



The Role of Livestock in Economic Development and Poverty Reduction

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EXECUTIVE SUMMARY

Introduction

Globally, agriculture provides a livelihood for more people than any other industry. Growth in agricultural production and productivity is needed to raise rural incomes, to support the increasing numbers dependent on the industry and to meet the food and raw material needs of the faster growing urban populations. Enhancing agricultural productivity contributes to industrial growth by providing cheap labour, capital investment, foreign exchange and markets for manufactured consumer goods.

Agriculture has a key role in reducing poverty since most of the world's poor live in rural areas and are largely dependent on agriculture, while food prices determine the cost-of-living for the urban poor. About half of the total poor live in South Asia, and half the remainder in Sub-Saharan Africa, with smaller numbers in the rest of the developing world. The global objective, of halving poverty levels by 2015, is unlikely to be reached at current levels of assistance to agriculture.

Livestock provide over half of the value of global agricultural output and one third in developing countries. Rapid growth in demand for livestock products (LPs), in the developing countries, is viewed as a 'food revolution'. LPs are costly in relation to staple foods, so developing country consumption levels are still low, but increase with rising incomes. Pig and particularly poultry meat consumption are growing fastest. Growth in consumption is at the expense of increasing net imports of all LPs. Increased production, and higher self-sufficiency would save foreign exchange. Livestock also contribute to rural livelihoods, employment and poverty relief. They integrate with and complement crop-production, embody savings and provide a reserve against risks. Some livestock have special roles in traditional culture.

Diverse and Changing Roles of Livestock

Livestock are capital assets, produced in the past and contributing to future product output. Investment in, or the acquisition of, livestock involves saving or borrowing, justified by the expected future return on capital. Apart from durable capital embodied in the animals, circulating capital is needed to meet current costs of production.

Investment in livestock raises farm production through (a) extension of the area of land area that can be utilised, (b) diversification of the productive activity on a crop farm and (c) intensification, i.e. by raising livestock value of output and hence total production per hectare of agricultural land increases. The latter involves increased inputs of labour and/or capital and may be achieved by increasing the stocking rate, increasing yield per head of livestock or changing to a more intensive production system. Scope for extending production onto unused, virgin land is limited since there is

little remaining that is usable. There is also limited scope for increasing stocking rates under pastoral systems, since pastoralists already make effective use of available grazing.

Livestock production systems are broadly categorised into i) 'grassland-based' pastoralism and ranching ii) 'mixed-farming', either rainfed or irrigated, and iii) 'landless', mainly pig and poultry production systems. These are listed in order of increasing intensity. The 'landless' production systems are largely responsible for the rapid growth in average meat supply per person in the developing countries, poultry production having doubled over the last 10 years. Reproduction and growth rates are faster in pigs and poultry than in the ruminant species of livestock. However, housing and hand feeding increase capital requirements and labour costs. Yields per head of these species and of cattle, in developing countries, are well below those in developed countries. Increases depend upon improvements in animal health, nutrition, breeding and management.

The 'landless' livestock production systems represent labour-using technology, in that labour requirements per hectare (devoted to feed production) are higher than for other systems. Conversely, the use of animal draught power is labour-saving, in reducing hand-labour requirements particularly at peak work periods. Use of the plough may allow a larger proportion of the farmed area to be cultivated each year, to increase cropping intensity.

Mixed crop-livestock production systems are important as the source of the bulk of ruminant livestock production and the home of the majority of the world's poor. Complementary relationships exist with livestock, fed on crop by-products and other plant material, contributing draught power, manure, additional sources of food and income, savings and buffer against risk. As intensity and livestock numbers rise, crop-livestock interactions become increasingly competitive, for the use of land and other resources. There is little, or no, interaction between crops and supplementary, landless livestock systems.

Landless livestock systems provide most of the world's production of pig and poultry meat. The majority is produced in developed countries and from large-scale commercial enterprises, now spreading in the developing countries. These products make up two thirds of all meat production world-wide, while, in the developing countries, poultry meat now accounts for more than half of all meat produced. Ruminant fattening is less important. Concerns arise regarding limited benefits to the rural poor, risks of environmental pollution and use of cereals to feed animals. Poor producers may participate, possibly by co-operation or vertical integration. Use of feed-grains does not compete directly with human consumers, while pig and poultry production converts feed efficiently and provides a cheap source of animal protein.

