TRADE IN LIVESTOCK AND LIVESTOCK PRODUCTS: INTERNATIONAL REGULATION AND ROLE FOR ECONOMIC DEVELOPMENT

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Preface

This is the sixth of a series of ‘Livestock Policy Discussion Papers’. The purpose of the series is to provide up-to-date reviews of topics relating to the livestock sector and its development in various regions of the world. A strong emphasis is placed on the compilation of quantitative information, methodological aspects and on the development of policy recommendations for the topic at hand.

The livestock sector plays a vital role in the economies of many developing countries. It provides food, or more specifically animal protein in human diets, income, employment and possibly foreign exchange. For low income producers, livestock also serve as a store of wealth, provide draught power and organic fertilizer for crop production and a means of transport. Consumption of livestock and livestock products in the developing countries, though starting from a low base, is growing rapidly.

This paper therefore explores current patterns of world trade in livestock and livestock products (LLPs) and the changes resulting from trade liberalisation, subject to sanitary and other controls, being introduced under the auspices of the WTO. Attention is focussed particularly on seeking an appropriate policy response for the developing, low income (LIC) and least-developed (LDC) groups of countries.

It is hoped that the paper stimulates discussion and any feedback would gratefully be received by the author and the Livestock Information and Policy Branch of the Animal Production and Health Division of FAO.

Disclaimer

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EXECUTIVE SUMMARY

Demand for livestock products is growing rapidly in the developing world. At the same time world trade is expanding within a changing institutional framework, centred on the World Trade Organisation. The Uruguay Round of trade negotiations (1986-1994), which led to the foundation of the WTO, also brought trade in agricultural commodities under review. Now is therefore an appropriate stage at which to review the current, changing patterns of world trade in livestock and livestock products, and the impact of the developing international institutional framework.

Livestock and livestock products (LLPs) account for about one sixth, by value, of all agricultural trade. Meat exports make up about half the total value, with bovine, pig and poultry meat as the three main types. Exports of pig meat have grown in volume by six percent annually over the last decade, while poultry meat exports have grown annually by over 14 percent. Exports of dairy products account for nearly a third, by value, of LLP exports and have grown by over three percent per year over the last decade.

Further analysis of trade in LLPs is based on comparison of three main groups of countries; developed, low income (LICs) and least developed countries (LDCs). The developed countries as a group account for more than three quarters of world LLP trade and are net exporters of virtually all livestock products to the developing countries. Net exports of dairy products make up more than half of the value of total LLP net exports and are growing by over three percent annually. Exports of all kinds of meat and live cattle and pigs make up a much smaller proportion of total LLP net exports but are growing rapidly.

Developing countries, including the LICs and LDCs, are net importers of LLPs overall. Dairy produce is the largest item contributing to total net imports. For the LICs, imports have grown over the last decade but for LDCs imports have fallen. Poultry meat is the next most important item for which net imports have grown in both LICs and LDCs. Live cattle are net imports into LICs as a group, but are exported from LDCs. The only items for which LICs are net exporters are bovine meat, hides and skins and live sheep and goats. The LDCs are net importers of bovine meat but export live cattle as well as sheep and goats and hides and skins. The main net exporters of livestock in the LDC group are identified as the countries of the African Sahel, with a smaller contribution from Cambodia and Laos.

The LDCs as a whole have more permanent pasture available per head of rural population than other developing countries but stocking density and meat production per animal are lower. Thus this group of countries might have a slight comparative advantage in producing live ruminant animals, but improvements in productivity would be desirable. Although the value of these livestock exports is relatively low per head of rural population, it represents up to four percent of the total national income (Gross National Product). This is larger than the contribution to GNP of LLP exports for any other developing country group.
Exporters of bovine meat from within the Low Income Country group are less dependent on LLP export sales as a contribution to national income and on imports of LLPs as a proportion of national supplies. India is a major contributor to net exports of bovine meat for this group, mainly because it is a large country, but exports of LLPs only account for a fraction of one percent of national income.

Middle Income Developing Countries carry more livestock per head of rural population than the Low-Income group and achieve higher levels of livestock productivity. Dairy products, poultry meat and lamb are the only commodities for which imports contribute more than one percent of total domestic supplies. Gross exports earn nearly US$4 per head of rural population on average. In some of these countries such as Mexico, Thailand and Turkey earnings from LLPs represent less than one percent of national income. Others in South America, such as Argentina, Brazil and Uruguay, and Namibia in Southern Africa earn considerably more per head of rural population from LLP exports and may have a comparative advantage in the production of ruminant livestock.

The predicted gains from trade are based on the theory of comparative advantage. All countries, both rich and poor, are expected to benefit from greater specialisation in the products for which they have a comparative advantage in production. Countries with plentiful grazing land resources may have a comparative advantage in ruminant livestock production. However, only the developed countries may have the necessary capital resources to provide a comparative advantage in more intensive livestock production systems.

Increased trade is claimed to increase incomes, reduce unemployment and spread new technology. International capital mobility may reduce the impact of differences in the capital resource base. However, critics of globalisation suggest that developing countries will become less self sufficient and more dependent on other countries and that trade will be concentrated in the hands of trans-national corporations. The extent of these dangers has probably been exaggerated.

Attempts have been made to justify tariffs and other trade barriers as a means of achieving beneficial social aims. Large countries or large trade associations may use their market power to influence world prices and may then gain economically form imposing trade barriers. However, such policies are likely to provoke retaliatory action and may result in trade wars. For the global system, free trade is the most efficient option.

Regional trading blocks include free trade areas, customs unions, common markets and economic unions in order of increasing integration between members. By reducing or eliminating trade barriers between members such organisations create trade, but only at the expense of diverting trade away from cheaper sources in non-member countries. The European Union is one of the oldest and most strongly established trading blocks but another 150 such associations have been formed over the last 50 years and many still survive. Many of these other groups have had limited success in creating trade possibly because they share comparative advantage in the same products. By contrast, 70 percent of EU trade is between member countries.
The Common Agricultural Policy of the EU has provided financial support and price stabilisation for European farmers, but this has been at the expense of raising barriers against imports from third countries and thereby depressing and destabilising world prices. Favoured treatment was offered to 70 African, Caribbean and Pacific Ocean (ACP) States under the Lomé Convention, recently replaced, as an interim measure by the Cotonou Agreement. The Lomé Convention provided for the stabilisation of export earnings and a significant reduction of tariffs on bananas, sugar, rum and beef and veal from the ACP countries. Botswana, Zimbabwe, Madagascar, Swaziland and Kenya have benefited from the beef protocol. The trade preferences to the ACP countries in particular must be abandoned by 2008 at the latest but the Least Developed Countries will benefit from free, un-taxed access to European markets for all products from 2005.

The General Agreement on Tariffs and Trade (GATT) launched in 1947 was aimed at trade liberalisation. It was not until the Uruguay Round of negotiations, from 1986 to 1994, that trade in the main temperate agricultural products was discussed. The Agreement on Agriculture signed in 1994 called for reduction of export subsidies, reduction in financial support for agricultural producers and improved access through replacement of non-tariff barriers by tariffication and reduction of the resultant tariffs. The GATT was replaced by the World Trade Organisation, which had stronger powers, at the end of the Uruguay Round.

Major global economic benefits were predicted from the Agreement on Agriculture and the establishment of the WTO, as a result of increased trade. Most studies predict a resultant modest increase in food prices, which will benefit exporters but may exacerbate food security problems of Low Income Countries. Some authorities predict falling food prices however. Food prices have generally trended downwards over the last five years.

Reduction of agricultural price support in Europe and the USA should lead to shifts in production and exports. Dairy exports may increase from Oceania, South Asia, South America, Eastern Europe and Southern Africa. Beef and lamb exports may expand from Oceania and South America. However it is predicted that Europe and North America may increase pig and poultry meat exports. Brazil, Thailand and Hungary are also predicted to increase exports of poultry meat.

Developing countries face problems not only of rising prices of food imports, but also of meeting the costs of compliance with the recommended customs and trade procedures. Potential exporters among the developing countries are further hampered by the tardiness of the developed countries in reducing trade barriers.

Sanitary and phytosanitary measures, aimed at protecting human, animal and plant health, may act as non-tariff barriers to trade. Generally the health and hygiene standards adopted by the developed countries are substantially higher than those of the developing countries. Thus developing countries face major constraints and costs on complying with the SPS standards required by potential importers of their products among the developed countries. Particular problems have arisen in relation to meat and meat products and, less frequently, with dairy products. Disputes have also arisen between developed countries regarding the effects of SPS measures on trade.
The SPS Agreement, finalised with the establishment of the WTO, is aimed at coordinating and minimising the adverse effects on trade. The Agreement promotes international harmonisation of standards; recognition that different SPS measures may provide equivalent levels of protection; scientific risk assessment for establishing appropriate levels of protection; adaptation to regional differences within member countries; greater transparency of standard setting; and formal procedures for dispute settlement. There are clear advantages for the developed countries in defining an acceptable level of health risks whilst limiting the constraints on free trade.

Developing countries face problems in meeting international SPS standards, linked with the small scale of export operations, which may require separate more rigorous SPS measures than production for home use. Deficiencies exist in the social infrastructure and support, services, including public health and veterinary services, while risks of disease outbreaks and pest infestations are high. The costs of compliance with international standards are high, possibly prohibitive.

Participation of developing countries in the SPS Committee meetings, and membership of the main standard setting organisations, OIE, IPPC and Codex Alimentarius, is low. None the less the developing countries consider that insufficient attention is given to their needs in the setting of SPS standards and insufficient time is allowed for compliance. Technical and financial assistance, from international and developed country agencies, is needed to enable developing country exporters to meet the required standards.

Given that the developing countries are net importers of LLPs, they may benefit from the assurance of acceptable SPS measures applied by the developed countries from which they purchase their imports. Developing countries, trading among themselves, might benefit from harmonising SPS measures albeit at a lower level than the recommended international standards.

The case for raising SPS standards, in developing countries, must depend largely upon the domestic benefits of improving public and animal health. Gains from increased trade will be small or non-existent. However, investment in SPS improvements has an opportunity cost in terms of alternative productive or social investment. Thus policy decision should be based on careful assessment of costs and benefits. Account should be taken of the risks associated with health measures and food safety. It is also desirable that account should be taken of other less tangible benefits of healthier human and animal populations.

Environmental groups claim that trade exacerbates environmental damage, including greenhouse gas emissions, global warming and loss of bio-diversity. The associated economic activity and transport of commodities must increase natural resource depletion and pollution. The counter argument is that economic growth, generated by trade, leads to increased concern for, and expenditure on, environmental protection. Developing countries view measures for environmental protection as costly forms of producer support, which if applied domestically would erode their comparative advantage in export products.
If developing countries maintain lower standards of environmental conservation and pollution control than developed countries, the former group may develop into “pollution havens”, production for export trade being attracted because of lower production costs. Available evidence for the existence of pollution havens is, however, weak.

It is suggested that the WTO is likely to be unsympathetic to environmental concerns although the foundation agreement referred to the need for sustainable development and environmental preservation. Voluntary eco-labelling schemes are allowable under WTO rules. However, it is questionable whether the WTO should be involved in adjudication on environmental issues.

Livestock production is accused of causing deforestation and rangeland degradation by ruminants and environmental pollution and loss of bio-diversity in the more intensive systems. The latter problems are more prevalent in developed countries where policies for their alleviation are more likely to be adopted. A range of domestic policy instruments is available for environmental protection, outside the auspices of the WTO. International aspects should be approached through Multilateral Environmental Agreements, voluntary eco-labelling and international support for global environmental protection.

Animal welfare has been raised as an issue for discussion within the WTO. Like environmental issues this is probably best dealt with domestically, but with voluntary international agreements, labelling-schemes and support where appropriate. National controls on animal transport may affect trade. Although intellectual property rights in genetic material may affect trade, no record has been found of disputes regarding ownership of animal genetic resources.

In summary, the following main findings policy recommendations can be made for specific groups. The developed countries are responsible for the bulk of world trade and represent the largest commodity markets, despite being net exporters overall. The current pattern of exports, mainly of dairy products and pig and poultry meat, reflects comparative advantage but is also influenced by high levels of producer support, particularly in the EU and US. Levels of support must be further reduced under WTO pressure and to reduce the budgetary costs. The EU must also adapt to allow accession of East European countries with large agricultural sectors. Most of these countries maintain international SPS standards, but many disputes arise from individual country differences.

Middle Income Country net exporters of LLPs may benefit from increased trade liberalisation, and should press for reduction of trade barriers in the developed countries. Producer support through subsidised credit, and agricultural research and extension are exempt from the WTO rules and are among the most cost-effective methods of raising livestock productivity and exports. Investment to meet the necessary international SPS standards for access to developed country markets may well be justified.

The Low Income Countries, including India, are net importers of most LLPs. Livestock productivity is low and LLP exports contribute little to rural incomes and national income. Recommended policy aims are to import from sources giving best value for money and to promote import substitution where opportunities exist. Support for livestock producers
may be justified for this purpose or to relieve poverty among poor livestock producers. Decisions on improving SPS standards must be based largely on the predicted impact on domestic human, animal and plant health. There may be a case for harmonisation, with greater transparency, of SPS measures among LICs.

The Least Developed Countries are more heavily dependent on live ruminant exports than other LICs, but face resource limitations on intensification of production and expansion of exports. They face similar problems in improving SPS standards, although there are clear benefits. Foreign aid and technical assistance is highly desirable for improvement of SPS standards and livestock productivity in this group.
## TABLE OF CONTENTS

**EXECUTIVE SUMMARY** .......................................................................................................................... II

**INTRODUCTION** ....................................................................................................................................... 1

**PATTERNS OF TRADE IN LIVESTOCK AND LIVESTOCK PRODUCTS)** ............................................. 1

- *World Trade* ........................................................................................................................................ 1
- *Analysis of Trade by Country Groupings* ................................................................................................. 5
- *Trade in LLPS in relation to natural resources, farming systems and human population* ............ 11

**ECONOMIC ISSUES** ............................................................................................................................... 15

- *The case for trade liberalisation* ........................................................................................................... 15
- *Trade barriers* ...................................................................................................................................... 18
- *Trade integration* ................................................................................................................................. 21

**THE WTO AND DEVELOPING COUNTRIES** ......................................................................................... 23

**HEALTH AND SANITARY CONTROLS** .................................................................................................... 28

- *The sanitary and phytosanitary (SPS) Agreement* ............................................................................... 28
- *The impact on developing countries* .................................................................................................... 31

**THE ENVIRONMENT, ANIMAL WELFARE AND INTELLECTUAL PROPERTY** ................................. 37

- *The environment* ................................................................................................................................ 37
- *Animal welfare and property rights in genetic material* .................................................................... 40

**TRADE IN LLPS AND ECONOMIC DEVELOPMENT** .............................................................. 41

**REFERENCES** ......................................................................................................................................... 45

**ANNEX: COUNTRY CLASSIFICATIONS** ............................................................................................... 52
Introduction

The livestock sector plays a vital role in the economies of many developing countries. It provides food, or more specifically animal protein in human diets, income, employment and possibly foreign exchange. For low income producers, livestock also serve as a store of wealth, provide draught power and organic fertilizer for crop production and a means of transport. Consumption of livestock and livestock products in the developing countries, though starting from a low base, is growing rapidly.

