

Acknowledgments

The authors would like to acknowledge the support and collaboration offered by Jelle Bruinsma, who has kindly provided the data on livestock projections and made valuable contributions to the analysis. The authors would also like to thank Giulia Conchedda, who has assisted with the data preparation for the tables and maps, and Gregory Yetman, who provided the updated version of Global Rural-Urban Mapping Project (GRUMP) data, and the urban extent data used in this analysis.

Valuable suggestions for analysis and comments on the paper were received from Joachim Otte and Henning Steinfeld.

Francesca Pozzi, Claudia Ciarlantini and Carmen Hopmans are acknowledged for the design, layout and formatting of the working paper.

Preface

Around 2.6 billion people in the developing world are estimated to have to make a living on less than \$2 a day and of these, about 1.4 billion are ‘extremely’ poor; surviving on less than \$1.25 a day. Nearly three quarters of the extremely poor – that is around 1 billion people – live in rural areas and, despite growing urbanization, more than half of the ‘dollar-poor’ will reside in rural areas until about 2035. Most rural households depend on agriculture as part of their livelihood and livestock commonly form an integral part of their production system. On the other hand, to a large extent driven by increasing per capita incomes, the livestock sector has become one of the fastest developing agricultural sub-sectors, exerting substantial pressure on natural resources as well as on traditional production (and marketing) practices.

In the face of these opposing forces, guiding livestock sector development on a pathway that balances the interests of low and high income households and regions as well as the interest of current and future generations poses a tremendous challenge to policymakers and development practitioners. Furthermore, technologies are rapidly changing while at the same time countries are engaging in institutional ‘experiments’ through planned and un-planned restructuring of their livestock and related industries, making it difficult for anyone to keep abreast with current realities.

This ‘Working Paper’ Series pulls together into a single series different strands of work on the wide range of topics covered by the Animal Production and Health Division with the aim of providing ‘fresh’ information on developments in various regions of the globe, some of which is hoped may contribute to foster sustainable and equitable livestock sector development.

In 2006 the FAO Global Perspective Studies Unit revised their estimates of prospective developments in food demand and consumption to 2030/2050 (FAO, 2006b). In this paper we take the estimates of supply and demand for animal-source foods and disaggregate them spatially for the years 2000 and 2030. By so doing we are able to present detailed maps and tables of change in supply and demand that are of direct use to researchers and decision makers in the livestock sector.

Abbreviations

AGAL	FAO Livestock Information, Sector Analysis and Policy Branch
CAST	Council For Agricultural Science And Technology
CIAT	Centro Internacional de Agricultura Tropical
CIESIN	Center for International Earth Science Information Network
ESRI	Environmental Systems Research Institute (Redlands, California)
FAO	Food and Agriculture Organisation
FCR	Feed conversion ratios
GAUL	Global Administrative Unit Layers
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
GLIMS	Global Livestock Impact Mapping System
GLW	Gridded Livestock of the World
GPW	Gridded Population of the World
GRUMP	Global Rural and Urban Mapping Project
HPAI	Highly Pathogenic Avian Influenza
IMF	International Monetary Fund
LDPS-2	Livestock Development Planning System Version 2
LGP	Length of Growing Period
NRC	National Research Council
ORNL	Oak Ridge National Laboratory
SUA	Supply Utilisation Accounts
UN	United Nations

Executive summary

Livestock is one of the fastest-growing sectors in agriculture, potentially presenting opportunities for economic growth and poverty reduction in rural areas, though unless carefully managed the main social effects may be negative – if the livestock-dependent poor are squeezed out of markets and are presented with few viable livelihood alternatives. There may be other negative outcomes to sector growth. A matter for recent concern has been the contribution that livestock make to greenhouse gas (GHG) emissions, for example, and there are public health implications of livestock production: the rapid spread of infectious diseases, typified by the recent and ongoing H5N1 avian influenza panzootic and the pandemic (H1N1) influenza A crisis, demonstrates the magnitude of problems arising from the emergence of novel diseases at the animal-human-ecosystems interface. Dealing with these important social, environmental and public health issues will require solutions that embrace the way in which the livestock sector grows to meet the increasing demand.

Given these important externalities to rapid livestock sector growth, it is important to understand where growth in demand for livestock commodities is likely to occur, and how and where production of livestock commodities will be increased in order to meet it.

Estimates of supply and demand for animal-source foods, provided by the Global Perspective Studies Unit at FAO, have been disaggregated spatially for the years 2000 and 2030. Demand for animal-source foods was mapped by estimating per-capita consumption and applying this to mapped population distributions in 2000. Population maps were produced for 2030 based on projected population growth and urbanisation rates and future estimates of per-capita demand applied to these. Similarly, livestock production maps were produced by spatially disaggregating the estimated production based on maps of the relevant livestock species. This has resulted in detailed maps and tables of change in supply and demand from 2000 to 2030 that are freely available to be downloaded from the Gridded Livestock of the World website (www.fao.org/ag/againfo/resources/en/glw/home.html).

The disaggregation of demand growth in this way allows distinctions to be made a) between growth arising from population growth, as compared to that arising from changing consumption patterns, and b) between urban and rural growth, with urban growth being explicitly linked to the major urban centres.

The results show that by far the most dramatic change is the projected increase in demand for poultry meat in South Asia; a 725 percent increase overall. This is driven by growth in demand in India where a staggering 850 percent increase is projected over the 30 year period (from 1.05 to 9.92 million tonnes, annually). They also show that the vast majority of growth in most areas is caused by increasing per capita consumption rates rather than by increasing population levels. In India, for example if consumption rates of poultry meat remained constant to 2030 only 5 percent of the projected growth would occur; whilst, even if the population size remained static 69 percent of the demand growth would still occur, driven by changing food consumption patterns. The results also highlight the importance of urbanisation in growth patterns; taking again the example of poultry meat in India, the relative increase in demand from the urban areas from 2000 to 2030 is 1 277 percent, almost twice that in the rural areas (677 percent).

The implications of these patterns of growth in demand for animal-source foods lie in structural changes to the livestock sector: there will need to be a rapid intensification of production in some areas accompanied by value chain development linking production zones with consumption centres. The maps of demand growth presented here can help identify where intensification of production is likely to occur in the coming decades.

Whilst the methodology can be improved in numerous ways, most importantly in linking production explicitly to production systems, the resulting maps and databases can be of direct use to researchers and decision makers in the livestock sector; through analysis of the social, environmental and animal and public health impacts of rapid growth and intensification in livestock production.