Inter-regional differences in livestock production systems depend upon agro-ecological features, human population density and cultural norms. A comparison of the main developing country continents, shows that Sub-Saharan Africa, Latin America and the Near East, with reasonably large areas of land per person engaged in agriculture, have a greater proportion dependent on grassland-based, ruminant livestock systems than do the more densely populated, land-scarce, regions of South and East Asia. Nonetheless, in all the continents listed, most of the agricultural population are engaged in mixed farming systems. These are mainly rain-fed in Africa and Latin America but, in South and Eastern Asia and the Near East, about half are irrigated. Poultry production is a key enterprise in Latin America, particularly Brazil, and in East and South East Asia, mainly China which is also a major pig producing country. South Asia is the largest milk producing region.

Analysts have suggested that production systems intensify and evolve, from pastoral livestock keeping to specialist crop production, then to mixed farming and eventually to independent crop and 'landless' livestock systems. The change from pastoralism to cropping is seen as a land-saving technology, or the substitution of labour for land. The move to mixed farming is capital using and land-saving; capital is substituted for land. Animal draught power, as an innovation, involves the substitution of capital for labour. Industrial development also affects technological change in agriculture, in different ways. In the Americas and Oceania industrialisation occurred while population was sparse; labour-saving mechanisation technology change was induced. In Japan industrial innovations occurred with a dense rural population, and therefore a land-saving bias, with improved seeds and agri-chemicals, was induced.

Institutional Changes

Institutions are the formal rules and laws, together with the informal norms of behaviour and conventions, which govern access to resources, transactions between individuals and group activity within organisations. The New Institutional Economics deals with decision-making under uncertainty, subject to 'bounded rationality'. Property rights include private, communal or State ownership or open access. Livestock are generally privately owned, but for land and other natural resources, private freehold tenure is only one alternative.

Transaction costs involve search for information, bargaining, contracting, monitoring and enforcing the outcome. Governance structures, ranging from individual spot market transactions to repeated relational contracting, possibly within unified business firm, co-operative group or farm household. If special assets are specifically needed for the transaction, if outcomes are uncertainty and the transactions likely to be repeated, formal contracting should result in lower transaction costs than individual spot market transactions. Contracts are often negotiated under 'information asymmetry' where the 'agent' providing a service, often has more information than the 'principal' for whom it is provided. Adverse selection arises if unsuitable agents are selected, and moral hazard if the agent does not properly fulfil the terms of the contract once it is agreed.

Institutional change may have a critical influence on economic development. In a 'closed' traditional village society, transaction costs are low, being based largely on relational contracting. New market institutions are needed to facilitate trade with the wider national and world economy and to enforce impersonal contracts. Historical stagnation and contemporary under-development in developing countries, are attributed to the lack of effective institutions.

Open access to pasture-land may lead to over-grazing and degradation. Private or communal ownership are preferable options. Private ownership gives individual security of ownership and incentive for conservation. However, communal ownerships can provide similar incentives under effective co-operative organisation. The enclosure of common land, to provide individual title involves high transaction costs of measurement and enforcement and possibly an unjust re-allocation of resources. The high transaction costs of settling disputes between pastoralists and cultivators, over crops damaged by livestock, are avoided by adopting mixed farming systems. Share-cropping, or the care-taking of livestock, is a form of risk-sharing between the owner and the user of the resource.

The farm household is a unit of production and consumption. Property rights and transactions, within the household, are governed by local cultural institutions. Intra-household transactions involve both co-operation and conflict. Levels of interpersonal contact and altruism are higher than in most other organisations. Land use rights, livestock and knowledge, inherited from the previous generation, provide for the establishment of new livestock enterprises. Some property transfers occur at marriage. Women rarely hold rights to land but may own small-stock such as goats or poultry or have rights to use the products. Child nutrition may be improved. Overall work burdens generally exceed those of men, and women are often at a disadvantage in intra-household disputes.