Concurrently there has been a rapid expansion in international trade and investment, a process often referred to as “globalisation”. Associated with this has been much, often heated, debate regarding the benefits and costs of the disciplines imposed by the World Trade Organisation. It is therefore appropriate to explore current patterns of world trade in livestock and livestock products (LLPs) and the changes resulting from trade liberalisation, subject to sanitary and other controls, being introduced under the auspices of the WTO. Attention is focussed particularly on seeking an appropriate policy response for the developing, low income (LIC) and least-developed (LDC) groups of countries.

This paper is comprised of six main sections. First an analysis of the statistics on trade in livestock and livestock products provides indicators of its importance for developing countries and rates of change. This is followed by a discussion of the economic arguments in favour of trade liberalisation. There then follows a review of the WTO and its impact on developing countries. Health and sanitary controls are then discussed along with food safety issues affecting trade. Debates regarding the impact of trade on the environment, animal welfare and intellectual property rights are summarised in the fifth section. Finally the findings are drawn together as a basis for suggested trade policy options affecting the livestock sector of developing countries.

Patterns of trade in livestock and livestock products

World Trade

The rapid growth in world production and consumption of livestock and livestock products (LLPs) is widely recognised as “the Livestock Revolution” (Delgado et al 1999, Delgado, Rosegrant & Meijer 2001). This has resulted in part from population growth but also from increases in average per capita incomes. Although as incomes rise, the proportion spent on food generally decreases, there is none the less an increase in the quantity demanded. In economic terms, the income elasticity (percentage change in quantity demanded induced by a one percent change in income) is well below unity but it is greater than zero. Livestock products however, as relative luxuries, have higher elasticities of demand than
most crop products, so the effect of rising incomes has a more significant effect on demand.

Growth in population and per capita incomes has been associated with rapid rural-urban migration, particularly in developing Low Income Countries (for definitions of country groupings see Annex A). Consumers in urban areas are more likely to diversify their diets into meat and milk. Thus urbanisation has probably contributed to the growth in demand for LLPs.

World production and supply of LLPs have more than kept pace with the growth in demand since prices (in constant US$) have declined over the past thirty years (Delgado et al op cit 1999, Delgado, Rosegrant & Meijer 2001). A contributory factor is the growth in world trade. Apart from cross border trade in live animals there was little scope for trade in LLPs before the introduction of steamships with refrigeration in the 1880s. Over the past century trade has expanded, while transport costs have fallen. Between 1920 and 1990, the costs of sea freight (in constant US$) fell by over 70 percent. Other costs of transport and communication have fallen even faster (Lall 1999).

Livestock and livestock products account for about one sixth of all agricultural trade in value terms, much less than proportional to the value added by livestock in the global farm economy of around 40 percent. This reflects the difficulties, and costs, of shipping livestock products, in relation to those for transporting most crops. Relatively small proportions of total livestock production are traded internationally; 11 percent of all meat, and 13 percent of bovine meat and of milk and dairy products. Even smaller fractions of pig, poultry and sheep meat enter international trade. These figures may be compared with 15 percent for all cereals, nearly 83 percent for rubber and 93 percent for coffee.

The relative contributions of different commodities to the total value of world exports of LLPs are given in Table 1. About half by value of livestock trade is in meat, the bulk of this (88 percent) being fresh, chilled or frozen and unprocessed. Bovine, pig and poultry meat each make up nearly a third of the total meat trade.
### Table 1 Composition of world exports in LLPs by value in 1999 and annual percentage change 1989 to 1999

<table>
<thead>
<tr>
<th>Product</th>
<th>Value (USD 1,000)</th>
<th>% of total</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>All meats</td>
<td>43,219,361</td>
<td>50.89</td>
<td>3.6</td>
</tr>
<tr>
<td>Bovine meat</td>
<td>15,600,000</td>
<td>18.37</td>
<td>0.4</td>
</tr>
<tr>
<td>Ovine meat</td>
<td>1,985,989</td>
<td>2.34</td>
<td>2.6</td>
</tr>
<tr>
<td>Pig meat</td>
<td>12,919,000</td>
<td>15.21</td>
<td>3.3</td>
</tr>
<tr>
<td>Poultry meat</td>
<td>9,677,152</td>
<td>11.40</td>
<td>11.5</td>
</tr>
<tr>
<td>Other meats</td>
<td>3,037,220</td>
<td>3.58</td>
<td>-3.2</td>
</tr>
<tr>
<td>Dairy products</td>
<td>26,005,660</td>
<td>30.62</td>
<td>3.5</td>
</tr>
<tr>
<td>Live animals</td>
<td>7,234,988</td>
<td>8.52</td>
<td>1.2</td>
</tr>
<tr>
<td>Cattle</td>
<td>4,304,145</td>
<td>5.07</td>
<td>0.6</td>
</tr>
<tr>
<td>Sheep &amp; goats</td>
<td>814,916</td>
<td>0.96</td>
<td>-1.0</td>
</tr>
<tr>
<td>Pigs</td>
<td>1,240,340</td>
<td>1.46</td>
<td>1.7</td>
</tr>
<tr>
<td>Poultry</td>
<td>875,587</td>
<td>1.03</td>
<td>5.7</td>
</tr>
<tr>
<td>Hides &amp; skins</td>
<td>5,198,652</td>
<td>6.12</td>
<td>1.7</td>
</tr>
<tr>
<td>Wool</td>
<td>2,256,479</td>
<td>2.66</td>
<td>-8.3</td>
</tr>
<tr>
<td>Eggs</td>
<td>1,008,033</td>
<td>1.19</td>
<td>1.2</td>
</tr>
<tr>
<td>Total</td>
<td>84,923,173</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

Dairy products make up nearly a third (31 percent) of the total LLP trade by value. Animals on the hoof, eggs, hides and skins and wool make up the remaining quarter of all trade in livestock and livestock products.

Trade in livestock products has grown rapidly along with increases in production and consumption, contributing to the “livestock revolution”. Over the 10 years 1989 to 1999, exports of livestock and livestock products, other than small ruminants (sheep and goats or “shoats”) and wool, have risen in volume at annual rates ranging from a quarter of one percent for ovine meat (i.e. meat of sheep and goats) to over 14 percent for poultry meat (mainly chicken) (Figure 1). This very rapid growth in the trade in poultry meat is accompanied by an increase of nearly 6 percent annually in the volume of pig meat traded and nearly 5 percent in the volume of dairy produce. The fast growth of meat production from intensive, landless production systems, mainly pigs and poultry, has been highlighted elsewhere (Seré & Steinfeld 1996). This growth in production is associated with similar rapid growth in international trade of the meat products of these systems. Most originates from the High Income Countries of Europe, North America and Oceania but more detailed analysis of trade flows will follow.
It has been argued that the expansion of intensive livestock systems has been at the expense of major increases in the use of feed grains and oilseeds (Cunningham 1992, Durning & Brough 1992). It is estimated that the cost of shipping frozen meat, per ton, is from 10 to 20 times the cost of shipping grain. Even for feedlot fattened beef, with a feed conversion rate of 9:1 it may be cheaper to import grain and produce the meat domestically than to import the beef. For pigs and poultry, with more favourable conversion rates of grain to beef, domestic production with imported grain is likely to be more economically attractive. “What makes global agricultural systems so interdependent and responsive to pressure anywhere in the world is the ease with which grain can be stored and shipped over long distances.....” (Cunningham *op cit* 1992). In 1984/85 the United States was recorded as the largest source of feed grains, accounting for 60 percent of all exports. In 1999 56.5 percent of all coarse grain exports and 71 percent of maize exports originated from the United States (FAOSTAT 2001).

In 1999, world exports of cereals were equivalent in value to just over 50 percent of the total value of exports of LLPs, while maize was equivalent to just over 11 percent. Growth in the quantities exported over the 10 years 1989 to 1999 has been modest at just over one percent per year for all cereals and half of one percent for maize. Much of the trade in cereals is for human consumption, but a significant proportion is for animal feeds especially in the case of maize. These statistics provide little support for the claimed continuing expansion of trade in feed grains observed in the 1980s. However, trade in animal feedingstuffs, including fodders and crop by-products, has grown by nearly 8 percent annually.
Analysis of trade by country groupings

Further analysis of the statistics on trade (FAOSTAT 2000) is concerned with the major LLP imports and exports of three groups of countries; Developed Countries, Low Income Countries (LICs) and Least Developed Countries (LDCs). The current (1999) membership of each group is given in the Annex. The Developed Countries group has 64 members including all High Income Countries of Western Europe, North America and Oceania together with some Middle and Lower Income Countries of Eastern Europe and Central Asia. The total population of 1,307 million represents 21.6 percent of the world total. The Developing Country group accounts for the remaining 78.4 percent of the world population.

The Low Income Country group is defined by the World Bank as including countries with a per capita income below a given ceiling. For 1999 the ceiling was set at US$ 755. Most of the 64 countries included in this group are also classified as Developing Countries.

The Least Developed Country list is reviewed every three years by the Economic and Social Council of the United Nations on the basis of three criteria: low income, weak human resources and low level of economic diversification. It is mainly a subset of the Low Income Country group, but there are a few additional members from the group of Middle Income Countries, such as Equatorial Guinea and Kiribati. The total population of the Least Developed Countries is 654 million, 10.8 percent of the world total and 13.8 percent of the total for Developing Countries. This group together with the Net Food Importing Developing Countries (NFIDCs) are classified as eligible for assistance under the Marrakesh Ministerial Decision on Measures Concerning the Possible Negative Effects of the Reform Process on the Net Food Importing Countries. The NFIDC group import LLPs along with crops, however, they are not considered separately here.

The Least Developed Countries have a per caput income of only 17 percent of that for other Developing Countries while more than a third of the total population is assessed as undernourished. More than half the total energy supplies are derived from cereals but cereal yields are low and production is declining. The cost of food imports has risen over the past 10 years, due in part to increased cereal prices (FAO 1999).

Most of the world trade in livestock and livestock products takes place between developed countries, which account for over 88 percent of the total value of LLP exports world-wide. The Low Income Countries (LICs) as a group contribute only one and a half percent of world exports, while the Least Developed Countries (LDCs) contribute only half of one percent.

However, the most rapid growth in demand and consumption of LLPs is occurring in the developing countries, which is the driving force behind the livestock revolution (Delgado et al 1999, Upton 2000). As might therefore be expected the Low Income Countries (LICs) and the Least Developed Countries (LDCs) are net importers of livestock and livestock products, largely from the developed countries which are net exporters. The LICs are responsible for 3.2 percent of world imports while the LDCs account for just over one percent. The developed countries account for 75 percent of imports (in value terms),
which is 15 percent less than their contribution to world exports. In short they are net exporters.

Table 2: Value (US$1,000) of net trade of LLPs and their growth rates (1989 to 1999) by country groups

<table>
<thead>
<tr>
<th>Product</th>
<th>Developed Countries</th>
<th>Low Income Countries</th>
<th>Least Developed Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Net Exports</td>
<td>Net Exports</td>
<td>Net Exports</td>
</tr>
<tr>
<td>Bovine meat</td>
<td>442,120</td>
<td>177,218</td>
<td>39,307</td>
</tr>
<tr>
<td>(26.2)</td>
<td>(28.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ovine meat</td>
<td>81,740</td>
<td>422</td>
<td>6,688</td>
</tr>
<tr>
<td>(10.9)</td>
<td>(-443.8*)</td>
<td></td>
<td>(301.7*)</td>
</tr>
<tr>
<td>Pig meat</td>
<td>348,800</td>
<td>17,959</td>
<td>33,523</td>
</tr>
<tr>
<td>(39.0)</td>
<td>(-5.4)</td>
<td></td>
<td>(2.6)</td>
</tr>
<tr>
<td>Poultry meat</td>
<td>496,368</td>
<td>325,502</td>
<td>107,067</td>
</tr>
<tr>
<td>(28.2)</td>
<td>(16.5)</td>
<td></td>
<td>(4.9)</td>
</tr>
<tr>
<td>Dairy produce</td>
<td>5,501,601</td>
<td>1,059,500</td>
<td>436,709</td>
</tr>
<tr>
<td>(3.7)</td>
<td>(2.4)</td>
<td></td>
<td>(-2.1)</td>
</tr>
<tr>
<td>Eggs</td>
<td>183,612</td>
<td>46,918</td>
<td>22,501</td>
</tr>
<tr>
<td>(0.9)</td>
<td>(12.6)</td>
<td></td>
<td>(0.6)</td>
</tr>
<tr>
<td>Wool</td>
<td>723,894</td>
<td>99,521</td>
<td>9,584</td>
</tr>
<tr>
<td>(-3.0)</td>
<td>(-2.3)</td>
<td></td>
<td>(-13.4)</td>
</tr>
<tr>
<td>Hides &amp; skins</td>
<td>1,699,074</td>
<td>251,665</td>
<td>132,384</td>
</tr>
<tr>
<td>(3.4)</td>
<td>(8.8)</td>
<td></td>
<td>(0.1)</td>
</tr>
<tr>
<td>Cattle</td>
<td>414,215</td>
<td>129,652</td>
<td>99,709</td>
</tr>
<tr>
<td>(-11.6)</td>
<td>(4.0)</td>
<td></td>
<td>(-9.7)</td>
</tr>
<tr>
<td>Sheep &amp; goats</td>
<td>112,675</td>
<td>97,855</td>
<td>149,348</td>
</tr>
<tr>
<td>(-14.1)</td>
<td>(0.8)</td>
<td></td>
<td>(0.2)</td>
</tr>
<tr>
<td>Pigs</td>
<td>92,300</td>
<td>25,167</td>
<td>3,405</td>
</tr>
<tr>
<td>(-9.5)</td>
<td>(7.1)</td>
<td></td>
<td>(1.3)</td>
</tr>
<tr>
<td>Live poultry</td>
<td>144,152</td>
<td>34,715</td>
<td>9,830</td>
</tr>
<tr>
<td>(-17.8)</td>
<td>(-0.8)</td>
<td></td>
<td>(-9.0)</td>
</tr>
<tr>
<td>All meat</td>
<td>1,369,028</td>
<td>343,461</td>
<td>6,688</td>
</tr>
<tr>
<td>(29.3)</td>
<td>(15.4)</td>
<td></td>
<td>179,897</td>
</tr>
<tr>
<td></td>
<td>(301.7*)</td>
<td></td>
<td>(301.7*)</td>
</tr>
<tr>
<td>Total LLPs</td>
<td>10,240,551</td>
<td>552,327</td>
<td>391,534</td>
</tr>
<tr>
<td>(5.3)</td>
<td>(13.3)</td>
<td></td>
<td>(2.8)</td>
</tr>
<tr>
<td></td>
<td>(5.1)</td>
<td></td>
<td>(1.5)</td>
</tr>
</tbody>
</table>

* Estimates of excessively high rates of growth are due to inclusion of very small numbers or zero values in some years.

If total trade in LLPs is broken down into constituent commodities, live sheep and goats, cattle and hides and skins represent the only items for which the Low Income and Least Developed Countries make a significant contribution to world exports, about 26 percent (22 percent for LDCs) of the total value of world exports for sheep and goats, four percent for cattle and six percent (2 percent for LDCs) for hides and skins. However the same groups of countries also import animals so net trade, that is value of exports minus value of imports, is a more useful measure (Table 2).

