]From Table 6.6; communal sector includes both communal areas and resettlement areas
[d]From Table 6.7
[e]For the commercial sector, the weighted average 1996 poverty rate for the LSC and SSC sectors is used to estimate the proportion of lower-income households among the total numbers of commercial farm households (LSC and SSC combined). For the urban sector, one-third of households are assumed to be upper income and two-thirds lower income.

6.4.2.4 FMD control zones

As discussed in Chapter 3, many of the impacts of FMD control on people involved in cattle production depend on the FMD control zone in which their farms are located. To get a sense of the numbers involved, estimates were developed of the different population groups living in each control zone under the different scenarios. These are summarised in Tables 6.9 and 6.10.

Table 6.9 Share of households in each FMD control zone, by population group and FMD control scenario

Population group	FMD control Scenario	Number of households	FMD control Zone			
			FMD-free export zone	FMD-free no-export zone	Surveillance Zone	Vaccination zone
			Percent of households			
All rural	Base	1,810,335	59	28	5	9
	1		41	32	18	9
	2		97	0	0	3
	3		0	0	94	6
Large-scale commercial	Base	373,624	74	20	2	4
	1		66	21	8	4
	2		98	0	0	2
	3		0	0	95	5
Small-scale commercial	Base	40,022	54	27	5	14
	1		41	32	13	14
	2		94	0	0	6
	3		0	0	91	9
Communal areas	Base	1,396,689	55	30	5	10
	1		35	35	20	10
	2		97	0	0	3
	3		0	0	94	6

Under the *status quo* Baseline Scenario, the FMD control zonation targets the export zone for areas where commercial farms are concentrated. A larger proportion of households working on the LSC farms therefore lie in the export zone (74%) than do communal area households (55%). Similarly, 10% of the communal area households—an estimated 140,000 households—are located in the most disadvantaged area where vaccination is required and market access is restricted, *versus* 4% of the commercial farm households. With the reduced export area under Scenario 1, this inequitable pattern is maintained. Under the last two scenarios, however, these differences between sub-sectors are greatly reduced, though not eliminated, as most households now lie either in the export zone (Scenario 2) or in the surveillance zone (Scenario 3).

Table 6.10 examines how these patterns evolve among the livelihood groups, and more specially among the rural poor and those rural poor with cattle. Looking again at the Baseline Scenario, the current FMD zones are seen to discriminate increasingly against the poor segment of the communal area population, and even

Table 6.10 Share of communal area households in each FMD control zone, by livelihoods group and FMD control scenario

Population group	FMD control Scenario	Number of households	FMD control Zone: FMD-free export zone	FMD-free no-export zone	Surveillance Zone	Vaccination zone
			Percent of households			
Group 1	Base	280,657	40	37	7	16
All are poor	1		23	51	11	16
No cattle	2		95	0	0	5
ownership	3		0	0	93	7
Group 2	Base	92,815	37	29	10	24
All are poor	1		0	43	33	24
	2		92	0	0	8
	3		0	0	92	8
Poor with cattle	Base	36,109	21	25	12	41
	1		0	35	24	41
	2		80	0	0	20
	3		0	0	80	20
Group 3	Base	152,863	44	22	10	24
All are poor	1		0	31	45	24
All own cattle	2		93	0	0	7
	3		0	0	93	7
Group 4	Base	665,290	61	33	3	4
All	1		50	33	13	4
	2		99	0	0	1
	3		0	0	95	5
Poor	Base	475,928	63	31	3	3
All poor own	1		48	31	18	3
cattle	2		99	0	0	1
	3		0	0	96	4
Group 5	Base	187,768	71	18	5	6
All	1		48	20	27	6
No poor	2		96	0	0	4
	3		0	0	92	8
Group 6	Base	17,296	74	4	8	14
All	1		0	0	86	14
No poor	2		100	0	0	0
	3		0	0	100	0
Communal areas	Base	1,002,263	51	31	6	12
All groups	1		29	38	21	12
Poor	2		97	0	0	3
	3		0	0	94	6
Poor with cattle	Base	664,900	56	28	5	10
	1		34	31	24	10
	2		97	0	0	3
	3		0	0	94	6

more so against the poor keeping cattle. Whereas 60-70% of the better-off households in groups 4, 5, and 6 are found in the export zone, only 40% of the first three groups are located there, and only 21% of the poor households with cattle in group 2. When FMD control is improved under Scenario 2, a smaller share of the households in the lower-income groups (1,2,3) benefit relative to the others.

6.5 Discussion

6.5.1 Benefit-cost indicators

The results of the BCA support the economic utility of FMD control. FMD Control Scenario 3, in particular, suggests that the current level of control yields Zimbabwe substantial returns in the order of Z$ 5 in avoided losses for each Z$ 1 invested in FMD control. The Zimbabwean economy will pay a high penalty if the capacity of the DVS to maintain these levels of control is allowed to continue to deteriorate.

The results for Scenario 2 offer evidence that investing in yet more rigorous FMD control will provide sufficiently attractive dividends in terms of avoided losses, especially those related to beef exports, to justify the investment in wildlife and livestock fences and enhanced DVS capacity. The BCRs are not very high, however, and in a small portion of simulations run, the returns to investment fall too low to cover the initial investment in FMD control. However, it must be remembered that a number of very conservative assumptions have been made during the analysis that would contribute to substantially underestimating the benefits. Therefore, despite being relatively close to the threshold of economic unworthiness (BCR<1.0), the estimated BCRs of 1.5-1.6 would appear to be robust in demonstrating the value of investing in better FMD control.