Once a livestock enterprise is established, replacements are generated by reproduction. However, initial establishment or system change requires saving, inheritance or borrowing. Borrowing of livestock, or credit in kind, may be offered in an emergency or as development aid. Heifer in trust schemes provide an in-calf heifer to the farmer on condition that one, or more, of the female calves are returned to the project pool, for distribution to other farmers. Rural credit facilities for cash loans are generally poor, due to high transaction costs environmental and market risks of non-repayment, lack of suitable collateral or of insurance facilities.

Labour hire for the care of livestock is usually based on long-term contracts to avoid problems of uncertainty, performance monitoring, and asset specificity. Care-taking represents a risk-sharing alternative. There is less need for skilled and trusted workers in intensive, automated poultry production systems, so casual hired labour is adequate. Reliable input delivery systems for pre-mixed concentrate feed and day-old chicks are needed, together with assured market outlets. These conditions, and economies of scale, may be achieved by vertical integration of producers with input suppliers and marketing agencies. Similar input supply and marketing issues arise in the

case of smallholder dairying. Vertical integration may be achieved through dairy producer co-operatives.

Animal health services are important in reducing losses due to animal disease. Technologies for disease control and cure are known, but delivery problems arise. Budget constrained Government Veterinary Departments have achieved some control of a few critical diseases, and served the larger commercialised producers. Recent budgetary constraints have caused cut-backs and pressure for privatisation. The 'public good' nature of disease control inhibits full privatisation. Private practices are only viable in areas of intensive livestock production due to high establishment costs and uncertain demand. Competition from continuing public service veterinarians is a further disincentive. Para-veterinarians may be employed to complement professional services.

Technological change plays a key role in agricultural development. The invention, innovation, diffusion chain involves many links. New technologies may be transferred from overseas, generated at international research centres or developed domestically by privately or publicly funded research. Private-sector research is done by farmers and by agri-business but since knowledge is a public good, public sector funding is also needed. Research prioritisation should be guided by demands of producers, processors and consumers for new technology. Farming Systems (and Farmer Participatory) Research provides for assessment of producer objectives and constraints and for testing of research results, but is costly per farm. Additional assessment is desirable, possibly involving cost-benefit analysis.

Development of market infrastructure and institutions is essential for economic growth. Meat, milk and eggs cost more per unit of energy than staple crops, so consumption is low in poor developing countries. Rising incomes and populations result in rapidly increasing demand. Market demand is concentrated in urban centres and transport costs, for perishable livestock products from remote production areas, are high. So too are costs of manufactured inputs. Peri-urban producers are at an advantage. Pig and poultry meat can be produced commercially more cheaply than other meats, so markets for these products derived from 'landless' systems are growing rapidly. Economies of scale in processing and marketing may be derived by vertical integration of smallholder producers with large-scale urban-based processors and input suppliers or by producer co-operatives. Similar issues arise for intensive smallholder milk producers, who have formed dairy processing co-operatives in countries like India. Parastatal abattoirs often operate below capacity and, following structural reform, many have ceased operation.

A transformation of developed country agriculture occurred towards the middle of the 20th Century, through the widespread introduction of industrial inputs of mechanical power, fertilisers and other agro-chemicals; liquid fuel and electricity replaced human and animal draught power, while fertilisers reduced the need for animal manure. Change was slower in the developing countries, where use of animal draught is still common since higher cost, labour-saving technology is less appropriate. Use of fertilisers, mainly nitrogenous, has spread rapidly, though again more slowly in developing countries where organic manure is still important for maintenance of soil fertility.

Growth of Markets and International Trade

Agricultural markets have expanded with the growth of international trade over the last 50 years. Trade in LPs, though increasing, represents only a small proportion of the total by value, and 80% is between developed countries. In recent years developing countries, as a group, have switched from being net exporters to being net importers of agricultural produce including all livestock products. Milk is the largest imported item by weight, while imports of poultry and pig meat are growing fastest. There are differences between continents and countries, with South Asia and Latin America and the Caribbean being net exporters, the former of buffaloes and their meat in particular, and the latter of poultry meat, cattle and honey.

Patterns of trade reflect international differences in comparative advantage. Every country benefits, under free trade, by producing goods for which it has a comparative advantage (or low opportunity cost) and importing other goods. Patterns of comparative advantage, and trade, shift

over time with changes in production technologies and consumer preferences. They are also influenced by trade regulations.