The Developed Countries, as a group, are net exporters of all LLPs except for live horses, which represent a relatively minor item in total trade. The relative contributions of
different commodities to the total value of LLP net exports from the Developed Countries are given in Figure 2.

![Figure 2: Distribution of net exports from Developed Countries](image)

Net exports have grown rapidly for several commodities, particularly pig and poultry meat. The growth rates of the volume of net exports over the 10 years 1989 to 1999 are shown in Figure 3.

![Figure 3: Growth in developed country net exports](image)
The main net exports of the LICs are bovine meat (31 percent of total net exports), live sheep and goats (18 percent of total net exports) and hides and skins (46 percent) (Figure 4). However this group of countries is a net importer of live cattle.

The Least Developed Countries are net exporters of live cattle (25 percent of total net exports), sheep and goats (38 percent of total net exports) and hides and skins (34 percent of total net exports) but are net importers of bovine meat (Figure 6). All these key exports have declined, in quantity and value, over the last ten years.

The most striking component of net trade, between country groupings, is the importance of dairy products, which make up 58 percent (growing by 3.4 percent) of the net exports of livestock products from Developed Countries and two thirds of the net imports of both the LICs (62 percent and growing) and the LDCs (66 percent but declining). Two thirds of the total value of dairy products, imported into LICs and LDCs, consists of dried milk powder. It should also be noted that a relatively small amount of dried skimmed milk is delivered to Developing Countries as a form of food aid.
Poultry meat is the second most important net import of both LICs and LDCs, accounting for between 16 and 20 percent of total net imports respectively (and increasing rapidly). It is also the second most important (and increasing) net export of the developed countries.

Cereal imports to developing countries have increased over the last decade. Maize imports represent nearly half the value of net exports of LLPs and have grown by 11 percent for the Low Income Countries. The quantities of maize and other cereals used for animal feed far exceed the quantities imported. In the Least Developed Countries, maize used for feed represents 94 percent of net imports of maize and 70 percent of the value of net exports of LLPs. Although the Low Income Countries, as a group, have become net exporters of animal feeding-stuffs, imports to the Least Developed Countries have been rising by over 12 percent annually.

The contributions of individual Low Income and Least Developed Countries to the total value of net imports of livestock products are presented in Table 3. Low Income Country importers of milk and dairy products include Indonesia (20 percent), Nigeria (18 percent), Bangladesh (10 percent), Yemen (6 percent), Côte d’Ivoire (4 percent), Vietnam and Senegal. Bangladesh, Yemen and Senegal are members of the Least Developed Country group, together with Haiti and Angola, which are also significant net importers of dairy products.
Table 3: Leading net importers of Dairy Products and Poultry Meat among LICs and LDCs (with percentage of group total)

<table>
<thead>
<tr>
<th>Dairy products</th>
<th>Poultry meat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LICs</strong></td>
<td><strong>LDCs</strong></td>
</tr>
<tr>
<td>Indonesia (20%)</td>
<td>Bangladesh (25%)</td>
</tr>
<tr>
<td>Nigeria (18%)</td>
<td>Yemen (15%)</td>
</tr>
<tr>
<td>Bangladesh (10%)</td>
<td>Senegal (7%)</td>
</tr>
<tr>
<td>Yemen (6%)</td>
<td>Haiti (7%)</td>
</tr>
<tr>
<td>Côte d’Ivoire (4%)</td>
<td>Angola (5%)</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>Myanmar</td>
</tr>
<tr>
<td>Senegal</td>
<td>Mozambique</td>
</tr>
<tr>
<td>Haiti</td>
<td>Mali</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>Sudan</td>
</tr>
<tr>
<td>Pakistan</td>
<td>Mauritania</td>
</tr>
</tbody>
</table>

Major importers of poultry meat, in the Low Income group, are East European and Central Asian countries such as the Ukraine (34 percent), Uzbekistan (10 percent), Armenia and Azerbaijan. The Yemen is the largest net importer of poultry meat in the Least Developed Country group, but only accounts for 11 percent of the total for the Low Income Countries. Significant net importers of poultry meat in Africa include Angola (6 percent), Ghana (5 percent), Benin and the Congo.

Table 4: Leading net exporters of sheep and goats, cattle and bovine meat among LICs and LDCs (with percentage of group total)

<table>
<thead>
<tr>
<th>Sheep and goats</th>
<th>Cattle</th>
<th>Bovine meat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LICs</strong></td>
<td><strong>LDCs</strong></td>
<td><strong>LDCs</strong></td>
</tr>
<tr>
<td>Sudan (37%)</td>
<td>Sudan (37%)</td>
<td>Mali (44%)</td>
</tr>
<tr>
<td>Somalia (27%)</td>
<td>Somalia (28%)</td>
<td>Chad (13%)</td>
</tr>
<tr>
<td>Mali (12%)</td>
<td>Mali (12%)</td>
<td>Mauritania (10%)</td>
</tr>
<tr>
<td>Mauritania (7%)</td>
<td>Mauritania (7%)</td>
<td>Niger (9%)</td>
</tr>
<tr>
<td>Niger (5%)</td>
<td>Niger (6%)</td>
<td>Burkina Faso (8%)</td>
</tr>
<tr>
<td>Chad</td>
<td>Chad</td>
<td>Guinea</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>Burkina Faso</td>
<td>Djibouti</td>
</tr>
<tr>
<td>Mongolia</td>
<td>Eritrea</td>
<td>Laos</td>
</tr>
<tr>
<td>Eritrea</td>
<td>Guinea</td>
<td>Sudan</td>
</tr>
<tr>
<td>Guinea</td>
<td>Ethiopia</td>
<td>Cambodia</td>
</tr>
</tbody>
</table>

Within the group of Low Income Countries the main net exporters of bovine meat are the Ukraine (41 percent) and India (39 percent), together accounting for 80 percent of the value of all net exports. Nicaragua, Moldova and Zimbabwe make smaller contributions to the group total (Table 4).

The main exporters of live sheep and goats are located in the African Sahelian sub-region (Sudan, Somalia, Mali, Mauritania, Niger, Chad, and Burkina Faso). Mongolia is the only country outside the African Sahel, included in the first 10 Low Income Country net exporters of small ruminants.
The main Least Developed Country exporters of live cattle are from the same sub-zone. Mali (44 percent), Chad (13 percent), Mauritania (10 percent) and Niger (9 percent) together contribute over three quarters of the total value of net exports of cattle from this group. Laos and Cambodia are net exporters from outside the sub-zone but they make a relatively minor contribution to the total.

All these live animal exports are likely to be cross-border trade intended for slaughter and consumption as meat, in more affluent neighbouring countries. From Niger, virtually all recorded exports of live cattle in 1998 went to Nigeria and other neighbouring countries (FAO database). However, some international trade in live animals is for breeding purposes. Many of the animals exported from the Developed Countries are intended to provide improved genetic material for upgrading indigenous stock in other parts of the world. Some animals exported from Low Income Countries may be intended for breeding and transmitting some of their desirable genetic characteristics; for example Boran Cattle from Ethiopia or Sahiwal or Red Sindh cattle from Pakistan.

Unfortunately, little information is available on the distribution of trade in animals between those intended for meat and those intended for breeding. Likewise trade statistics on exports and imports of semen and embryos for transplanting are not readily available. Potential barriers to trade associated with the management of genetic resources will be discussed later.

**Trade in LLPs in relation to natural resources, farming systems and human population**

Trade in LLPs is linked to patterns of domestic production, and consumption for these commodities. These, in turn, are influenced by the natural resource base and livestock populations. Land resources and animal numbers per thousand human members of the rural population are given in Table 5.

From the first three rows it is apparent that the rural population density on agricultural land is much higher in developing countries than in the developed countries, but that within the developing countries group the Least Developed Countries have more permanent pasture available. Although most LDCs are located in the tropics with fairly poor quality pastures and unreliable rainfall, the availability of natural grazing may result in a comparative advantage in ruminant production. This argument is supported by the finding that more cattle, sheep and goats are carried per head of rural population than in other developing countries, although fewer pigs and poultry are kept. The LDCs are characterised by grassland based livestock production systems. Other Low Income and Developing Countries keep a higher proportion of more intensive forms of livestock, although the numbers are much smaller than in the Developed Countries.
### Table 5: Land use and livestock numbers per 1000 rural people

<table>
<thead>
<tr>
<th></th>
<th>Developed Countries</th>
<th>Developing Countries</th>
<th>Low Income Countries</th>
<th>Least Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arable land per 1000 rural popl’n (ha.)</td>
<td>1,905</td>
<td>301</td>
<td>285</td>
<td>277</td>
</tr>
<tr>
<td>Permanent pasture per 1000 rural popl’n (ha.)</td>
<td>3,553</td>
<td>793</td>
<td>561</td>
<td>1,239</td>
</tr>
<tr>
<td>Permanent pasture as % of agricultural land</td>
<td>65</td>
<td>73</td>
<td>67</td>
<td>82</td>
</tr>
<tr>
<td>Cattle per 1000 rural popl’n</td>
<td>963</td>
<td>360</td>
<td>321</td>
<td>422</td>
</tr>
<tr>
<td>Sheep &amp; goats per 1000 rural popl’n</td>
<td>1,217</td>
<td>480</td>
<td>449</td>
<td>702</td>
</tr>
<tr>
<td>Pigs per 1000 rural popl’n</td>
<td>853</td>
<td>218</td>
<td>52</td>
<td>40</td>
</tr>
<tr>
<td>Chickens per 1000 rural popl’n</td>
<td>12,359</td>
<td>3,608</td>
<td>1,608</td>
<td>1,496</td>
</tr>
</tbody>
</table>

Some crude comparisons of productivity between groups of countries are given in Table 6. The number of Grazing Livestock Units is estimated by treating cattle and buffaloes as unity and sheep and goats as one eighth. Although the stocking rates in the Developing Countries are generally higher than in the Developed Countries, the figure for the Least Developed Countries is low, reflecting the poor quality of the pastures.

### Table 6: Some measures of productive performance of livestock

<table>
<thead>
<tr>
<th></th>
<th>Developed Countries</th>
<th>Developing Countries</th>
<th>Low Income Countries</th>
<th>Least Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grazing Livestock Units per 1000 hectares perm. pasture</td>
<td>314</td>
<td>603</td>
<td>811</td>
<td>425</td>
</tr>
<tr>
<td>Meat/head cattle (kg)</td>
<td>92.0</td>
<td>24.2</td>
<td>14.0</td>
<td>12.2</td>
</tr>
<tr>
<td>Meat/head sheep &amp; goats (kg)</td>
<td>8.0</td>
<td>5.7</td>
<td>4.4</td>
<td>3.8</td>
</tr>
<tr>
<td>Meat/head pigs (kg)</td>
<td>132.5</td>
<td>83.2</td>
<td>49.8</td>
<td>31.6</td>
</tr>
<tr>
<td>Meat/head chickens (kg)</td>
<td>7.5</td>
<td>3.2</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Milk/head cattle (kg)</td>
<td>1,047</td>
<td>191</td>
<td>222</td>
<td>89</td>
</tr>
<tr>
<td>Eggs/1000 chickens (kg)</td>
<td>4.3</td>
<td>3.4</td>
<td>1.8</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Production per head, of all classes of livestock, is much lower in the Developing Countries than in the Developed Countries. In general productivity is lowest of all in the Least Developed Countries. However, it should not be concluded from this that the Least Developed Countries cannot benefit from trade. Theory, to be discussed in the next
section, suggests that they may still have a comparative advantage in certain products and can benefit from engaging in trade.

The relationship between production, consumption and trade varies between groups of countries and between different livestock products (see Table 7).

Table 7: Net exports as a percentage of production or net imports as a percentage of domestic supply

<table>
<thead>
<tr>
<th>Product</th>
<th>Developed Countries</th>
<th>Developing Countries</th>
<th>Low Income Countries</th>
<th>Least Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exports % of prod.</td>
<td>Imports % of supply</td>
<td>Exports % of prod.</td>
<td>Imports % of supply</td>
</tr>
<tr>
<td>Bovine meat</td>
<td>1.80</td>
<td>0.40</td>
<td>1.95</td>
<td>1.08</td>
</tr>
<tr>
<td>Ovine meat</td>
<td>8.16</td>
<td>2.77</td>
<td>0.15</td>
<td>0.27</td>
</tr>
<tr>
<td>Pig meat</td>
<td>1.61</td>
<td>0.97</td>
<td>0.59</td>
<td>3.15</td>
</tr>
<tr>
<td>Poultry meat</td>
<td>6.81</td>
<td>3.24</td>
<td>8.92</td>
<td>10.86</td>
</tr>
<tr>
<td>Dairy products</td>
<td>6.50</td>
<td>8.27</td>
<td>2.75</td>
<td>7.85</td>
</tr>
<tr>
<td>Eggs</td>
<td>0.92</td>
<td>0.30</td>
<td>1.25</td>
<td>5.78</td>
</tr>
</tbody>
</table>

Exports from the developed countries represent less than two percent of production for bovine meat, pig meat and eggs. However, a significantly larger percentage of ovine meat, poultry meat and dairy products are exported. The Developing Countries, as a group, are net importers of all the main livestock products, with imports of ovine meat, poultry meat and dairy products providing more than two percent of domestic supplies.

In contrast, the Low Income Country sub-set of developing countries are net exporters of bovine and ovine meat. However, exports represent only a small percentage of total production of these commodities. Net imports of poultry meat and dairy products, contribute a significant proportion of domestic supplies, particularly in the Least Developed Countries. In this Least Developed group, pig meat and egg imports are also of some importance in meeting domestic consumption demand. The main conclusion must be that the developing countries and particularly the Least Developed are more heavily dependent on imports of LLPs, rather than exports. For those that do export LLPs the proportion of national output that is exported is quite small.

It is possible that trade within a group of countries, which is cancelled out in calculating net trade, is more important than trade with “the rest of the world”. This possibility is checked by calculating net exports as a percentage of total exports for each group of countries (Table 8).

For the developed countries it is indeed the case that most trade occurs between members of the group. Net exports represent only a small fraction of total exports. However, for the Low Income Countries only about half the trade is within the group. For the Least Developed Countries most exports are delivered to the rest of the world. None the less, even if gross exports had been used, in calculating the percentage of production exported, the values for Low Income and Least Developed Countries would still have been small.
Table 8: Net exports as a percentage of total exports of LLPs

<table>
<thead>
<tr>
<th></th>
<th>Developed Countries</th>
<th>Low Income Countries</th>
<th>Least Developed Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine meat</td>
<td>8.7</td>
<td>44.0</td>
<td>62.5</td>
</tr>
<tr>
<td>Ovine meat</td>
<td>31.6</td>
<td>53.2</td>
<td>62.5</td>
</tr>
<tr>
<td>Cattle</td>
<td>11.5</td>
<td>63.3</td>
<td></td>
</tr>
<tr>
<td>Sheep</td>
<td>28.8</td>
<td>45.7</td>
<td>71.3</td>
</tr>
</tbody>
</table>

Gross exports of LLPs from developing countries yield very little revenue per head of rural population (Table 9). The revenue is less than two percent of that earned in Developed Countries. Thus it might be argued that exports of LLPs from developing countries make relatively little contribution to the rural economy. The revenue per head of the total population is, of course, even smaller.