The conclusions drawn from Scenario 2 need, however, to be considered in light of the results for Scenario 1. Under the rather simplistic assumptions of Scenario 1, a contraction alone of the FMD-free zone would suffice to generate, at no additional cost, the same amount of net benefits (Z$ 3 billion) as would the investments provided under Scenario 2. One might be tempted to jump to the conclusion, therefore, that improved FMD control is not needed. This would be dangerous since there is a very real risk that the continued high number of FMD outbreaks under Scenario 1, even if occurring less frequently in the designated FMD-free zone, would damage Zimbabwe's credibility with its beef trade partners, and with its beef exporting neighbours. The investments envisaged under Scenario 2, on the other hand, would probably reduce the FMD risk significantly and establish Zimbabwe's credibility on a much stronger footing.

The results for Scenario 1 do, however, underline the importance of how the Baseline Scenario is defined. If Scenario 1 were considered the more likely future process by which Zimbabwe would adjust its FMD control and beef export strategies while maintaining its current level of control investment, and Scenario 1

therefore became the baseline scenario with which the other scenarios were compared, then clearly the expected BCR for improved FMD control (Scenario 2) would no longer be favourable because the incremental gains of going from Scenario 1 to Scenario 2 appear to be negligible. This is one caveat among many others that must be considered by users of the results of the analysis.

The results across the three trade sub-scenarios vary little within any of the individual FMD control scenarios. This is not surprising given the relatively short- to medium-term nature of EU price advantage, according to the arguments presented in Chapter 4, compared with the longer-term 25-year horizon adopted by this analysis. The implications are important, however, in that this finding suggests that maintaining access to the EU markets has been overemphasised, and that Zimbabwe should be just as, if not more, concerned with its general competitiveness in other markets.

6.5.2 Distribution of costs and benefits

Different indicators of the impact of the costs and benefits of FMD control on different segments of the economy and population have been presented and are summarised in Table 6.11 below.

Table 6.11 Summary of impacts of FMD control on different sectors

	Share of HHs[a]	1996 Poverty rate[a]	Sectoral losses[b]	Income losses[c]	FMD control zonation[d]	Incidence on the poor
Communal farms	48%	88%	11%	16%	Poor with cattle more likely to be located in zones with poor market access	Not insignificant; portion of losses shared by the poor as many own or have access to cattle (2/3 according to Table 6.10)
Commercial farm	14%	76%	20%	37%	Commercial farms more likely to be located in zones with better market access	Negligible apparent impacts on farm workers
Other (industry, urban)	38%	53%	54%	47%	-	Relatively large impacts on workers in other sectors, many of which figure among the poor
Public sector	-	-	14%		-	-

Notes:
[a]From Table 6.8
[b]From Table 6.6
[c]From Table 6.7
[d]Based on Tables 6.9 and 6.10

It is clear that the majority of the impacts of FMD and the benefits from its control accrue to the commercial sector that comprises cattle production, beef processing, and input industries and services. These benefits are passed on not only to the owners of the factors of production in that sector (commercial farmers, wealthy urban households, enterprises), but also to a certain degree through wage earnings to urban workers in both the formal and informal sectors.

Nearly half of Zimbabwean households, and 57% of all poor households (Table 6.8), derive their livelihoods in the communal sector. The number of poor communal households that own or depend on cattle varies considerably according to the poverty measure used. The data presented for the livelihood groups in Table 3.5 and the 1996 poverty rates suggest a crude estimate of 66%, but these rates appear to be considerably inflated by the high poverty rates reported in the 1998 Central Statistics Office (CSO) survey document.[43] Only a relatively small share of the animals destined for export is sourced from poor communal households, but the analyses indicate that this link to export markets translates nonetheless into a significant amount of additional economic activity and income in the communal sector, some of which is probably captured by the poor. Just as important is the evidence from the preceding chapter that the beef export trade raises cattle prices across all sectors and FMD control zones, and so benefits even those who do not necessarily sell their animals for export. Unfortunately, the macro-economic modelling was not able to capture and quantify these price effects. The price effects can be viewed as offsetting to some degree the market restrictions imposed on the relatively higher numbers of poor communal households with cattle located in the vaccination or surveillance FMD control zones. Poor farm households with cattle benefit from the export trade whether or not they sell their animals for export.

But if cattle keepers gain from higher prices, consumers lose, at least in the short to medium term. As noted in the preceding chapter, meat accounts for 6-10% of household cash expenditures in Zimbabwe, even among the poorest households. Higher meat prices reduce household real income. All households are consumers, so the numbers of poor households affected are much larger than those benefiting as cattle keepers, in the order of two million total poor households compared to the 500,000-850,000 poor households with cattle. These poor households with cattle may in fact incur a net loss from higher cattle and meat prices since many consume more meat than they produce. In the longer run, higher meat prices would be expected to attract increased investment in cattle production and meat processing, and eventually improve the efficiency of production and contribute to a downward trend in prices over time.