Tariffs, or taxes on imports, are imposed along with other trade barriers, by the European Union, the USA, Japan and other countries, both developed and developing. In the developing countries, trade barriers against manufactured inputs raise costs to farmers. Trade barriers against imports of livestock products, support domestic producers in Europe, the USA and Japan, but make it difficult for producers in other countries to compete. Associated 'dumping' of low-priced surplus beef in West Africa, in the early 1990s disrupted local trade. However, low-priced exports of surplus skimmed milk powder to India contributed to the growth of the local dairy industry. The Lomé/Cotonou Agreement of the EU sets low concessionary tariff rates for certain African, Caribbean and Pacific (ACP) countries.

The World Trade Organisation (WTO) aims at promoting a phased reduction in trade barriers. Developed countries, like Australia and New Zealand where trade barriers and farmer support are already low, are predicted to benefit most. Developing country exporters may also gain, other than those currently benefiting from the Lomé/Cotonou Agreement. Tariff barriers remain high and the WTO is criticised as failing the poorer nations. However, the overall gains from trade liberalisation for developing countries are expected to be small.

Sanitary and phytosanitary (SPS) measures, aimed at protecting human, animal and plant health, affect trade flows. Rules imposed by the developed countries act as barriers to exports from poorer countries with lower SPS standards. The SPS Agreement of the WTO is aimed at harmonising different national standards. For developing country exporters to developed countries, the high cost of meeting the required SPS standards may be justified. For others, although the protection of human and animal health is important, somewhat lower standards may be appropriate for trade with other developing countries. Consumers in developed countries increasingly seek assurance of ethical methods of production concerning the environment, animal welfare or intellectual property rights. These issues and their impacts on trade are also subject to international negotiation.

Promoting Livestock Development

The need for increased livestock production is pressing, given the rapidly growing demand for animal products and the important contribution of livestock to the incomes and welfare of the rural poor. Additional physical, or financial capital is needed for the introduction of a new livestock enterprise, but thereafter replacements may be home bred. Human capital in the form of husbandry knowledge and skills is also needed. Technological innovations should be appropriate to the resource base, while access is needed to market outlets and input delivery systems.

There is limited scope for increased offtake from grassland-based systems. Options for welfare improvement include provision of water supplies and drought relief. Mixed crop-livestock systems contribute most to ruminant production and income for the rural poor. Nutrient recycling and other beneficial crop-livestock interactions arise, though individual ownership of land and enclosure may be needed to confine livestock and protect crops. Options exist for technical improvements in animal health, nutrition and production systems. The latter may involve greater specialisation, for instance into dairy farming, with the introduction of exotic breeding material.

Poultry and pig production systems are the most intensive and fastest growing sources of meat. They are now more important than ruminant meats in developing country diets. Much of the growth derives from large-scale, commercial production companies in peri-urban locations. Concerns, over competition with poor livestock producers, reliance on feed grains, loss of genetic diversity and environmental pollution, must be recognised. However, these systems are the most economically efficient and cheapest sources of animal protein. There is considerable scope for import substitution and saving of foreign exchange. Improvements to traditional 'backyard' systems are needed, together with development of an institutional framework to promote equitable contracts between commercial processors and smallholder producers and joint action by smallholders in establishing processing and marketing facilities. Similar issues arise in relation to smallholder dairy development.

Livestock development policies include trade and pricing policies, to encourage the developed countries to reduce trade barriers, to reduce domestic protection of industrial sectors and to make limited use of subsidies and taxes. Subsidies may be used for disaster relief or to promote use of innovations. Taxes may be used to recover costs publicly financed services. Institutional development requires strengthening of rural roads and communications, property rights and contractual agreements, and organisations for the provision of credit, animal health services, and other inputs. Dissemination of timely market information is desirable and promotion of links between producers and processors or of producer groups for processing and marketing.

The decline in funding for livestock research must be reversed. More research is needed on animal and veterinary public health, forage crops and the utilisation of crop by-products, improved husbandry and production systems and possibly on breeding. In addition, socio-economic research is needed into existing production systems, and institutions for land tenure, credit, labour hire, input delivery and product marketing together with methods of research prioritisation. Increased funding for well-designed policies for trade, pricing, institutional development, research and technological change should yield substantial returns in terms of growth in agricultural and national income, saving of foreign exchange and rural poverty relief.