Table 9: Gross exports of LLPs per head of rural population (US$)

<table>
<thead>
<tr>
<th></th>
<th>Developed Countries</th>
<th>Developing Countries</th>
<th>Low Income Countries</th>
<th>Least Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruminant livestock</td>
<td>11.77</td>
<td>0.36</td>
<td>0.24</td>
<td>0.78</td>
</tr>
<tr>
<td>All LLPs</td>
<td>213.36</td>
<td>3.74</td>
<td>0.89</td>
<td>1.12</td>
</tr>
</tbody>
</table>

The relative importance of LLPs in Developing Country trade can be explored further by considering the situation for individual nations. Four groups of countries were considered:

- Mali, Mauritania and Sudan: Least Developed Country live ruminant exporters;
- India, Nicaragua and Ukraine: Low Income Countries but not LDCs, ruminant meat exporters,
- Mexico, Thailand and Turkey: Middle Income mixed-farming livestock producers
- Argentina, Namibia and Uruguay: Middle Income grassland based ruminant producers.

Of the first group, Mauritania and Mali are quite heavily dependent on trade in livestock products. Exports of LLPs per head of rural population amount to US$ 30 in Mauritania and US$12.3 in Mali. These exports earn between 3 and 4 percent of Gross National Product in these two countries. The relative contributions to national income for Mauritania and Mali are the largest recorded for any of the twelve countries. The Sudan, with a much larger economy, is less heavily dependent on LLP exports, which earn a little over one percent of GNP.

In the second group, both the Ukraine and Nicaragua produce about US$15 from LLP exports per head of rural population. In fact Nicaragua exports more live ruminants per head of rural population than does the Sudan. The contribution of LLP exports to GNP is about one percent in each case. India is exceptional in that LLP exports account for only US$0.28 per head of rural population and only 0.05 of one percent of GNP. India’s impact on the average trade statistics for the Low Income Countries is simply due to the dominant size of the Indian economy. The results for China would probably be similar.
Although LLP exports per head of rural population, in the third group, range from US$3.4 for Turkey to US$13.8 for Mexico, as a proportion of GNP they represent only a fraction of one percent. In short, LLP exports can be considered relatively unimportant to the national economy.

Countries of the fourth group are major exporters of livestock products, with the values of LLP exports per head of rural population ranging from US$74 in Argentina to US$525 in Uruguay. Despite this the contribution of these exports to the national income is less than one percent even for Uruguay. Namibia is a little different, in that LLP exports account for over 20 percent of the total value added by the agricultural sector and represent nearly three percent of national income.

The general conclusions to be drawn are that:

- LLP exports, mainly in the form of live ruminants, in terms of the contribution to GNP are of relatively greatest importance to the Least Developed Countries,
- For the Low Income, but not Least Developed countries, exports of LLPs are of less significance in terms of both return per head of the rural population and contribution to GNP
- The major livestock producing countries in the Middle Income group derive a substantial income per head of rural population, from LLP exports, but the relative contribution to national income is quite small (Namibia being an exception).

Economic Issues

The case for trade liberalisation

Trade in livestock and livestock products, like trade in other commodities, has increased, as a natural and profitable response to international differences in the real costs of production; real costs being measured in terms of the alternative income foregone or “opportunity cost”. For a typical meat exporter, the price received for exported produce is higher than the domestic price, which would prevail in the absence of trade. Conversely for a meat importer it is cheaper to import the meat than to produce it domestically. In the limit, completely free trade should eliminate international price discrepancies, to the benefit of all participants.

The theoretical argument in favour of free trade is based on the principle of “comparative advantage”, outlined in the box below.
One of the basic tenets of economics is that all participants benefit from trade, even the least productive economies. The theory of Comparative Advantage, as expounded by David Ricardo (1817), can be illustrated by considering two potential traders, Country A and Country B. There are two alternative commodities, meat and dairy products, and labour is the only productive resource. A worker in Country A can produce 6 tons of dairy products or one ton of meat in a year. However, a worker in Country B can only produce 3 tons of dairy produce or 0.75 tons of meat.

These figures have been chosen to show that Country A has an absolute advantage, or greater resource productivity, for both products, but has a comparative advantage in dairying. The yield of dairy produce, per worker, is twice that in Country B, whereas productivity is only one third greater in meat production. This necessarily implies that Country B has a comparative advantage in meat production. The opportunity cost per ton of meat, in terms of units of dairy produce foregone, is 4 tons of dairy produce whereas a similar calculation for the Country A gives an opportunity cost of 6 tons of dairy produce per ton of meat.

If prices can be negotiated, between the two countries, such that the price of meat is between 4 and 6 times the price of dairy produce, then both will benefit from trade. Let us assume that the price per ton of dairy produce is $1p and that per ton of meat is $5p and ignore transaction costs. Then Country A will gain by transferring a worker out of meat production and exporting the additional 6 tons of dairy produce. The export revenue will be $6p while the cost in terms of meat sales foregone will be only $5p. Country B will gain by exporting meat, since each ton exported will earn $5p but at a cost of only $4p for the sales of dairy produce foregone. Thus both partners gain from the transaction.

Alternatively if it is assumed that appropriate numbers of workers are transferred into the activity for which the country has a comparative advantage, then production of both commodities may be increased. In Table 10 below, 8 workers are transferred from meat production to dairy production in Country A, while 12 workers are transferred from dairy production to meat production in Country B. As a result total meat production, in the two countries, is increased by one tonne, while total dairy production is increased by 12 tonnes.

<table>
<thead>
<tr>
<th>Labour productivity (tonnes per worker)</th>
<th>Meat (tonnes)</th>
<th>Dairy products (tonnes)</th>
<th>Value at prices (per tonne) 5p for meat and 1p for dairy products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country A</td>
<td>1</td>
<td>6</td>
<td>5p or 6p</td>
</tr>
<tr>
<td>Country B</td>
<td>0.75</td>
<td>3</td>
<td>3.75p or 3p</td>
</tr>
<tr>
<td>Changes in productive activity (greater specialisation)</td>
<td>Country A (eight workers switch from meat to dairy)</td>
<td>-8</td>
<td>+48</td>
</tr>
<tr>
<td>Country B (twelve workers switch from dairy to meat)</td>
<td>+9</td>
<td>-36</td>
<td>(+45p - 36p = +9p)</td>
</tr>
<tr>
<td>Total gain (or loss)</td>
<td>+1</td>
<td>+12</td>
<td>+17p</td>
</tr>
</tbody>
</table>
Within each trading country, some individuals gain more than others. Consumers of imported goods benefit from the resultant lower prices, but domestic producers suffer a loss in revenue. Producers of exported goods, and owners of resources used in the production of such goods benefit from the higher prices received, but domestic consumers must bear the cost of the increased prices. In both cases it can be shown that the benefits of free trade exceed the costs, so there is a net gain in social welfare.

Differences in comparative advantage between countries depend upon (a) the available resources of land, labour and capital and (b) the available technology. The two are closely related both because capital resources are intimately involved in the development and implementation of new technology and because relative factor scarcity influences, and induces changes in, the prevailing technology.

The resource base is influential in that countries with plentiful land and labour resources, but limited capital have a comparative advantage in the production of land-using or labour intensive products. The fact that the Low Income and Least Developed Countries of the African Sahel export live ruminants, whilst importing other livestock and livestock products, reflects their comparative advantage in raising grazing livestock on the extensive semi-arid rangelands of that sub-region. The apparent comparative advantage of the Developed Countries in the production and export of dairy products is due to the greater availability of capital and the availability of modern dairy technology.

In situations where labour, and perhaps other resources are unemployed, unused resources may be employed in producing commodities for export. Thus opportunities for trade may lead to a reduction in unemployment and a general improvement in wages and incomes. Increased trade leads to increased incomes and capital investment, which in turn should generate further growth. The benefits of trade identified in the theory of comparative advantage are thereby extended into a dynamic process of economic growth.

International movements of capital have become increasingly important over the last half century. It has been suggested that this invalidates the theory of comparative advantage, since resource availability is now variable. A capital-scarce economy with plentiful land and labour will not need to specialise in capital-saving exports, since it will be an attractive site for foreign investment. More capital will be made available. However, there are limits on capital movements, particularly in the light of the international debt crisis, so the principle of comparative advantage still applies. More generally the concept of comparative advantage and the benefits of trade do not depend upon the immobility of productive resources (Keuschnigg 1999).

A further presumed benefit of free trade is the spread of new technology from country to country. In countries shielded from foreign competition by trade barriers, traditional technology and methods of production are likely to hold sway. Under free trade, however, competition with foreign producers forces the domestic producers to stay abreast of the latest technologies. This argument applies to the Sanitary and Phytosanitary (SPS) measures affecting world trade, to be discussed later. Furthermore the general contacts made through trade contribute to the diffusion of modern technologies from the developed to the less developed countries. Some empirical analyses have indicated a convergence in
agricultural technology and productivity between trading partners (Lusigi, Piesse & Thirtle 1998).

Although the two-country model with just two traded commodities, outlined above is adequate to illustrate the principle of comparative advantage and the potential gains from trade, it is clearly a gross simplification of the real world. One significant omission is that of transactions costs, which typically involve the costs of information, search, negotiation, screening, monitoring, co-ordination, transport and enforcement. For livestock products and other agricultural commodities, which are bulky and perishable, transport and transactions costs are substantial. As a result the import parity price for a given product is likely to be significantly higher than the export parity price\(^1\). If the domestic market clearing price lies somewhere between these two levels there are no benefits to be gained from trade in this product. However, given that transactions costs are taken into account in the cost of imports and the value of exports, the theory of comparative advantage and the gains from trade still apply.

Instances will exist where transactions costs are so high as to preclude trade in certain commodities. This was the case for intercontinental trade in meat before the development of refrigerated transport. As noted earlier, in the discussion of the rapid expansion of trade that has taken place over recent decades, much of this can be attributed to the reduction in transport costs and improvements in methods of transport and communications; in short to a reduction in transactions costs. Similarly differences in transactions costs explain the fact that the volume of trade between neighbouring countries is generally greater than that between countries in different continents.

**Trade barriers**

Despite the predicted benefits of free trade, there are many opponents of trade liberalisation. Those broadly in the tradition of political economy have argued that the developing countries are at an inherent disadvantage in international trade. This is partly because the prices of primary products (agricultural and mineral) which they produce decline over time relative to the manufactured products they import. In short there is a secular decline in the “terms of trade” (Prebisch 1959). This argument has lost its force now that the Low Income and Least Developed Countries have become net importers of agricultural products, and should therefore benefit from a secular decline in their prices.

The case against free-trade is put more strongly by dependency theorists, who argue that comparative advantage is not determined by natural differences in relative factor endowments but by “negotiated differences” in wage rates and technologies imposed by colonialism and unequal exchange in the past. In this sense, developing countries may have suffered losses and been exploited by trade. Even if this is true it does not provide a case for imposing barriers to trade on which the developing countries currently depend. A much better solution would be to remove the barriers imposed, mainly by the developed

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\(^1\) Import parity price is the border price price plus the costs of internal transport to the point of consumption. Export parity price is the border price minus the costs of internal transport to the border.
countries (Binswanger & Lutz 2000). The benefits are likely to greatly exceed the current levels of aid offered to developing countries (Economist, 2001).

There are also concerns that trade is concentrated in the hands of transnational corporations (TNCs), also known as multinational enterprises (MNEs). These organisations are almost states in themselves. Some generate turnover far in excess of the National Income (Gross Domestic Product) of smaller countries. Branches of multinationals are established in developing countries, to benefit not only from cheap labour but also from rapidly expanding urban markets. Examples of such developments in LLP trade are the spread of Kentucky Fried Chicken outlets and the establishment of plants to reconstitute cheap powdered milk imports in some African Countries.

Opponents of the activities of transnational corporations claim that these organisations can extract monopolistic profits untrammelled by ethical or environmental considerations and transfer the gains overseas (Madeley 2000). The extent of such distortions is debatable, while it is clear that TNCs bring benefits, in the form of capital investment, technology and managerial skills, to the host country. If some of their practices are unacceptable to the host country, policy measures for their control should be adopted, rather than curtailment of trade.

In the past many countries have imposed tariffs on imports, or used other forms of protection, to support domestic producers. These barriers to trade have often been used to promote industrial development as part of an inward-looking, import-substitution strategy for development. Various arguments are put forward to justify the imposition of tariffs. The aim may be:

1. to support infant industry
2. to raise public finance
3. to reduce unemployment or
4. to redistribute income towards poorer sectors of society, which supply resources to the protected industry.

A tariff may help to achieve these aims but, just as trade liberalisation can be shown to raise social welfare for participating countries, barriers to trade must reduce social welfare. For instance an import tariff yields revenue to the Government and raises the price received by domestic producers but consumers suffer from the price increase. In general the costs to consumers exceed the gains for producers and the Government. Tariffs on manufactured imports result in distortions to relative prices in domestic markets that discourage agricultural production and exports (Kreuger, Schiff & Valdés 1988, Bautista & Valdés 1993). Tariffs may also be used to protect and support domestic agricultural or livestock producers, with consequent higher food costs for consumers. Thus, in pursuit of the four aims listed above, policies that tackle the underlying problems directly are likely to be more cost effective than the imposition of import tariffs (Heffernan & Sinclair 1990). Such policies might include:

- credit or production subsidies for infant industries
- general taxation to raise public finance
employment subsidies

There are various other forms of protection, including import quotas, variable import levies, export production subsidies and voluntary control of exports by suppliers of imports. These may meet some or all of the aims listed above. However, in all cases the extra costs to consumers, exceed the benefits to producers plus the revenues, or minus the costs, to Government if these arise. In short all such interventions cause a net loss in social welfare, although not the same in all cases. Again there are likely to be alternative more cost-effective direct methods of supporting infant industries, raising public finance, reducing unemployment or improving producer incomes.

Trade barriers may also include export taxes. These have commonly been raised, in the past, on primary export commodities, for instance by the cash crop marketing boards in many African countries, and the big oil price rises imposed by the Organisation of Petroleum Exporting Countries (OPEC). In these cases public revenue is raised but this is exceeded by the cost to potential domestic export producers. The disincentive effects may cause long-term damage to the export industry. Structural problems in the macro-economy and in particular an overvalued currency create disincentives for producers of both exports and import substitutes by making both exports and imports artificially cheap. Structural adjustment programmes, promoted by the World Bank and International Monetary Fund have been aimed at removing these distortions and barriers to trade.

The argument that all trade barriers have a net social cost to the nation needs qualification in the case of large countries; large in this case meaning able to have a significant influence on the world price for an import or export. A large country importer can deploy monopsony power and force the world price down by restricting or taxing imports. An exporter can use monopoly power to force the price of its exports up by restricting or taxing the supply. However, the use of such policies is likely to induce retaliation by trading partners and could result in a tariff war in which all parties are worse off than they would be under a free trade regime.

Subsidy support for farmers in large, developed countries, of Europe and North America, has probably depressed world prices for the subsidised cereals and dairy products. Trade liberalisation and the reduction of farm subsidies are therefore likely to raise world prices, and to benefit producers in other parts of the world. However, the Low Income and Less Developed Countries, which are net importers of these products, will then suffer from the increased prices. The wider effects of the liberalisation of agricultural trade under the General Agreement on Tariffs and Trade (GATT) and the World Trade Organisation (WTO) will be discussed in more detail later.