The conclusion that emerges regarding the distributional economic impacts is therefore that improving FMD control is neither clearly pro-poor nor anti-poor. The commercial sector captures many of the benefits, but some are shared by or get

[43]See, for example, the comparison of ICES 2 estimates in Tables 3.3 and 3.4.

passed on to poorer segments of the population in both rural and urban areas. The data and methods used in this analysis have provided indicators of how impacts are allocated among different segments of the population, but it has not yet been possible to accurately quantify the full range of impacts and their incidence specific to the poor in each sector, and this remains an area for future research.

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Chapter 7

Study synthesis and conclusions

7.1 Introduction

This wide-ranging study presents one of the first in-depth analyses of the complex impacts of national animal disease control measures in developing countries that are driven largely by export markets. It attempts to bring together the often separated issues of cost:benefit of foot and mouth disease (FMD) control options, the distribution of costs and benefits, the impacts of access to meat export markets resulting from effective FMD control, the impacts of FMD control measures on poverty reduction, and the influences of future developments in the international beef trade. The results of the study allow certain conclusions to be drawn, but they also raise several questions.

An attempt has been made to identify regional issues related to the impact of FMD control in southern Africa, but a large part of the study was focused specifically on one case study country in the region, namely Zimbabwe, in particular for the livelihoods study and the benefit-cost analysis (BCA). Although there are many lessons to be learnt from the results of these components of the study that might be relevant to countries other than Zimbabwe, inevitably some of the results will not be directly applicable, and caution must be exerted when attempting to extrapolate the results directly to other countries and regions.

Previous economic impact assessments of FMD control have generally focused their attention on the costs and benefits of control to the national economy of the country in question. The objective of such an approach has been generally to determine the impact of returns to investment in FMD control on national economic growth. We have followed convention initially, and carried out such an analysis for the case study country of Zimbabwe. We start this synthesis by summarising the results. We then go on to discuss the distribution of these costs and benefits, to help evaluate who gains and who does not (and thus how the financing of FMD control might evolve), and relate the results to national development and livestock development policies for the country. Then, we discuss the contributions made by FMD control to the poverty reduction element of development policies, and suggest how a greater balance between national development and poverty reduction targets might be achieved through animal disease control.

7.2 Impact of FMD and its control on national development in Zimbabwe

The study results show that FMD control measures are likely to be of considerable benefit to the national economy of Zimbabwe. This is demonstrated in several ways. Firstly, in a comparison between the baseline and the pessimistic FMD control scenarios, it is shown that for every $ 1 that Zimbabwe disinvests

from the FMD control programme, $ 5 further are lost by the country. (Note that a generic 'dollar' currency is used in this and the following paragraphs when discussing price ratios since the principle expressed applies regardless of the currency used, it has the same meaning whether expressed as US$ or Z$). This is a very stark result. It is important to note that in this pessimistic scenario in which FMD controls decline significantly, no transboundary effects were taken into account, and the losses calculated are uniquely those of Zimbabwe. However, the association of the outbreak of FMD in south-eastern Botswana in March 2002 after over 30 years of freedom with the outbreaks in western Zimbabwe suggest that the costs to the region as a whole of Zimbabwe's disinvestments could be much greater. In addition, it is important to point out that the effect of declining FMD control infrastructures on the control of other diseases is not taken into account in the BCA. The negative effects of disinvestments in FMD control are thus considerably underestimated.

Secondly, the results show that if Zimbabwe were to invest in the fences and the veterinary service infrastructures required to create a much larger and much more secure export zone that is World Organization for Animal Health (*Office International des Epizooties*: OIE)—recognised as FMD free, there would be returns of approximately $ 1.5 for every $ 1 invested. As with the disinvestment scenario, this does not incorporate benefits to the region as a whole through greater disease security from FMD control, nor does it include the other benefits from an enhanced national veterinary service. Despite the relatively high quality of data available in Zimbabwe on which these analyses are based, the rapid changes taking place in the country do raise certain questions. These include whether the investment in fence reconstruction and improvements in veterinary services infrastructure and capacity are achievable in the current economic climate, whether the time frame and cost estimates are realistic, and whether Zimbabwe is able to maintain the capacity, in terms of quantity and quality, to supply the export markets (given the current dramatic decline in the size and productivity of the predominantly high offtake commercial sector, and the greater reliance this places on the lower offtake resettlement and communal sectors).

A third indicator of the scope of benefits to the national economy came from the social accounting matrix (SAM)/computable general equilibrium (CGE) modelling of how income levels across different sectors of the economy would be affected by the loss of beef exports resulting from bans imposed after FMD outbreaks. Results of this analysis, which were incorporated into the BCA, showed that effective FMD controls required for trade contribute to an expanded value of economic activity at the rate of $ 1.79 for each $ 1 of beef export revenue earned, a significant proportion of which is earned by other sectors of the economy.[44]

[44]What does the figure of $ 1.79 mean? We conclude that it is both positive and significant. Clearly values of greater that $ 1 indicate a positive contribution to economic activity beyond the direct incomes from beef trade, but values that are too high raise credibility questions regarding the analysis. Sadoulet and de Janvry (1995) concluded from an analysis of SAM multiplier models used by Haggblade and Hazel (1989) that values over $ 3 are unrealistically large.

What degree of confidence can we attribute to the results? Several features of the manner in which the analysis was developed have assured a reasonable degree of robustness. Firstly, the definition of the various FMD control and trade scenarios has ensured that a wide range of key assumptions has been represented. Secondly, the analysis was performed using a spreadsheet model (@RISK © that permitted random sampling from probability distributions for a number of key parameters, particularly those related to the frequency and location of future FMD outbreaks. This approach provided confidence intervals rather than simple point estimates for the indicators such as the benefit-cost ratio (BCR). These techniques, built directly into the analysis, reduce the need for traditional sensitivity analysis.

The clear conclusion of these three elements of the study is that FMD controls have a very positive impact on the national economy in Zimbabwe.

7.2.1 Implications for the southern African region

The results of this study supplement those from the only previous cost-benefit analyses in the region, those carried out in Botswana. In the Botswana study of 1994, a BCR of over 11:1 was calculated, when comparing the official control policy of the country (with beef exports to the European Union (EU)) to a 'without control' policy, using a 20% incidence of FMD derived from data from extensive systems in Tanzania. While this figure does represent a worst-case scenario, it is extremely high, and does illustrate the importance of the choice of parameters in a baseline comparison. The BCR values derived for a pessimistic scenario in the Zimbabwe study here are high, but not of that magnitude.

We are not aware of benefit-cost analyses of this type being undertaken in countries of southern Africa other than Botswana, and it is not possible to extrapolate directly from these results what may be the economic merits for the area of different future FMD control and meat trading options. Nevertheless, it is not unreasonable to speculate that benefits from international trade will be sufficient to justify FMD control across the region. The present study provides a methodological framework that could be used to confirm this in the other countries of the region exporting beef, namely Namibia, South Africa, and Swaziland.

7.3 Distribution of costs and benefits of FMD control in Zimbabwe

When it comes to the distribution of costs and benefits, the distributions of both appear highly skewed. At present the expenditures for FMD control are borne almost entirely by the public sector, but when the losses from trade bans brought on as a result of FMD outbreaks are included, private sector costs dominate. The total present value of all costs in the Baseline Scenario amount to Z$ 17 billion over the 25-year study period, of which 86% are borne by the private sector and 14% by the public sector. The direct impact of disease in terms of production losses represents only 0.2% of this total cost. Some of the benefits accruing from

FMD control, and from the access to export markets, come back to the public sector (6-14%, depending on the scenario), particularly through the ability to manage other disease threats to the nation (which have not been incorporated into the analysis), and in foreign exchange remitted to the exchequer. However, the vast majority of the incremental benefits (85-94%, depending on the scenario) are captured by the private sector, the largest share of which is to the beef-processing industry.

The majority of impacts of FMD, and benefits from its control, accrue to the commercial sector, comprising cattle production, beef processing, and related input industries and services. These benefits pass to owners of the different factors of production, including the wage earners in these sectors. Much of the gain in wider economic activity shown by the SAM/CGE modelling is captured by the beef-processing industry, but gains are also passed to cattle producers and other agricultural, industrial, and service sub-sectors of the economy. Approximately 16% of the increased value of economic activity resulting from effective FMD control is transferred as income to low-income households in both rural and urban areas.

Whereas the distributions of direct costs of FMD control and benefits derived from the export of beef appear severely skewed, those income losses resulting from export bans are more widely distributed across major population groups. While the majority of such losses are borne by the upper-income groups, virtually one-third of losses are incurred by lower-income groups. For lower-income urban households, these losses probably represent employment effects in beef processing and other industrial and service sectors of the economy. For communal area households, the losses are mostly related to reduced returns to their land, labour, and capital assets invested in cattle production. The employment effects for commercial farm workers appear to be negligible.

Summing up the results on the distribution of costs and benefits, we propose that policymakers may be justified in expecting the private sector to contribute much more to FMD control in the future, whether directly or through taxation or levies. A high level of control adequate to maintain freedom in OIE-recognised FMD-free zones will not be a one-off investment; it will require a continued investment to protect the zone's FMD-free status once it has been achieved. Sustained public funding of all the necessary FMD surveillance and control costs may not be justifiable, particularly given the commercial orientation of its benefits. Participation of the direct beneficiaries from the private sector would provide a more equitable and sustainable alternative.

7.3.1 Implications for the southern African region

The main message from these results concurs with that from other recent studies on the distribution of costs and benefits of FMD control, such as the study of Randolph et al. (2002) in The Philippines. While the public sector is largely funding FMD control, it is elements of the private sectors that are reaping most of

the economic benefits, particularly from the access to export markets. The Philippines studies used hypothetical export volumes and prices, as they are in the final stages of eradicating FMD and are yet to establish meat export markets, but this study has been able to capitalise on actual data, given the long history of beef exports to the EU from Zimbabwe.

It seems highly likely that the distributions of costs and benefits are similarly skewed in other countries of the southern African region in which FMD is controlled and meat exports occur.

The major implication of this finding is that the principal beneficiaries of FMD control measures should play a greater role in funding control measures.

Again, the methodology developed here could be applied to all the other countries of the region, and in this case could be a valuable tool for influencing policy on the financing of national FMD control programmes.

7.4 Impacts of FMD and its control on the poor in Zimbabwe

Here we summarise the direct and indirect impacts, both positive and negative, of FMD, and of its control upon the poor.