Whereas monopoly power stems from being the sole seller of a product and allows the seller to raise the product price by restricting supplies, monopsony power stems from being the sole buyer. This allows the buyer to restrict purchases and thereby lower the purchase price.
Trade Integration

Trade integration has occurred with the formation and expansion of regional trading blocks. All such arrangements are based on the removal of trade barriers between member states. The basic form is a “free trade area” which leaves members independently responsible for trade relationships with the rest of the world. An example is the North American Free Trade Agreement (NAFTA) ratified in 1994 by the inclusion of Mexico in the already existing Canada-United States of America Trade Pact.

A “customs union” is more closely integrated in that members have a mutually agreed set of tariffs and trade arrangements with the rest of the world. If, in addition, free movement of labour and capital resources between member states is allowed, the block becomes a “common market”. With moves towards closer monetary, fiscal, social and legal integration, the common market becomes an “economic union”. The European Common Market became the European Union after ratification of the Maastricht Treaty in 1993 and is now one of the oldest and most strongly established trading blocks. It is now responsible for 60 percent of all world trade. It is the largest importer of agricultural produce in the world and the second largest exporter.

Apart from these powerful developed-country trading blocks, the establishment of more than 150 other regional integration agreements have been reported over the last 50 years, most of which are still in force. Almost half of these have been established since 1990. Existing regional groupings include the Southern Cone Common Market (MERCOSUR) in Latin America and the Caribbean Community (CARICOM) serving 12 West Indian island states together with Belize. In Asia established trading blocks include the Association for South-East Asian Countries (ASEAN), the Asia Pacific Economic Cooperation (APEC) and the South Asian Association for Regional Cooperation (SAARC). Examples from Africa include the Central African Customs and Economic Union (UDEAC), the Common Market for Eastern and Southern Africa (COMESA), the Economic Community of West African States (ECOWAS) and the Southern African Development Community (SADC).

The formation of an integrated trading block is expected to create trade as a result of the removal of barriers between member countries. Intra-community trade should increase. Except for the European Union, regional integration has not created much extra trade between member countries (Economist 1998). This is probably due to the close similarity of the productive resource base, and consumer tastes between neighbouring countries. Trade creation is more likely to outweigh trade diversion if customs union partners have different relative resource endowments or if their consumers have different tastes, so that members have comparative advantage in different export commodities. Only ASEAN has consistently shown trade between member countries exceeding 10 percent of the total for the group. In contrast, within the European Union, agricultural trade between member countries accounts for over 70 percent of the total agricultural trade of the community. This integrated trading block is now responsible for nearly 40 percent of the total world merchandise trade, and a slightly higher percentage of the world’s agricultural trade.

Much of the trade creation achieved by regional integration may be at the expense of trade diversion away from cheaper sources in non-member countries. This leads to
misallocation of resources because it shifts production from the lowest cost import suppliers in the rest of the world to a higher cost producer within the community. Thus the Common Agricultural Policy of the European Union leads to consumers paying more for food, produced within the community, than the (pre-tax) import parity prices at which the same items could be imported from third countries. For member states there are both gains from trade creation and losses through trade diversion. The Union appears to have created more trade than it has diverted, but agricultural policy has been highly protectionist and wasteful.

The disposal of agricultural surpluses, resulting from producer subsidies, at artificially low prices is known as “dumping”. This practice was prevalent in the 1980s by which time the European Community had accumulated large stocks of beef and dairy products through intervention buying. Cheap sales of beef from the European Community to coastal West African Countries in the early 1990s provided a large proportion of their needs (60 percent of the beef supply for Ghana and 40 percent of that for Côte d’Ivoire) caused a serious drop in trade from the Sahelian Countries to the Coast (Van Ufford & Bos, 1996). A decline in price support through intervention buying in the European Union, together with anti-dumping measures introduced under the General Agreement on Tariffs and Trade (GATT), have reduced the incidence of such problems.

The Common Agricultural Policy is also aimed at stabilising farm prices and has had some success in this respect. This has brought benefits in terms of risk reduction but producers lose income on average by not responding to fluctuations in world prices.

Apart from gains and losses to member countries, the policies of the European Union also affect world prices. It is generally believed that the Common Agricultural Policy has destabilised and depressed world prices for agricultural products. The gains to member countries and the impacts on the rest of the world are due to the large size of the contribution to world trade made by European Union. As noted above this is also true for individual large countries. However, small countries in smaller regional groups must be better off trading freely with everyone, rather than retaining barriers against imports from non-group members (Heffernan & Sinclair 1990). From a global point of view, a general reduction of trade barriers is preferable to regional group action.

An integrated trading block may form a special relationship with individual third countries or other groups of countries. For example, the European Union, between 1975 and 2000, maintained a special trade and aid agreement with a group of eventually 70 African, Caribbean and Pacific Ocean (ACP) States.

The Lomé Convention was aimed at providing financial and technical assistance, industrial cooperation, stabilisation of export earnings and a preferential trade regime, for the ACP Countries. The stabilisation of export earnings (STABEX) scheme involved payment of compensation to exporters of selected cash crops when the world price fell below an agreed floor, with some cost recovery when the price exceeded an agreed ceiling. Export prices of raw hides of cattle, sheep and goats and leather from ACP countries to the EU were supported in this way. Trade preferences were given by means of a significant
reduction in tariffs on imports of bananas, sugar, rum and beef and veal, to the EU from ACP countries.

The special protocol on beef and veal specifies that import duties (the variable import levies) are reduced by 90 percent on specified quantities of imports from selected ACP countries. These countries, in decreasing order of quota size, are Botswana, Zimbabwe, Madagascar, Swaziland and Kenya. The total quantity imported from these countries amounts to less than five percent of all EU imports of beef and veal. However, this trade makes a much larger contribution to the export trade and foreign exchange earnings of the selected ACP countries.

The Cotonou Agreement, which superceded the Lomé Convention from mid 2000, provides for a transition from the Lomé programme of assistance to one suited to more liberal global trade environment. The results of 25 years operation of the Lomé Convention have been mixed. Imports from ACP countries declined from 6.7 percent of EU imports in 1976 to just three percent in 1998. Furthermore changes in the global trading environment were being driven forward by the World trade Organisation.

The aim of the Cotonou Agreement is to maintain the present trade regime during a transitional, preparatory period, but to start liberalisation by 1 January 2008 at the latest. The STABEX scheme will be subject to the limits of funding allocated to individual countries. The beef and sugar protocols will be maintained, but will be reviewed in the framework of negotiations for the new trading arrangements. The Least Developed Countries (which include 39 ACP countries) will benefit from free, un-taxed access to European markets for all products from 2005. Alternative possibilities for assisting developing countries, not included in the Least Developed category will be explored (www.europa.eu.int/comm/development/cotonou/overview_en.htm accessed August 2001).

The WTO and Developing Countries

In the aftermath of the second World War, which followed the great slump, enthusiasm for reducing and binding trade barriers led to the establishment of the General Agreement on Tariffs and Trade (GATT) in 1947. Since its foundation, developed country tariffs on manufactured goods have fallen from around 40 percent to less than 4 percent. Global trade has grown much faster than global GDP, of which trade now accounts for over 40 percent (World Bank 2001). Membership of the GATT, now reformed as the World Trade Organisation, had risen to 140 by 2000, with 28 other countries waiting to join. The organisation’s members are responsible for over 90 percent of total world trade.

It was not until the Uruguay Round of GATT negotiations, from 1986 to 1994, that agricultural trade was put on the agenda. The aims of this Round were to reduce, if not eliminate, policies for the protection of the agricultural and textile industries. Under the Agreement on Agriculture (AOA), signed in Marrakesh in 1994, member countries were committed to make the following adjustments, by the year 2000 (Special and differential
treatment was accorded to the developing country members, which make up 80 percent of the total membership, extending their implementation period to 2004).

- Reduction of export subsidies by at least 36 percent (24 percent for developing countries). This reinforces the anti-dumping measures agreed under an earlier round of GATT negotiations.
- Reduction in aggregate measures of agricultural support for domestic agricultural producers by at least 20 percent (13.3 percent for developing countries)
- Improved access to imports through the removal of non-tariff barriers such as quotas, which may be replaced by tariffs (tariffication), reduction of tariffs (by the same proportions as for export subsidies) and maintenance or creation of conditions of minimum access to import markets.

The Least Developed Countries are exempt from the reduction commitments but are required to convert non-tariff barriers, such as import quotas, into tariffs and may not increase domestic support for agriculture beyond the 1986-88 level (fuller details are set out in Alexandratos 1995).

The World Trade Organisation (WTO) was established, at the end of the Uruguay Round, as a replacement for GATT but with a stronger institutional framework. It has a formal organisational structure, with a Director General, the bi-annual Ministerial Meeting as the highest decision making body and a General Council, meeting several times per year. The commitments agreed during the Uruguay Round have been ratified in members’ parliaments. Special arbitration panels of the WTO are called upon to adjudicate in trade disputes that may arise between member countries. Thus the WTO provides a single global, international agency charged with the promotion of world trade liberalisation.

High hopes were placed on the results of the Uruguay Round of negotiations and the establishment of the WTO. Agricultural trade was expected to expand, with increased efficiency of resource use stemming from greater specialisation. Taxpayers and consumers in economies with high levels of agricultural protection would benefit from the reduction of barriers, as would efficient producers around the world. The resultant economic growth should benefit all, both developed and developing countries. One estimate, based on Computable General Equilibrium modelling, gave the predicted gain in the world gross product at between US$ 35.2 billion a year in the short run and US$ 73.6 billion a year in the longer term (Harrison, Rutherford & Tarr 1996, also see Roberts et al 1999).

Within this context it is predicted that the growth in world demand resulting from the increased trade in livestock and livestock products will lead to modest increase in prices, as for other agricultural products. The greatest benefits will accrue to producers in the main exporting countries and to their governments through reduced expenditure on support measures. The developed countries will derive the greatest benefits and savings, since they contribute most to world exports and some currently apply the highest levels of protection. Importing countries, which for animal products include the Least Developed Countries, are predicted to face increased border prices. This, in part, justifies according them “special and differential treatment”. However, it is argued that developing countries may still
benefit from freer trade enabling them to exploit their comparative advantage in other productive activities.

The effects of trade liberalisation are expected to differ as between commodities and groups of countries. For **dairy products**, the reduction in price support in the European Union and the United States will lead to reduced exports and lower domestic consumer prices, with associated increases in home consumption. However, world prices are predicted to rise by between 6 and 9.2 percent as a result of the policies recommended \(^3\) (Stevens *et al* 2000). The main beneficiaries from increased world demand will be the main exporters who are not heavily dependent on protection. Several of these have formed the “Cairns Group” of countries with competitive agricultural sectors with low levels of protection. The main beneficiaries include Australia and New Zealand and possibly India, Pakistan, Argentina, Uruguay, some former Eastern European states and South Africa and Zimbabwe (Griffin 1999a and b, Shaw & Love 1999). Net importers, including the Least Developed Countries will face higher import prices. The increase in prices may provide additional incentives for the development of their domestic dairy industries.

The world **meat trade** is influenced significantly by sanitary and health restrictions imposed by importing countries. Discussion of these and other non-tariff trade barriers is deferred until the next section of this paper. The main concern here is to assess the impact of reducing direct price support. There are two large trading zones in **beef**; the Atlantic trade between the European Union, the countries of South America and the Middle East and Africa, and the Pacific trade, dominated by the USA, Japan, Australia and New Zealand. The world price for beef is predicted to rise by between 0.9 and 5.3 percent (Stevens *et al* 1992). In the Atlantic trade, the European Union is required to reduce direct price support and the level of exports. The main exporting countries of Argentina and Uruguay are expected to benefit most. In the Pacific region, trade liberalisation in the United States, Canada, Japan and Korea will offer substantial gains to Australia and New Zealand in the form of increased exports (MLC 1994, FAO 1994). Least Developed Countries may benefit if they can gain access to developed country markets.

Changes in the global market for **sheep and goat meat** are likely to be smaller, although price support for producers within the European Union will be reduced, with some benefits accruing to New Zealand and Australia through increased exports and slightly higher prices. There may be some scope for expanded exports of small ruminants from the Least Developed Countries.

Trade in **pig and poultry meat** is less subject to barriers, although European Union producers benefit from export refunds. The limited support may be due to the fact that, in the developed countries, these are generally commercial enterprises, not warranting assistance on environmental or social grounds. Trade liberalisation will therefore have a limited direct impact on these products. Prices, production and trade are more likely to be influenced by changes in the prices of cereals and other feedstuffs, which are expected to rise. As already suggested, demand for these products is likely to increase with growth of

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\(^3\) The findings are the result of comparative static analysis, comparing prices before and after the policy change. There is no prediction of the time lag between policy implementation and the outcome.
per caput incomes and urban populations. There are prospects for increased export revenue for pig and poultry meat produced in Europe, the United States, and China, together with Canada for pig meat and Brazil, Thailand and Hungary for poultry meat. Prices are not expected to rise much (Stevens et al 1992) so the impact on importing countries, including the Least Developed Countries, will be limited. Incentives will remain for expanding domestic production in countries producing sufficient feed grains.

The major innovation of the Uruguay Round Agreement on Agriculture was to extend trade liberalisation to temperate agriculture, including livestock products, but to allow slow and gradual change. Some of the predicted outcomes have occurred, as illustrated by the growth in trade in dairy products and meat illustrated above (Figures 2, 4 and 5).

However, world prices for cereals have declined over most of the last five years, and meat prices have fallen since mid 1997, with some recovery in the current year. This recovery is ascribed to disease outbreaks (FMD, CSF, BSE) and contracting supplies rather than reduction of trade barriers. The price index for dairy products has shown a downward trend since 1996, although in mid-2000 the price index rose sharply. The ratio of the price index for intensive livestock products to the prices of feed ingredients, namely grains and oil cakes and meals, has fluctuated widely but is showing a gradual upward trend since 1996 (FAO 2001a). Graphs of price indices for the last 10 years are available from this FAO site. Price movements have not been just as most researchers have predicted. However, some authorities predict that most food prices will decline as a result of trade liberalisation (Pingali 2001). This would, of course, benefit the Developing Countries most of which are net food importers.

There are many influences on world prices, apart from the effects of trade liberalisation. The break up of the communist block, of Eastern Europe and Central Asia, has been important. So too have been the structural adjustment programmes in many developing countries, which have reduced negative protection of agriculture through export taxes and overvalued currencies. Furthermore it is argued that the Uruguay Round Agreements did not go far enough, in reducing trade barriers in the developed countries, to have a significant impact (Roberts et al 1999). Distortions in markets for agricultural products are far larger in industrialised (Organisation for Economic Cooperation and Development) countries than in developing countries (Tyers & Anderson 1992, Binswanger & Lutz 2000). Although there was some abatement in levels of support in the mid-1990s, by 1998 levels of support for agriculture in the OECD countries had returned to the relatively high levels that had applied in the early 1990s (Roberts et al 1999).

Progress in reducing agricultural trade barriers is hampered by substantive disagreements and differences of objectives between major trading groups within the WTO. This is thought to be one of the reasons for the failure of the third WTO Ministerial Conference, held in Seattle, USA in late 1999, to reach agreement on a final declaration and agenda for the next round of trade negotiations (FAO 2001a). While the Cairns Group, together with the United States are pressing for increased liberalisation, Europe and Japan are seeking to limit the social and political problems associated with a rapid reduction in agricultural price support. Developing countries have an interest in the reduction of both domestic support and export subsidies in the developed countries, but have a concomitant interest in
maintaining their ability to adopt appropriate development policies for the agricultural sector (FAO 2001b).

Problems for developing countries arise from the imbalances in the impacts of the Agreement on Agriculture. Although developed countries, such as the European Union, the United States and Japan, are committed to cutting protection for their agricultural exporters, they start from high levels of protection in the base period (1986-1990). Despite the concessions allowed to the developing countries as “Special and Differential Treatment”, namely smaller reductions in support over a longer implementation period, most start from very low levels of support in the base period. Thus, little cutting is necessary. However, the outcome is that policy options will be limited in the future, since tariff levels are “bound” and domestic support cannot be increased in the future (FAO 2001b). Tariff quota rates, such as those for beef operating under the Lomé and Cotonou Agreements, are subject to conceptual and implementation problems and have rarely been fully utilised.

The Least Developed and Net Food Importing Developing Countries have particular concerns regarding food security. Not only are the prices of imported foodstuffs, including dairy products and poultry meat, expected to rise, but also food aid is likely to decline as publicly held surpluses diminish in developed countries. Furthermore, although world prices are expected to become more stable as a result of the disciplines imposed on trade-distorting policies and the greater integration of markets, instability of world markets will remain a problem for countries with weak agricultural sectors and high dependence on food imports (FAO 1999, Stevens et al 2000).

Further problems arise, for developing countries, in meeting the costs of reforming trade procedures for import licensing, customs valuation and other areas of regulation. World Bank studies on the costs of reform of customs procedures give estimated costs of $8-10 million for Tanzania, $1.6 million for Armenia, $3.8 million for Lebanon and $16.2 million for Tunisia (Finger & Schuler 1999). Implementation of other agreed measures on Sanitary and Phytosanitary Measures (SPS), Technical Barriers to Trade (TBT) and Trade-Related Aspects of Intellectual Property Rights (TRIPS), will raise the costs to perhaps $180 million; a full year’s development budget for many countries (Finger 1999). It is argued that while the GATT began as a forum for the reciprocal liberalisation of trade restrictions, the WTO is now imposing rules which are costly to implement and inappropriate for the existing infrastructure in developing countries.

It is widely believed, however, that institutional strengthening for the regulation of markets and trade is essential for the efficient operation of competitive markets. In the long run transactions costs are reduced and development is promoted (Roberts et al 1999, Anderson 1999). On these grounds it is claimed that expenditure on the reform of trade procedures is justified in terms of promoting general economic development, apart from qualifying the country for membership of the WTO. Similar issues arise in connection with the SPS measures, which are next to be addressed.

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4 A tariff is “bound” when it is subject to a predefined maximum.
Health and sanitary controls

*The Sanitary and Phytosanitary (SPS) Agreement*

Trade in livestock and livestock products, and in crops, has always been associated with the risks of transmitting diseases and pests, of animals, plants and humans, across national boundaries from one country to another. The main areas of risk are summarised under the headings of plant health, animal health, food safety and the natural environment. These risks represent an “external cost” to the importing country and a form of market failure. Public policies are needed to control imports and adjust for these risks. They are generally designated as “Sanitary and Phytosanitary” (SPS) measures. Application of these measures necessarily adds to the transactions costs of international trade.

The measures that may be adopted by a potential importer are to either:

- Introduce a system of border inspections and controls, and to reject consignments that do not meet the required SPS standards; *(ex post controls)* or
- Require the country of origin of the imports to comply with the required SPS standards through process-based controls enforced by a “competent authority” *(ex ante controls)*.

The ultimate sanction is to impose a partial or total ban on imports from countries that fail to meet the required SPS standards. An example is the disputed European Union ban on imports of beef treated with hormones from the United States.

These measures represent non-tariff barriers to trade. They transfer some of the risks and costs back to the exporting country. The cost of rejection of a consignment at the border can be considerable, including loss of product value, transport and other export costs, together with re-export or destruction of the consignment. Exporter risk is associated with the uncertainty about whether the consignment will be rejected.

Relative costs and risks are a greater burden for Low Income and Less Developed Country exporters than they are for developed countries, since the fixed costs of establishing appropriate SPS control systems is spread over a much smaller volume of exports. Of the respondents to a survey of African countries, 57 percent stated that exported products had been rejected within the previous two years following border inspection. The reasons for rejection were mainly microbial spoilage or contamination. Although all the countries inspected food consignments before export, most respondents considered that testing and inspection facilities were inadequate due to financial constraints (Mutasa & Nyamandi 1998).

The alternative of compliance with the SPS standards required by importers is very costly, as illustrated by projects supported by the World Bank (Finger & Schuler 1999). The cost, for Argentina to achieve the disease- and pest-free status needed to meet the SPS requirements of potential importers of meat, fruit and vegetables was reportedly $82.7
million over the period 1991-96. In Hungary, the cost of upgrading slaughterhouses to meet the required EC hygiene standards over 1985-91 is estimated to be $41.2 million.

Although such controls in the importing countries may reflect legitimate concerns regarding food quality and safety, and protection of plant and animal health, the high costs of compliance may prove prohibitive for some exporters. Regulations sometimes discriminate between one supplier and another, thereby diverting trade. At times the SPS measures applied to imports are stricter than those imposed on domestic suppliers. Even if similar measures are applied to both imported and domestic supplies, the costs of compliance for importers may exceed those for domestic suppliers, because of the need for additional screening for instance. Problems are exacerbated for Low Income and Less Developed Countries that may use inappropriate production and marketing methods or lack the resources needed for compliance.

Trade barriers associated with SPS requirements are important for livestock and livestock products. In a study of “the impact of SPS measures on developing countries” (Henson et al 2000, Henson & Loader 2001), respondents were asked which products caused most problems over the last three years, relating to these measures. Of the eight categories listed, “Meat and meat products” came second, with over 50 percent of the responses after fish and fish products. Dairy products were also reported as causing problems but by only 3 percent of respondents.

In the same survey, respondents were asked to indicate the significance of the main problems their countries faced in exporting agricultural and food products to the European Union. The most significant factors were assessed as “Insufficient access to scientific/technical expertise” and “Incompatibility of SPS requirements with domestic production/marketing methods”. Financial and time constraints, on the time allowed for compliance, were also mentioned together with limitations of the country’s administrative arrangements for meeting SPS requirements. Lack of information and of administrative awareness of SPS requirements were also recorded (Henson et al 2000, Henson & Loader 2001 op cit).

The first international agreement relating to measures for food safety, animal and plant health was the GATT Agreement of 1947. More recent disputes between developed countries could not be resolved under the GATT settlement procedures. The 1947 Agreement was superseded by the Agreement on SPS Measures finalised together with the establishment of the WTO with the aim of minimising the adverse effects of SPS controls on trade. Within the Agreement SPS measures are defined as any, within the territory of the Member State, applied to:

a) protect animal or plant life or health from risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms;

b) protect human or animal life or health from risks arising from additives, contaminants, toxins or disease-carrying organisms in foods, beverages or feedstuffs;
c) protect life or health from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests; or

d) prevent or limit other damage from the entry, establishment or spread of pests.

Clearly all of these measures may apply to trade in livestock and livestock products.

The major principles embodied in the agreement are listed below, under six headings (WTO 1995 &1996).

1. **Harmonisation**

Member States are encouraged to participate in international standard-setting organisations such as the Codex Alimentarius (mainly relating to item “b” above), the International Office of Epizootics (OIE) and the International Plant Protection Convention (IPPC) (both relating in particular to item “a” above). The standards, guidelines and recommendations set by these organisations should be applied across all Member States, although individual countries are entitled to adopt measures giving a higher level of protection, provided that this can be justified scientifically. Lower standards are not officially acceptable under the SPS Agreement, although this is subject to the equivalence condition outlined below. Presumably, lower standards would be acceptable for a voluntary, bilateral trading arrangement even between member countries.

2. **Equivalence**

The SPS Agreement requires that a member state should accept the SPS measures of other member states, where they can be demonstrated to be equivalent in offering the same level of protection. Thus equivalence relates to the level of protection regardless of how it is achieved. For instance the Hazard Analysis Critical Control Point (HACCP) recommended by the Codex Alimentarius, being a process cannot be made mandatory under the SPS Agreement.

3. **Risk assessment for establishing the appropriate level of SPS protection**

The introduction or maintenance of sanitary or phytosanitary measures which result in a higher level of protection than would be achieved on the basis of relevant international standards, guidelines or recommendations should be based on demonstrated scientific evidence and assessment of the risks to human, animal or plant life or health. Risk assessment is further defined as “The evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of an importing Member according to the sanitary or phytosanitary measures which might be applied, and of the associated potential biological and economic consequences; or the evaluation of the potential for adverse effects on human or animal health arising from the presence of additivies, contaminants, toxins or disease-causing organisms in food, beverages or feedstuffs” (WTO 1995, Annex). In cases where relevant scientific evidence is insufficient, a Member may provisionally adopt sanitary or phytosanitary measures applied by other Members.

4. **Adaptation to regional conditions**

It is recognised that SPS risks are not limited by national boundaries; they may be confined to specific areas within a country. More specifically there may be low risk areas within a
country. A good example is that of designated Foot and Mouth Disease (FMD) free areas within a country which does not have FMD free status for the whole country.

5. Transparency
Communication of information regarding SPS measures will be improved. Members must notify the SPS Secretariat of all proposed and implemented SPS measures. This information is forwarded to the “Notification Authority” within each Member State. Furthermore each Member must establish an “Enquiry Point” as a direct point of contact for queries regarding SPS measures.

6. Consultation and Dispute Settlement
Settlement of disputes, regarding SPS measures, is subject to detailed and structured procedures. It operates under a two-tier system in which a panel assesses the facts and comes to a legal judgement. The panel consists of three (sometimes five) trade lawyers or trade policy officials, specifically not originating from the disputing parties. Appeals are heard by another body. Decisions are then ratified by the Dispute Settlement Body.

It is claimed that all SPS relevant dispute cases so far have revolved around whether sufficient scientific evidence had been demonstrated through risk assessment (Neumayer 2001). This was the basis of the case brought by the United States and Canada against the European Union regarding the ban on beef from cattle raised with anabolic hormones (WTO 1998a). The appellate body overruled an earlier panel finding that the import prohibition resulted in “discrimination or a disguised restriction in international trade” but agreed with the ruling that the scientific reports the EU had put forward as a risk assessment “do not rationally support the EC import prohibition”. Hence the prohibition was judged inconsistent with the SPS requirements and the United States were authorised to impose sanctions worth US$ 191.4 million against the EU, which has still refused to lift the ban. Another case concerns Japan’s effective prohibition of imports of agricultural products under quarantine measures; “Japan – Measures Affecting Agricultural Products” (WTO 1998c). Here again an appellate body concluded that the scientific evidence was Inadequate and not based on a risk assessment as demanded by the Agreement.

The impact on developing countries

The survey of developing countries discussed above (Henson et al. 2000) showed that their SPS facilities are deficient and their standards lower than in developed countries, owing to lack of resources and inadequate information. Yet, when trading with each other, they often require the international standard to be met! The SPS Agreement has the potential to help facilitate exports from developing countries by increasing transparency, promoting harmonisation and preventing the imposition of trade barriers that cannot be justified scientifically. However, the current level of animal health protection is generally too poor to justify removal of SPS barriers. The Low Income and even more the Least Developed Countries, are hampered by:
• small scale of export operations,
• the necessity to apply separate treatment to products destined for foreign markets, since domestic SPS standards and methods of production are not compliant with those required by the foreign importer,
• the shortage, low performance and high costs of support services, and
• high risks of diseases and infestations (FAO 1998).

A few cases may serve to illustrate the problems faced. For instance, meat for local consumption in many Low Income Countries, is from animals slaughtered the same day without the use of refrigeration. Therefore meat for export would have to be slaughtered and handled in special facilities, constructed specifically for this trade. The same would be true for storage and transport of meat intended for export. Construction and operation of these facilities is costly and may be difficult to justify when the volume of throughput is highly variable and rarely reaches design capacity (FAO 1998 op cit). These considerations help to account for the emphasis on exports of animals on the hoof from the Least Developed Countries which limits the number of potential trading partners to those fairly close by and constitutes an elevated risk for disease introduction.

Smallholder dairy production is often based on milking by hand and little or no cooling or pasteurisation, for sale that day. In South Asia much of the production for urban consumption is derived from “cattle colonies”, with large numbers of small production units grouped together in a limited area. Dairy products for export are required, under European Union rules, now incorporated under the SPS Agreement, to be manufactured from milk from farm-based and machine-milked cows and processed under appropriate hygienic conditions. Much of India’s dairy output cannot be exported to the European Union for this reason (Henson et al. 2000). This is probably only a temporary issue since India has become a net importer of milk and the milk deficit is supposed to grow substantially by 2020! (Delgado, Rosegrant & Meijer 2001).

Resource limitations generally mean that the developing countries have far fewer veterinary personnel per million livestock units (excluding poultry) than the developed countries. This deficiency together with poor infrastructure and facilities for pest and disease control create serious problems for developing countries in meeting the SPS requirements for exports. The international acceptability of veterinary certificates issued by a developing country, an essential accompaniment to exports, might be threatened (FAO 1998 op cit).

The survey of the impact of SPS measures on developing countries (Henson et al. 2000) showed low levels of participation in the international organisations responsible for defining standards for animal and plant health and food safety (OIE, IPPC and Codex Alimentarius). Only about a third of Low Income and Lower Middle Income Countries belong to all three of these organisations as well as the WTO, while for High Income Countries the proportion is more than two thirds. Of the Low Income Country members of the WTO less than a third have established both an Enquiry Point and a National Notification Authority as required by the SPS Agreement. Practically all High Income Country members have complied.
Few developing countries regularly send delegates to the SPS Committee meetings in Geneva. Over 50 percent sent no representatives to any of the 10 meetings held between November 1995 and September 1998. Less than half the Low Income Country members have notified one SPS measure to the WTO, whereas the average number of notifications per High Income Country member is nearly 50. Clearly the Low Income and Developing Countries are much less active than the higher income Countries in the implementation of SPS measures.

The main conclusion of the survey is that the SPS measures are a severe constraint on developing country exports to the European Union, and presumably to other developed countries. This is mainly due to the lack of resources and facilities for compliance, limited access to scientific and technical expertise, shortage of information and finance (Henson et al 2000, Henson & Loader 2001). Furthermore, methods of production, processing and marketing in developing countries may prove incompatible with developed country SPS requirements. Although the SPS Agreement was aimed at harmonising and rationalising SPS measures to benefit both developed and developing countries, resource constraints restrict compliance by the latter group. With regard to LLP products however, there must be severe doubt as to whether Low Income and Least Developed Countries could benefit much from a reduction of constraints due to SPS measures. They would still be competing with countries like Uruguay, Argentina and Australia, which produce a more standardized product, are more reliable suppliers and have fewer animal health problems to impede trade.