7.4.1 Direct impacts of FMD on the poor

As far as FMD is concerned, the results suggest that the direct impacts of the disease itself on the poor are currently very meagre. On the rare occasions that FMD occurs in communal lands it has limited productivity impacts, and limited impacts on traction and on animal value. However, it is important to recognise that much of this is due to the good control that has existed, and in other parts of the region where FMD is more prevalent, so are the impacts on livestock owned by the poor.

7.4.2 Indirect impacts of FMD on the poor

The indirect impacts of FMD are also limited, and can be both positive and negative, depending on who is affected by them. The major effect of a cessation of international trade due to FMD is a drop in the beef price. This decrease in the value of beef has positive results for poor consumers of beef, for households in a net deficit for beef and cattle, and for the poor trying to acquire cattle through purchase or barter, as the items they wish to purchase are cheaper. However, the price drop has negative impacts on those households in net surplus of beef and cattle and wishing to sell, on the small proportion of poor engaged in direct or indirect marketing of cattle for export, and for those large numbers of ‘wealth storers’ who have already invested in cattle, as the value of their assets will drop.

7.4.3 Direct impacts of FMD control on the poor

The most obvious direct effect of FMD control measures on the poor is negative through the movement controls imposed. The restriction on the movements of all livestock, not just cattle, limits those within certain distances of FMD outbreaks from marketing their animals as and when they wish to. This is likely to be transitory, and affect small numbers, but is particularly important at the times when school fee payments are required, or when urgent medical expenses are incurred, for example. In addition, when these are imposed in times of drought, they limit the traditional risk avoidance responses to drought of livestock keepers, such as relocation in search of grazing, and this will affect large numbers.

7.4.4 Indirect impacts of FMD control on the poor

A major indirect effect of FMD control measures has been the development of infrastructure and capacity for public veterinary services, and this has both positive and negative impacts on the poor. On the positive side, the need for credible diagnostic, control, and surveillance facilities to underpin the lucrative beef export market has contributed to the support from government public funds and from donor organisations for investment in veterinary service delivery infrastructures, and an element of this has been the creation and running of the animal management and health centres scattered throughout the communal lands of the country. This has indeed been a positive effect, but of course has also been driven by the need to control tick-borne and other diseases affecting the livestock kept in communal areas. This in theory has allowed greater awareness of animal health issues and their resolution in the communal areas communities, as well as an intelligence system for the detection of other major infectious diseases. On the negative side, however, these services do not appear to have been adequately geared to the needs of the poorer sectors of smallholder livestock keepers, and in particular to the health and management of poultry and small ruminants (see section 7.5.5).

Other positive indirect effects of FMD control measures on the poor in the short and medium term are the employment and income generation opportunities provided in the beef and associated industries that serve the export markets. In the longer term, FMD control measures improve trade, which promotes national economic growth and wealth creation, although how much of this is captured by the poor is questionable.

And lastly, the positive contributions to economic growth that FMD control has contributed have helped provide a favourable economic environment for development, within which poverty reduction programmes could be developed.

7.4.5 The effects of FMD control zonation on impacts on the poor

Many of the impacts of FMD control on people involved in cattle production depend on the FMD control zone in which their farms are located. The comparative distributions of the poor, and of the beef export catchment zones,

therefore provide an additional indicator of how the poor might benefit, through employment, marketing opportunities, etc., but as indicated in the livelihoods study, regular commercial marketing of cattle is in fact practised by a very small minority of cattle keepers in communal areas. In the optimistic (2) and pessimistic (3) scenarios, the bulk of the country either becomes FMD free (including 97% of communal areas) or FMD endemic together, so the zonation does not appear to play a major role in these scenarios. However, in the Baseline Scenario and reduced export zone scenario (1), the zone size has an impact. For example, whereas 55% of the communal area population is included in the catchment zone in the Baseline Scenario, this reduces to 35% in Scenario 1.

If the communal area population is differentiated according to the six livelihoods groupings, the extent of the disadvantage to the poor in the Baseline and reduced export zone scenarios becomes even more pronounced. In the Baseline Scenario, the current FMD zones are seen to discriminate increasingly against the poor segment of the communal area population, and even more so against the poor keeping cattle. Whereas 60-70% of the better-off households in livelihoods groups 4, 5, and 6 are found in the export zone, only 40% of the first three groups are located there, and only 21% of the poor households with cattle in group 2. When FMD control is improved under Scenario 2, a smaller share of the households in the lower-income groups (1,2,3) benefit relative to the others.

Again, though, these analyses of the distribution impacts of zonation must be interpreted with caution. According to the livelihoods study, only in Matabeleland South are a small proportion (less than 2%) of communal area farmers regularly marketing cattle. The very low participation in regular marketing elsewhere suggests that the zonation itself has a very limited direct effect on the poor.

7.4.6 Summary of impacts on the poor

So what is the net impact of FMD control under different control scenarios on the poor? On face value, the direct, and even indirect, impacts of all FMD control scenarios are very limited. Having said that, it is very difficult to make a single net judgement. The size of the benefit to the poor will depend on whether they are measured in the short, medium, or long term, and whether they are measured in economic or social terms. This is well illustrated in the following example.