There is some dissatisfaction, particularly among developing countries with the SPS Agreement and the way in which it operates. It is even argued that it is a major element of the WTO programme of imposing rules, which are costly to implement and inappropriate for the existing infrastructure in developing countries (Finger 1999). Admittedly the OIE Animal Health Code, on which the zoosanitary measures are based, is full of recommendations, such as e.g. the chapter on Rift Valley Fever, for which compliance by the LDCs is extremely difficult. The Code was basically written to protect the health of livestock in developed countries. However, the World Trade Organisation, in its attempt to harmonise, and adjudicate on, the rules is charged by some commentators with imposing them on the developing countries (Finger op cit 1999). Developing countries have concerns that insufficient attention is given to their needs in setting SPS requirements and insufficient time is allowed for compliance. As shown above, participation by the developing countries in the agencies responsible for SPS decision-making is limited.

These issues, affecting access by the developing countries to export markets in the developed world, need to be addressed at global and national levels. The WTO and international standard setting organisations need to facilitate developing country participation by modifying their procedures and providing technical, scientific and legal assistance. Assistance is already provided by the WTO, the World Bank, FAO, United Nations Conference on Trade and Development (UNCTAD) and the European Union. However support is always subject to funding limitations and this type of assistance has been subjected to criticism by some developing countries (WTO 1998b).
Technical, scientific and legal assistance may also be offered, on a bilateral basis by
developed countries. It is suggested that developed countries should seek to be more aware
of the special circumstances of developing countries and to take these into account in
formulating SPS policies. This does not imply any lowering of developed country
standards of human, animal and plant health, but does suggest making allowances for
different systems of production and marketing in the developing countries.

Governments of developing countries need to design and implement appropriate SPS
policies to benefit both producers of food including livestock and livestock products and
the health of consumers. It should be noted that for developing countries, although
attempts are being made to privatise veterinary services for instance, sanitary and
phytosanitary measures are public goods. Improvements in public health and hygiene and
in the control of epidemic diseases are generally non-exclusive and non-rival and must
therefore depend largely upon public investment. Cost recovery from livestock producers
may assist funding but responsibility for ensuring that services are available lies with the
public authorities.

The above discussion, and most of the literature on the impact of SPS measures on
developing countries, is concerned with the non-tariff barriers to exports from the
developing countries to developed countries. Given that Low Income and Least
Developed Countries are net importers of livestock and livestock products a broader view
is needed. It is debatable whether global harmonisation of sanitary rules is appropriate
given the wide discrepancies in sanitary and phytosanitary standards between countries.
Since most food imports, including LLP imports, come from the developed countries,
where international standards already apply, the developing countries may adopt a “free-
rider” position. In short they may benefit from the food security and protection of plant
and animal health provided with the imports whilst applying lower SPS standards to
domestic production. (The equivalence rule is unlikely to be invoked, since the higher SPS
standards are not made a condition for supply of the imports.)

However, if trade between developing countries, possibly within a regional grouping or a
free trade area, is to be promoted, there are advantages in harmonising the SPS rules, albeit
at a lower level than that recommended under WTO rules. Currently the Low Income and
Least Developed Countries are net exporters of small ruminants, while the latter group also
exports live cattle. Since most of the trade is across borders with neighbouring developing
countries, exporters do not need to comply with the high SPS standards required by
developed countries. None the less some measures of control, of the spread of epidemic
livestock diseases, are desirable and widely applied. There are clear benefits to be gained,
by both importers and exporters, from harmonisation of control measures and greater
transparency regarding their application.

The Low Income Countries, as a group, import cattle but are net exporters of bovine meat.
Major exporters in this group include the Ukraine, India, Nicaragua, Republic of Moldova,
Mongolia, Sudan, Zimbabwe and Kenya. As mentioned earlier, export of meat probably
necessitates hygienic slaughter in an abattoir, with meat inspection, and refrigerated
transport. This is likely to be associated with the application of more stringent SPS
standards than those required for imports of live animals. Hygiene becomes an issue,
whereas with live animals precautions are only needed against potential disease carriers. Currently, with incomplete international harmonisation, the required standards will depend upon the destination of the exports. Countries such as Zimbabwe, the Ukraine and the Republic of Moldova also export dairy produce. Again this should involve the application of high food health and safety standards.

The main justification for improving SPS standards in most developing countries lies in the benefits accruing to the domestic economy and society. These benefits will accrue in the form of:

- improved health and productivity of domestic livestock,
- reduced losses from disease epidemics,
- improved quality of livestock products,
- public health improvement and
- spill-over benefits to other elements of the food chain.

Thus there is probably a case for improving national SPS standards, even where it is not simply to overcome a non-tariff barrier on exports to developed countries.

It might be argued, on moral and economic grounds, that the same international SPS standards should be applied globally. The moral case rests on the injustice of differences in food safety being faced by different societies. The economic case rests on the international costs of border controls and inspections, the restrictions on trade, and the risks of chance importation of diseases or food contaminants. The OIE apparently assumes that the standards recommended for disease control should be applied globally.

However, as already argued, the costs of compliance with international standards are beyond the means of many developing countries. There are also limits on international aid. Money invested in raising sanitary and phytosanitary standards, might alternatively be spent on improving domestic health services, other social services or productivity enhancing investment. Thus the raising of SPS standards has an opportunity cost. Any decision on meeting or raising SPS standards should be based on careful assessment of the costs and benefits to the national economy. For decisions relating only to livestock and livestock products the costs are likely to include essential changes in the infrastructure of veterinary clinics, laboratories, abattoirs, processing plants, border inspection posts, quarantine camps and so on. Increased staffing will be needed of veterinarians, meat inspectors, laboratory technicians and others. Refrigerated transport will be needed and effective systems of processing, marketing, inspection and monitoring of quality standards, testing, disease surveillance and control measures. The high costs of implementing some of these improvements were discussed above.

The benefits derived from improvements in animal health, can probably be assessed in monetary terms, as the sum of the values of increased production, facilitation of sales (domestic and export) increased prices and future reduction of expenditure on animal health programmes. In a review of socio-economic impacts of freedom from livestock disease, McLeod & Leslie (2000) suggest that for evaluation “economic cost-benefit analysis increasingly combined with herd and/or epidemiological models, is the most
widely used technique. "Most of these benefits are highly variable and uncertain, so some form of risk analysis is appropriate. The simplest approach would be to use expected (average) values for a first assessment and then to explore the stability of the assessment using sensitivity analysis. It is also suggested that other less tangible benefits, and costs, should also be taken into account, possibly by using a scoring and weighting technique (McLeod & Leslie, 2000).

Improvements in public health are more difficult to evaluate, although some attempts have been made. In practice it may be more appropriate to identify maximum acceptable levels of risk to human health, and to calculate the most cost-effective way of achieving these targets. Estimation may be based on a Hazard Analysis Critical Control Point (HACCP) plan, as recommended in the Codex Alimentarius “Recommended International Code for Hygienic Practice for Fresh Meat” and its “Recommended International Code for Ante-Mortem and Post-mortem Judgement of Slaughter Animals and Meat”.

In summary, the impacts of the SPS Agreement differ between different groups of countries. For the developed countries there are advantages resulting from the harmonisation of standards, increased transparency in the setting of these standards and structured procedures for the settlement of disputes. These provisions allow for the adoption of measures providing an acceptable level of risk to importers, whilst limiting the constraints on free trade between Member Countries.

For the developing countries the adoption of the Agreement is less attractive. Those seeking to export to the large markets in the developed countries, must first meet the substantial costs of compliance with the international SPS measures. Part of the appraisal of the merits of compliance must be an assessment of the size of the potential market, the competition from other exporters and the scope for expansion of domestic production.

Access to technical and scientific information is important and should be improved through greater participation in the decision-making bodies of the Agreement and the enquiry point and notification centre network. Technical, scientific and legal assistance may also be required.

The Low Income and Least Developed Countries would face severe financial difficulty in complying with the international SPS standards. Even if sufficient resources could be found for compliance, it is doubtful whether these relatively resource poor countries could compete with Middle and High Income Country livestock producers of Latin America and Oceania. For the Low Income Countries, improvement and protection of the health of domestic human, animal and plant populations are more important determinants of the appropriate SPS measures to adopt, than are the prospects of exports to developed countries. The measures adopted must be supported by trade controls, especially on imports from other developing countries where transparency of SPS standard setting is low. Harmonisation of SPS measures, at a level below the international standards, would bring benefits to Low Income Countries trading among themselves.
Each case for the implementation of particular SPS measures should be judged on its own merits. Expected costs and benefits must be compared on the basis of scientific study and risk analysis.

The environment, animal welfare and intellectual property

The Environment

The intense opposition of environmental groups to the liberalisation of global trade was apparent on the streets of Seattle at the time of the last Ministerial Meeting of the WTO in November – December 1999. Concerns have grown, particularly in the developed countries regarding environmental problems of pollution, resource degradation and loss of bio-diversity. Issues such as global warming and greenhouse gas emissions are seen as global problems, needing an international response (Brown et al 2001). Many northern Non-Government Organisations (NGOs) and environmental groups see the liberalisation of world trade as exacerbating environmental damage. Given that trade increases economic growth, production and consumption, it must necessarily contribute to increased external costs of resource depletion and pollution. Furthermore, trade expansion involves the use of land, sea and air transport, which contributes to various forms of atmospheric pollution and depletes energy resources (Quinet 1994). The latter argument favours policies of import-substitution and self-sufficiency (Mander & Goldsmith 1996, Madeley 2000).

The counter arguments are that trade benefits the environment by allowing greater specialisation of production in countries where inputs are used more efficiently, and that the resultant increases in income lead to greater concern for, and spending on, the environment. The first of these arguments is linked with the idea that economic growth and specialisation leads to improvements in production technology and increased government spending on the social infrastructure, including the environment. It has been suggested that “the only way to attain a decent environment in most countries is to become rich” (Beckerman 1994). The second argument is based on the fact that concern for the environment increases with increased per capita income. Environmental protection is a “normal good”\(^5\) (even perhaps a “luxury”) so that the quantity demanded rises with increased income (Bhagwati 1993).

The effect of income levels on public attitudes to environmental protection is reflected in disagreements between high income, developed countries and low income, developing countries regarding the need for trade limitation to protect the environment. Whilst most developed countries, possibly under NGO pressure, support such “green” measures, the low income countries (and the Cairns Group) perceive them as unwarranted forms of support for developed country producers and constraints on their own exports (WTO 1996). Their views are illustrated by the following statement from Kenya. “It is important to emphasise that Kenya is a keen proponent of environmental conservation. However, Kenya objects to any move to use environmental measures as a barrier to trade... It is

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5 A “normal good” is one which is bought in greater quantities as income increases. This is in contrast to an “inferior good” which is bought in smaller quantities as income increases.
Kenya’s view that environmental norms and standards are a function of the stage of development of the economy. Therefore to impose on low income developing countries environmental standards prevailing in advanced countries would, internally, artificially raise their costs of production and, externally, extinguish their comparative advantage in the export sector.” (Government of Kenya 1999, quoted in Neumayer 2001).

It has been hypothesised that, if some (high income) countries impose high levels of control on pollution, or other forms of environmental damage, while other (low income) countries do not, production will migrate to the latter group of unregulated countries representing a “pollution haven”. The costs of controlling pollution raise the costs of production for the former group of countries, which therefore become less competitive on world markets. The “unregulated” countries benefit from their increased export trade but suffer from increased levels of pollution as a result. Evidence of the existence of pollution havens is rather weak. It appears that producers place more importance upon factors other than the environmental regulation in deciding where to locate (Hanley, Shogren & White 2001, Neumayer 2001).

Economic theory suggests that there is no clear justification for imposing trade barriers in order to protect the environment. It is more economically efficient, since costs to society are lower, if domestic policies are used to protect the environment, and trade is not restricted. Reliance on trade measures, to protect the environment is considered to be a sub-optimal, second-best alternative, only justifiable where the failure of domestic policies in some countries may have consequences for the global environment. Examples of Multilateral Environmental Agreements (MEAs) include the Montreal Protocol aimed at reducing the use of chloro-fluorocarbons and other atmospheric pollutants, the United Nations Convention on International Trade in Endangered Species of Wild Fauna (CITES) and the Basel Convention on the trans-boundary movement of hazardous wastes.

Given that the expressed aims of the WTO are to strive for “a large and steadily growing volume of real income and effective demand, developing the full use of resources of the world and expanding the production and exchange of goods” there are natural concerns that the Organisation will be unsympathetic to Multilateral Environmental Agreements and any trade restrictions aimed at protecting the environment (Daly 1993, Nader 1993). However, in the preamble to the agreement setting up the WTO, reference is also made to the need for “sustainable development” and “environmental preservation”. A Trade and Environment Committee has been established to bring environmental and sustainable development issues into the main stream of WTO activity (WTO 1999).

Of the 38 Articles which form the basis for resolving trade disputes, Article XX is important in allowing exceptions to the rules favouring freer trade, provided that “such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade”. Article XX(b) applies to measures needed to protect human, animal or plant life or health, while Article XX(g) relates to the conservation of exhaustible natural resources. Thus, most product-related environmental policies do not conflict with WTO rules provided that they apply equally to domestic and imported products.
The WTO Agreement on Technical Barriers to Trade (TBT Agreement) is aimed at setting rules for the establishment and application of technical regulations and standards, including labelling requirements as they apply to a product, process or production methods. Mandatory “eco-labelling” is only likely to be allowed under this agreement, if the quality of the product is influenced by the method of production. However, voluntary eco-labelling by a purely private body is not subject to WTO rules (Cheang 1997).

Serious concerns have been raised regarding the possible adverse environmental impacts of livestock production. These range from deforestation, the degradation of rangeland and the loss of biodiversity of herbage species resulting from overgrazing in grassland based systems, to the various forms of environmental pollution, and loss of genetic diversity in animals, associated with intensive landless production systems (de Haan, Steinfeld & Blackburn 1997). Increased demand for livestock products, associated with growth in world trade, is likely to lead to intensification of production, with increased stocking rates in grassland based systems and more rapid expansion of landless systems.

In the High Income Countries agriculture is increasingly seen as multifunctional with opportunities for the development of niche markets, for example in organic foods, increasing bio-diversity, improved food variety and quality, and environmentally friendly institutions. In this context trade liberalisation and the reduction of producer support are seen as beneficial in reducing pressure on the environment. Low Income Countries are more concerned with increasing production. However, this does not appear to have lead to the development of pollution havens for intensive livestock production. High Income Countries such as the USA and the European Union are still the main exporters of dairy, pig and poultry products, while the Low Income Countries are net importers of these products.

A particular case, which received some publicity, is the accusation by some environmental groups that international “beefburger” companies are responsible for the destruction of the Amazonian rainforest for the establishment of pasture for beef production. However, deforestation, which in Latin America occurs at less than 1 percent annually, is more directly affected by domestic policies. In Brazil, forest clearance to allow for the spread of agriculture, has been encouraged through subsidies, price exemptions and land title regulations which provide strong financial incentives. Some of these policies such as production subsidies, are likely to be ruled out under WTO regulations.