Ostensibly, the scenario in which Zimbabwe disinvests in FMD control, and FMD becomes endemic, could have the greatest direct short-term benefit to the poor, through lowering prices of beef and cattle. But in the medium and long term, the incidence of FMD would rise, and the disease would undoubtedly have greater direct impact on communal area livestock keepers by affecting the capacity for traction and other livestock functions. Furthermore, the reduction in veterinary services implicit in this scenario would reduce the capacity to address the health constraints of poultry and small ruminants. And finally, this scenario would probably eliminate the lucrative beef export market to neighbouring countries such as South Africa, with the deleterious effects this would have on national, and regional, economic growth.

7.4.7 Implications for the southern African region

The results of the poverty impact component of the study have immense potential relevance to the region. It is not that the results are necessarily directly transferable, many of them are not, but FMD control is a very high-profile example of development programmes that will need a much better balance between their impacts on growth, and their impacts on equity.

It would be particularly valuable to compare the compatibility between livelihoods strategies and cattle marketing targeted at exports for other communities in the region in Botswana and Namibia, which claim more proactive and direct involvement of smallholder producers in supplying export channels, as well as in South Africa and Swaziland.

In addition, a greater compatibility in both data quality and the level of data disaggregation by segments of the population would permit better integration of SAM modelling with other poverty assessment techniques, including livelihoods analysis approaches.

7.5 Broader implications of study results

7.5.1 The need for balance

While ensuring that as many different components as necessary are included in national development policies, it is important that they do not contain contradictory elements. As such, it is important to balance policy elements promoting national economic growth with those supporting social development (equity), minimising the trade-offs, and enhancing the synergies.

The outputs of the three main elements of this study, summarised in Sections 7.2, 7.3, and 7.4, demonstrate apparent inconsistencies in the impacts of FMD control measures. They contribute quite positively to the national economy, but the major beneficiaries (the commercial beef sector) provide only a small proportion of the investment in control measures (the majority of which is paid by the public sector), and the contributions to poverty reduction are very limited and mostly indirect.

Given these inconsistencies, it is appropriate to consider the results in the context of published national and livestock development policies (see Section 1.8), and discuss the implications they might have on a balanced development policy, on international trade in livestock products, and on publicly funded animal health services.

7.5.2 The contributions of FMD control to national development and livestock development policies in Zimbabwe

The four priority areas in the medium-term plan of the Millennium Economic Recovery Programme (MERP; Government of Zimbabwe 2000) are: sustainable macro-economic stability and growth; land reform and agricultural development;

infrastructure development; and human resource development. How consistent are the results presented in this report with these elements?

They are certainly consistent with the argument that FMD control supports macro-economic stability and growth, agricultural development, and infrastructure development, as described and discussed in Chapter 6. With relation to land reform and human resource development, the consistency of the results with policy depends on the interpretation of these terms. The livestock export industry provides an important enterprise that could be a valuable asset and incentive to land reform, providing that confidence in the industry, and a continued effective FMD control programme, are sustained. Similarly, the livestock industry supports human resource development through the skills and labour opportunities it provides, but, as will be discussed further below, it has minimal direct positive human resource impacts on the very poor of the country.

With regard to agriculture, the policies for the development of the livestock sector are contained in Zimbabwe's Agricultural Policy Framework 1995-2020 (Government of Zimbabwe, undated) as described in Chapter 1. These policies are devoted to promoting increased production and commercialisation, with considerable emphasis given to cattle. Poverty is mentioned only as a constraint, with no reference to poverty reduction among the objectives of livestock sector policy. Promoting livestock production in this context would support the maintenance and further development of Zimbabwe's beef export markets as a means of achieving the specific priority given to increasing offtake from smallholder farms. As the results suggest, beef exports do appear to contribute to higher prices and enhanced incomes among the commercially orientated segments of the communal sector. Putting aside the equity implications, improving FMD control to protect and enhance the beef industry serves well Zimbabwe's stated livestock policies for livestock development and economic growth based on commercial development.

7.5.3 The contribution of FMD control to poverty reduction policies

MERP, and particularly the Agricultural Policy Framework, identify poverty as a major constraint to Zimbabwe's development and growth, although no specific actions are proposed to reduce it. Improved FMD control and beef exports clearly benefit those segments of the population that are able to participate in increasing and intensifying production for export, but much less so those without sufficient livestock assets, which obviously include the great majority of the poor. It is in support of poverty reduction policies and pro-poor livestock policies, therefore, that there is the least consistency with study results. The key results of the livelihoods study indicate that:

- FMD has a minimal impact on the livelihoods of the poor, including poor cattle keepers.
- A large sector of the very poor do not own cattle.

- Cattle owners in communal areas use cattle to meet a range of other livelihood needs and do not have large enough herds to market cattle on a regular basis.
- The livestock species of most importance to the livelihoods of the poor are poultry and goats.
- Current services for credit, extension, and animal health are not meeting the needs of the poor.

So is FMD control pro-poor? In itself, clearly, the disease is not, at present, a major constraint to the poor, nor is FMD control a major opportunity for poverty reduction. This report does not address alternative poverty reduction strategies through disease control that might offer better investment options than FMD control, so we are not in the position to discuss specific alternatives that might have greater impact on poverty. However, there are many elements of FMD control, its efficacy, and its financing highlighted in this report that lead us to believe that there are ways to permit it to form the base for a more pro-poor service in animal health, and we will review these in Sections 7.5.5 and 7.5.6.

7.5.4 The implications for international trade in beef

There are several implications of the study results for international trade in beef by Zimbabwe and other countries of the region.

7.5.4.1 The importance of the EU market for boneless beef

The results show that there appears to be little impact on the BCRs of variations in the prices obtained for beef, as depicted in the three trade sub-scenarios applied to each FMD control scenario. This is not surprising given that, due to several independent trends, the EU price premium ends up disappearing in the short to medium term (see Figure 6.1). This finding suggests that the importance of maintaining access to the EU markets as the primary driver of a future export policy has been overemphasised.

7.5.4.2 Competitiveness

The trend in international markets for beef, in particular the changes in the Common Agricultural Policy (CAP), the renegotiation of the Cotonou Protocol, and the evolving policies of the World Trade Organization (WTO), suggest that the prices that the southern African beef exporters might be able to receive for their boneless beef exports will steadily decline over the medium term. This prediction, along with the likelihood of increasing competition on the world market with other suppliers, particularly certain countries of South America, suggests that Zimbabwe will need to increase the competitiveness of its product if it is to retain access to key markets such as the EU.

7.5.4.3 Marketing and processing

The pressures for greater competitiveness should also permeate to Zimbabwe's monopoly company for marketing and processing beef for export, Cold Storage Company (CSC). The advantages of a single company in dealing with the relatively small volumes of beef exported in terms of economies of scale are clear, but the need for greater competition in the marketplace, which has benefited the domestic market in recent years and broadened the participation in these markets, deserves consideration.

7.5.4.4 Supplying cattle for the beef export market

The majority of cattle supplying the export market in Zimbabwe have come from the commercial farming sector, with less than 25% of cattle purchased directly from communal lands by CSC going for export. The dramatic decline in the commercial farming sector is likely to have a significant impact on the ability to supply the export market, particularly in the short to medium term. The study results (see 6.3.1.1) suggest that if cattle for the beef export market were sourced entirely from the communal sector, current estimated offtake rates would be insufficient to meet demand in all but the scenario in which virtually the entire country is FMD-free as a result of increased investment in fencing and other veterinary infrastructures (Scenario 2). And this does not take into consideration quality issues. Therefore, a key assumption underlying the analysis is that sufficient capacity to produce commercial grade cattle continues to exist.

At the same time, the study results suggest that increasing the offtake rate of cattle from the communal herd may not be compatible with the livelihoods objectives of many communal area households, and will not be consistent with a pro-poor livestock policy. There may be an expectation that following the dramatic decrease in the commercial cattle herd that the communal areas will be able to step in. The results of the livelihoods study suggest that this may be unrealistic.

7.5.4.5 Meeting international requirements on FMD status

The requirements for meeting standards on FMD control status, including surveillance and animal identification, are set by OIE. Given the freedom from FMD of many developed countries, there is much pressure from them for even higher standards to prevent spread of the disease. This pressure has intensified following the recent outbreak in the UK in 2001. These high standards are making it increasingly difficult for developing countries in southern Africa and elsewhere to engage in international trade to higher-value markets, even in boneless beef, a relatively safe product. Furthermore, there are certain inconsistencies in policy that discriminate against such countries.

An example encountered in this study concerns the export of lamb from Namibia. Namibia has an OIE-recognised FMD-free zone, from which it exports

boneless beef. In theory, they should be able to export bone-in beef, but there is no economic advantage to this, given the higher shipment charges, the higher processing charges in the EU, and the limited demand for bone-in beef products. Nevertheless, they do aspire to export bone-in lamb, as there is a major market in the EU for leg and shoulder of lamb. However, only boneless lamb is acceptable to the EU for importation, which has marketing and cost disadvantages to the Namibian meat industry.

There is a need for greater consideration of the development of standards that provide acceptable disease security, but are also pro-poor, in that they consider the use of alternative procedures that are more consistent with the infrastructures and capacities of developing countries, so permitting them greater access to international markets. This is an area that deserves further attention. It is understood that OIE is currently canvassing opinion among its delegates on this issue, termed 'equivalence'. A recent study (Redmond 2002) examined the issue of the cost of compliance with sanitary and phytosanitary (SPS) requirements for international trade, and whether this cost was prohibitive. Using Botswana as a case study, it was concluded that the resource cost to developing countries wishing to enter the market for fresh beef was substantial where existing domestic standards are low, suggesting that technical standards and high costs of compliance could act as significant barriers to trade.

7.5.5 The implications for livestock (particularly animal health) services

The implications of the study results on animal health services for Zimbabwe have two sides. Firstly, they have been very effective in the past in providing services to commercial agriculture, and in promoting the health of cattle kept in communal areas. Much, but by no means all, of the funding obtained for this has been justified on the basis of the need for effective FMD control. And, until recently, the effectiveness of the Department of Veterinary Services (DVS) had resulted in a decrease in the incidence of FMD. Furthermore, the strongly negative BCR of disinvesting in FMD control sends a clear message as to the strong role animal health services have played in the national economy of the country.

FMD control measures have played a major part in setting up and maintaining veterinary service infrastructures in Zimbabwe. As a result, there is a network covering the country, including the widespread distribution of animal management and health centres in communal areas across all FMD control zones. This study suggests, however, that, given the great diversity of livestock enterprises within communal lands, and the emphasis placed on cattle in disease control activities, these centres and the services they provide do not cope adequately with the priority livestock species of the poor, namely poultry and goats.