A wide range of domestic policy instruments are available for protection of the environment and the control of pollution from livestock production, and other activities (Steinfeld, de Haan & Blackburn 1997, Upton 1997). Area wide integration of crop and livestock production is viewed as an important approach (FAO 2001c). Domestic policies are influenced by public opinion and attitudes to environmental conservation. Disputes may arise when an importing country attempts to impose its values regarding the environment on the countries producing the imports. The framework for negotiation is less clear cut than for SPS measures, which can be subjected to risk analysis.
However, environmental issues are best dealt with, outside the auspices of the WTO through:

a) Multilateral Environmental Agreements dealing with protection of the environment
b) the use of voluntary eco-labelling schemes, supported by appropriate domestic policies, (possibly with more formal labelling schemes where allowed under the Technical Barriers to Trade Agreement) and
c) international support for the protection of the global environment where appropriate.

Environmental issues related to livestock production are more likely to be subject to domestic policies for their control.

**Animal welfare and property rights in genetic material**

Increasing public concerns, particularly in the High Income, Developed Countries, regarding animal welfare has led to the adoption of policies reflecting these concerns. Two main types of policies are used:

a) to support production methods which promote animal welfare (or control production methods which harm animals)
b) to impose requirements on imported products that acceptable standards of animal welfare are applied, in transport as in production.

The imposition of animal welfare requirements on imported products may be allowed under the so-called “green box” measures of the WTO if there are no trade distorting effects. If trade distortion is likely, controls and compulsory labelling might be allowed under the TBT Agreement. However, no clear test cases have arisen.

As is the case with environmental conservation, information is often lacking on the standards of animal welfare applied in the production and transport of imported livestock products. At the same time the costs, to domestic producers, of applying high standards of protection may disadvantage them economically. However, as with environmental issues, animal welfare issues are best dealt with, outside the auspices of the WTO through:

a) Multilateral Agreements dealing with protection of animal welfare,
b) the use of voluntary labelling schemes, supported by appropriate domestic policies, (possibly with more formal labelling schemes where allowed under the Technical Barriers to Trade Agreement) and
c) international support for measures to protect animal welfare where appropriate.

Concerns over animal welfare in High Income exporting countries may limit trade in live animals. This helps to account for the decline in exports of live sheep from Australia to the Middle East.
A further area of potential international disagreement regarding the effects of trade is subject to the Trade Related Intellectual Property Rights (TRIPS) agreement. Among other forms of intellectual property, genetic resources developed by plant breeders have been classified in this way. Although no record has been found of disputes regarding the ownership of animal genetic resources, there is a recognised need for a global strategy to conserve and make sustainable use of farm animal genetic resources.

Under the auspices of the Commission on Genetic Resources for Food and Agriculture and the FAO, an Intergovernmental Technical Working Group on Animal Genetic Resources for Food and Agriculture has been charged with developing a Global Strategy for the Management of Farm Animal Genetic Resources (FAO 1998). The aims are to provide a technical and operational framework for assisting countries, comprising:

- an intergovernmental mechanism for direct government involvement and policy development.
- a country-based global infrastructure to help planning national strategies for managing animal genetic resources
- a programme of technical support for sustainable intensification, conservation, characterisation and access to animal genetic resources
- a reporting and evaluation system.

Consideration of these proposals suggests that they are unlikely to conflict with the WTO objectives of trade liberalisation, yet should contribute to the growth in productivity and sustainability of livestock production systems.

**Trade in LLPs and economic development**

There are large potential advantages for all countries, both developed and developing, from freer trade. Even the Least Developed Countries should have a comparative advantage in some products. Trade statistics suggest that these countries, mainly in the African Sahelian region, may have some limited comparative advantage in ruminant livestock production and associated hides and skins.

Some other Low Income Countries have exported some beef and veal in recent years but it is doubtful whether they could compete in world markets with the Middle and High Income beef producing countries. Overall the Low Income Countries, indeed developing countries in general are net importers of livestock and livestock products. Predictions are that net imports will continue to increase for the foreseeable future. The most important and fastest growing livestock product imports are dairy products and poultry meat.

Despite this growing dependence on imports for LLPs and other agricultural goods, developing countries should, at least in theory, have a comparative advantage in the production of some other commodities. They should benefit from freer trade by importing goods for less than they would cost to produce domestically and exporting other commodities at a higher price than would be earned if sold on the home market.
The activities of the General Agreement on Tariffs and Trade, and its successor the World Trade Organisation, are aimed at deriving the benefits of freer trade by reducing the existing barriers and harmonising trade policies internationally. Some of the criticisms of these aims are misdirected. The suggestion that free trade promotes specialisation and discourages agricultural self-sufficiency may, in part, be true but the disadvantages must be set against the resultant gain in national income and social welfare. In any case, the expansion of trade is unlikely to lead to complete specialisation and the end of production for the home market. The argument that the wealthier, developed countries maintain their barriers to trade while the developing countries have reduced theirs, only gives support to the activities of the WTO in attempting to reduce all trade barriers.

Hence the recommended policy for developed and developing countries is to promote free trade and reduce tariff and non-tariff barriers where possible. To this end a large and increasing number of countries, both developed and developing, have joined the World Trade Organisation and are accepting its rules and obligations. It is recognised that compliance with the rules and obligations and preparing legal briefs in trade disputes make heavy demands on the resources of Low Income developing countries. Bilateral and multilateral assistance, both technical and financial, is definitely needed.

Predictions differ but most analyses suggest that once obligations to reduce trade barriers are met, moderate rises will occur in the prices of foods, including LLPs. Although the cost of imports would rise for the developing countries, this will provide an incentive for domestic producers of LLPs to increase production while other sectors of their economies may benefit from the increased trade opportunities. It is widely argued that the main objective, in trade negotiations, for the developing countries should be to persuade the developed countries to reduce support for their own agricultural producers and to reduce barriers to trade (Binswanger & Lutz 2000).

The SPS Agreement has a significant impact on trade in livestock and livestock products. Members of the WTO have the right to impose controls on imports in order to ensure food safety and to protect animal and plant health. In the past, under the GATT individual nations and groups, such as the European Community, imposed border controls in order to maintain appropriate SPS standards. The SPS Agreement is aimed at harmonising standards between Member countries, rendering standard setting more transparent and formalising dispute settlement procedures. These developments should facilitate the maintenance of appropriate SPS standards by individual countries and groups of countries while minimising the associated barriers to trade.

However, although all national SPS policies should be guided by international standards, such as those recommended by the Office International des Épizooties (OIE) for animal health, there are big differences between countries in the standards maintained. Generally the standards maintained by the developing countries are, due to resource limitations, below those of the developed countries. Hence the costs of achieving the higher SPS standards required by the developed countries act as a barrier to exports from developing to developed countries. Emphasis has been given to the need for enhancing the capability of developing countries to comply with the SPS requirements of developed countries. Yet, the Low Income and Least Developed countries may have difficulty in competing for
developed country markets even if they were able to comply with the required SPS standards. For these Low Income countries, the most important effect of raising SPS standards may be the improvement of domestic human, animal and plant health.

Other issues, that are claimed to receive insufficient attention in the promotion of free trade, include the environment, animal welfare and the dangers of creating intellectual property rights in genetic material. Although concerns about these issues are growing in the developed countries, they have not yet had a major impact on world trade. However, labelling and assurance schemes may become necessary to satisfy the preferences of some developed country consumers and pressure groups. Currently these issues do not provide a basis for non-tariff barriers to trade.

The policy implications of changes in the patterns of trade in LLPs, and the institutional framework in which trade occurs, differ between groups of countries. The developed countries, mainly of the Organization for Economic Cooperation and Development (OECD), as a group are net exporters of livestock and their products. However, more than three quarters of world trade takes place between members of the group. Thus, although they are net exporters, the world’s main markets for LLPs and other commodities are found in the developed countries. This explains why many developing countries are seeking access to these markets.

The main net exporters of livestock products, among the developed countries, include the European Union for all products, Australia and New Zealand for beef, lamb and dairy products, and the USA for pig and poultry meat. The current pattern of trade reflects the comparative advantage of these developed countries in production of their LLP exports, but is also influenced by the levels of support for production and exports provided by the European Union and the United States in particular. Australia and New Zealand, leading members of the Cairns Group, have largely abandoned agricultural support measures so their dominance in world markets must reflect a genuine comparative advantage in ruminant production.

Most developed countries are members of World Trade Organisation, with the expectation of overall gains from freer trade. However, progress in trade liberalisation has been slow. The European Union has abandoned variable import levies and export refunds, and has switched some support from price subsidies to “decoupled” area payments for crops and headage payments for livestock. None the less the final bindings, or maximum limits, set on tariffs for the EU for 2000 were almost two-thirds higher than the actual tariff equivalents for 1989-93 (Anderson et al 1999). The final bindings for the United States in 2000 were more than three-quarters higher (Binswanger & Lutz 2000). Dairy production in particular is still heavily supported in the EU and the US.

These continuing high levels of support will have to be reduced for full compliance with the WTO Agreement on Agriculture and to reduce the financial burden on taxpayers. The European Union is also under pressure to admit new East-European members with large agricultural sectors. The additional costs of maintaining existing levels of agricultural support to these new members would be prohibitive. As a result of further reductions in support for LLP producers and exporters in the EU and North America, some export trade
for dairy products and beef may be lost. Middle Income Countries of Latin America are likely to benefit from increased export markets for their beef.

Most developed countries, at least the High Income Countries, already comply with the international standards of disease control and hygiene proposed under the SPS Agreement. Indeed the EU and other Members of the WTO continue to notify the Organisation of new SPS measures, which may possibly be more stringent than those previously applied. Most of the disputes regarding whether a particular SPS measure is scientifically justified, have occurred between members of the High Income Developed Country group. In future, trade disputes focussing on environmental or animal welfare issues (e.g. regarding Genetically Modified Organisms) may arise.

Some Middle Income developing Countries, such as Argentina, Brazil and Uruguay, Thailand and China, are substantial net exporters of LLPs, beef, lamb and poultry for the former group and poultry and pigs for the latter. With the further reduction of trade barriers promoted by the WTO, these countries may be able to capture a larger share of world export markets for certain livestock products. It is clearly in the interest of these countries to press for reduction in production and export subsidies on LLPs by the developed countries, and for a general reduction in import tariffs.

Exports from these countries could be promoted by offering some direct price support. Under the WTO Agreement on Agriculture, less stringent reductions in producer support are required from developing countries. However, measures such as subsidised credit, and publicly funded research and development and extension are exempt from the rules for trade liberalisation since they are assumed to have no trade distorting effects (these are known as “green box” support policies). Such measures are among the most cost-effective forms of investment for raising livestock productivity and exports.

Compliance with international SPS standards is necessary for the development of sustainable export trade, but should also include benefits in terms of improved animal health and productivity and better human food safety. The total net benefits should be sufficient to justify the substantial investment costs of implementing and maintaining these SPS standards. In short, for these LLP exporting Middle Income Countries investment in the general improvement and development of the livestock sub-sector is likely to be economically justified.

The Low Income Countries are in a different situation. Livestock productivity is low and for the aggregate trade in LLPs they are net importers. Bovine and sheep and goat meat are the only livestock products for which the group is a net exporter. Even then, only two percent of bovine meat production is exported and a small fraction of one percent of ovine meat. A substantial part of the trade occurs within the group, rather than with Middle- or High-Income Countries and overall gross exports of LLPs contribute less than one percent of national income. It should be noted that India alone accounts for over 40 percent of the total population of the Low Income Countries and may have an undue influence on the group averages.
Given these facts and the comparative lack of resources for the Low Income Countries, the main policy objectives relating to LLPs should be to import from the sources which give best value for money and to promote import substitution where this is economically viable. The main benefits of trade liberalisation, under the auspices of the WTO, are likely to be found in other sectors of the economy than livestock production. The principle gain for the LLP sub-sector is likely to be reduced instability of world prices and supplies. The decision of whether to seek membership of the WTO is dependent on other considerations than the impact on trade in LLPs. Promotion of livestock production will require justification as a means of import substitution or to improve the livelihoods of pastoral livestock keepers.

Within this context it is questionable whether compliance with international SPS standards is justified on the basis of its predicted impact on exports. Rather the determination of SPS standards is likely to be based on the benefits expected from domestic improvements in human, animal and plant health. Although they may be lower than the international standards applied by developed countries, any level of health protection must depend upon border controls on imports. There are advantages to be gained from harmonisation of standards between Low Income Countries and making the setting of standards more transparent. This should facilitate trade and reduce disputes between Low Income Countries. It is assumed that High and Middle Income Countries exporting to the Low Income Countries apply the same high SPS standards to their exports as to products for domestic consumption.

The Least Developed Countries differ from the other Low Income Countries in being somewhat more dependent on the production and export of cattle, sheep and goats. This sub-group includes countries of the African Sahel, Laos and Cambodia, where livestock productivity is low, but where LLP exports account for as much as three percent of national income. Transport limitations ensure that livestock can only be exported to neighbouring countries, most of them being in the Low Income Group. However, improvements in production and trade are difficult to achieve without a shift to more intensive forms of production. These countries suffer from severe resource constraints and can ill afford the necessary investments in research and extension, infrastructure and production inputs needed.

Similar constraints apply to the introduction and maintenance of appropriate SPS standards. As already argued for the Low Income Countries in general, domestic SPS standards, even if below those recommended by the international disease and food safety control agencies, must be supported by appropriate border controls. These must limit free trade in LLPs. The improvement of SPS measures, including strengthening of border controls, is a worthy area for foreign aid and technical assistance.

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## Annex: Country Classifications

**Table 1: Least Developed- and Low Income Countries**

<table>
<thead>
<tr>
<th>Sub-Saharan Africa:</th>
<th>Least Developed</th>
<th>Low Income</th>
</tr>
</thead>
<tbody>
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<td>Sub-Saharan Africa:</td>
<td>Benin, Burkina Faso, Cape Verde, Cent Afr Rep, Chad, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, SãoTomé Prn, Senegal, Sierra Leone, Togo</td>
<td>Benin, Burkina Faso, Cameroone, Cent Afr Rep, Chad, Congo Rep, Côte d’Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, SãoTomé, Senegal, Sierra Leone, Togo</td>
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<td>West Africa</td>
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<td>Cambodia, Indonesia, Korea D P Rep, Laos, Mongolia, Myanmar, Solomon Islands, Vietnam</td>
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<td>Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan</td>
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<td>East Asia and Pacific</td>
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<td>South Asia</td>
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<tr>
<td>Europe and Central Asia:</td>
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<td>Middle East and North Africa:</td>
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<td>Yemen</td>
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<td>Middle East</td>
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<tr>
<td>Americas:</td>
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<td>Haiti, Nicaragua</td>
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Table 2: Developed Countries

<table>
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<th>East Asia and Pacific</th>
<th>Eastern Europe and Central Asia</th>
<th>Western Europe</th>
<th>Middle East</th>
<th>Americas</th>
</tr>
</thead>
<tbody>
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<td>South Africa</td>
<td>Australia, Japan, New Zealand</td>
<td>Albania, Armenia, Azerbaijan, Belarus, Bosnia Herzegovina, Bulgaria, Croatia, Czech Rep, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russian Fed, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Yugoslavia</td>
<td>Andorra, Austria, Belgium, Channel Is, Denmark, Faeroe Is, Finland, France, Germany, Gibraltar, Greece, Holy See, Iceland, Ireland, Isle of Man, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Spain, Svalbard Is, Sweden, Switzerland, UK</td>
<td>Israel</td>
<td>Canada, United States</td>
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</tbody>
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