The other side of the implications, therefore, is that veterinary services could probably do much better if the goal of poverty reduction is central to national policy. It would appear that access to and ownership of livestock are central to the aspirations of the poor, and that a 'livestock ladder' operates in Zimbabwe, in

which poultry and goats are the lowermost rungs, and wealth storing on each rung is the priority over strategic and opportunistic sales of livestock. The implication is that the best way to promote greater commercial use of cattle may be to secure the assets provided to the poor by poultry and small ruminants, and health, feeding, breeding, and management are central to this process.

In order to say that it would be more effective, or more pro-poor, to focus entirely on the health and productivity constraints of poultry and goats (which was the main implication of the livelihoods study) rather than FMD, we would have needed to undertake a comparative study of the relative merits of the two in a cost-benefit analysis approach. This we have not done. Our conclusion, however, is that the two are not mutually exclusive. The focus on FMD control has provided funding and political support (with its contributions to the national economy), both of which are crucial. What might be required is a continued support of the FMD measures, but financed more by those who benefit from the export market, and greater focus on the allocation of public funds to the priority issues of poor livestock keepers (and so likely to include a greater emphasis on small stock).

7.5.6 The implications for a balanced development policy

7.5.6.1 The positive impacts of FMD control on the national economy

This study concludes that FMD control can have a positive effect on national economic growth, and possible future disinvestments would have a very negative effect. From a purely economic perspective, investments in FMD control that allow international trade in beef produce positive returns.

7.5.6.2 How to redress the imbalances in who pays for, and who benefits from, FMD control measures?

Based on the different elements of this study, and on other recent studies that have been undertaken in other regions on the economic impact of FMD control in developing countries currently engaged in, or aspiring to be engaged in, export of fresh and frozen meat products from FMD-free zones, it appears that although the major beneficiary of these exports is the commercial livestock sector, it is the public sector that bears most of the costs. It seems reasonable to suggest that in the interests of the sustainability of positive investments that support national economic growth, a much more active engagement with the different elements of the private sector be sought in order to redress the imbalances that appear to be present in the funding of FMD control activities.

Furthermore, as interest in greater regional coordination of FMD control initiatives increases, this principle could also be applied to southern Africa. Those countries, or livestock sectors within the region as a whole, that are most likely to gain from the export opportunities and other benefits of FMD control, might be expected to consider more seriously investing in the control of FMD in neighbouring countries from which the importation of the disease is a high risk.

7.5.6.3 How can FMD control have greater impact on poverty reduction policies?

Effective FMD control appears to bring very limited direct benefits to the poor. However, poverty reduction measures function best in an environment of national economic growth, a situation which FMD control appears to promote. Thus, rather than abandon FMD as a focus for veterinary service delivery, and replace it with another option that may not attract the funding opportunities, international interest, and economic returns that FMD does, it is worth considering how poverty reduction value can be added. With greater private sector investment in FMD control to reflect the distribution of benefits received, as advocated above, there could be strong opportunities to retain public sector investment to build on the veterinary infrastructures so developed and diversify animal health services for greater direct benefit to the livestock species and constraints of more direct concern to the poor; in the case of Zimbabwe, these are probably the health constraints to the raising of poultry and small ruminants.

7.6 Other implications of the study results for the southern African region

This study has looked in some detail at Zimbabwe, and superficially at the other southern African countries. One of the key lessons coming out of this study is that while each country has its own agreements with beef trading partners, and its own beef marketing enterprises, they have a common threat from the potential for spread of FMD in the region that needs to be addressed jointly. Despite the individual country labels on agreements and market partnerships, given the concern that exists in FMD-free nations regarding the risks of importing the disease, the region will be increasingly perceived as one entity in terms of disease security. Recognising and responding to this will require very high levels of communication, fast and accurate disease reporting, and complete transparency.

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Note on prices used in cost estimations

Unless otherwise noted, monetary values are reported in current prices in Zimbabwe dollars (Z$), US dollars (US$) or Euros (€). Z$ values reported in constant 2001 Z$ have been converted from current prices to constant prices using the Consumer Price Index values in the table below as the deflator. Exchange rates used for converting current Z$ values to US$ equivalents are also reported in the table below.

Year	Official exchange rate Z$/US$	CPI deflator
1990	2.64	9.1
1991	5.05	11.3
1992	5.48	16.5
1993	6.93	21.0
1994	8.39	26.3
1995	9.31	32.8
1996	10.84	41.1
1997	18.61	51.3
1998	37.37	64.1
1999	38.11	80.3
2000	44.62	100.0
2001	55.08	228.7
2002	55.00*	

Source: Exchange rate: CSO, RBZ 2000 & 2001. Rate for 2002 estimated based on observed rates. CPI: Consumer Price Index for all items, 1990-94: estimated based on nominal and real beef prices reported in The Agricultural Sector of Zimbabwe Statistical Bulletin 2001, Ministry of Lands, Agriculture and Rural Resettlement, 2000; 1995-2001: CSO Prices Bulletin, 13 November 2001; readjusted to 2001 as the base year.

When price ratios are discussed (e.g. “every $1 invested generates returns of $1.79”), a generic ‘dollar’ unit ($) is used since the principle expressed applies regardless of the currency used; it has the same meaning whether interpreted as US$ or Z$. Note on prices used in cost estimations.