



Livestock Sector Development, Economic Growth & Poverty Reduction

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ABSTRACT

Global poverty alleviation has progressed substantially, but it still remains a monumental work in progress. This paper examines the potential for livestock sector development to accelerate poverty reduction. In particular, we review a number of studies and provide our own estimates of how livestock productivity be a potent catalyst for livelihood improvement among the world's rural poor majority. Because of structural change in food demand patterns, particularly in emerging economies, livestock and their many products often offer better income growth opportunities to agricultural smallholders than staples and many other crops. Policies that facilitate smallholder market access can help them capitalize on these opportunities. In this way, markets can offer avenues for self-directed livelihood improvement through individual enterprise development, and policies that help overcome barriers to market access, information failures, and other market constraints can be cost effective strategies for poverty alleviation.

1. Introduction

Around 2.6 billion people in the developing world are estimated to have to make a living on less than \$2 a day (Chen and Ravallion, 2009). Of these, about 1.4 billion are classified as 'extremely' poor, i.e. having to make a living on less than \$1.25 a day. Asia harbours the majority of the 'extremely' poor (933 million), whilst the incidence of extreme poverty, one in two (50%), is highest in sub-Saharan Africa (Chen and Ravallion, 2009; World Bank, 2007).

In order to achieve rapid advances in poverty reduction, interventions need to be well targeted. Over three quarters of the extremely poor, that is around one billion people, live in rural areas (World Bank, 2008). Despite growing urbanization, the majority of the World's poor will continue to live in rural areas for some decades to come and it has been estimated that more than half of the 'dollar-poor' will reside in rural areas until about 2035 (Ravallion *et al.*, 2007). Most rural households depend on agriculture as part of their livelihood and around ninety percent of the World's extremely poor are engaged in small-scale farming (Lipton, 2005).

Given that in most developing countries agricultural populations are still continuing to grow while land for sustainable agriculture cannot be made available at the same rate, agricultural production cannot easily be expanded 'horizontally'. As a consequence, productivity gains leading to increased value of output, and hence income, per area of land (and unit of labour input) are one, essential, means to raise rural incomes and improve food security.

Livestock should form part of the solution to poverty reduction and agricultural productivity growth in developing countries since nearly three out of four of the rural and extremely poor keep livestock as part of their livelihoods (Thornton *et al.*, 2002), and because livestock have a variety of characteristics that make them important contributors to food security and sustainable rural development. Livestock provide high quality food and marketable products that can be produced by small-scale farming systems with limited land resources and livestock products are generally of higher value and less vulnerable to climatic shocks and critical harvest timing than many crops. Livestock furthermore increase crop production by the provision of draught power and manure, they increase total farm productivity by converting non-human edible material into high value food and non-food products and they increase farm labour productivity through temporal and intergenerational smoothing of labour demand. Finally, livestock, specifically small-stock such as poultry and sheep and goats are particularly important assets for rural women, who in many cases form the backbone of the agricultural workforce, to earn some income that remains under their control.

This paper explores the potential for livestock production and market development to contribute to the livelihoods of the world's rural poor majority. In the next section (Section 2) we distill the

evidence from a variety of studies suggesting that market emergence presents such opportunities, while Section 3 presents estimates of the macroeconomic growth potential of livestock sector promotion. Both perspectives support the notion that, in the short to medium term, livestock can be a potent catalyst for livelihood improvements, both for individual farmers and rural economies as a whole. Section 4 presents our own empirical estimates of economywide growth effects arising from livestock demand, as well as dynamic growth benefits from promoting productivity in this sector.

2. Upstream and downstream effects of agricultural growth

Given the rapid and sustained demand growth for livestock products in emerging economies, especially for dairy and poultry products, significant new market potential exists for absorbing domestic output. Hence livestock production can serve as a fast growing enterprise subsector within agriculture. The resultant rapid growth in farm incomes should generate employment and expansion in the rural non-farm sectors and contribute to broadly-based economic development.

Many livestock holders can benefit directly from the increasing market demand for livestock products. Demand growth rates of three percent for cereals are less than half the corresponding rates for high value livestock commodities, demand for which is increasing by 6 to 8 percent annually. Furthermore, the poor can benefit from the fact that livestock sector development creates demand for labour, supports economic linkages to feed and processing industries, encourages food security through stronger domestic supply response, and supports lower prices for food of animal origin.

While agricultural expansion has a direct impact on employment and incomes in farming, an important indirect impact on employment and poverty reduction comes from its stimulus to the labour intensive, non-tradable, rural non-farm sector (Mellor, 1995). It is generally found that the poorest of the poor lack land and other resources and are therefore largely dependent on wage-employment for their livelihoods. With growth of agricultural output, and associated rural incomes, demand for local non-tradable goods and services will grow. The products are described as non-tradable since they are delivered and used mainly within the rural community, and cannot be traded in international markets. The associated activities are highly labour intensive, but require local demand to grow in order to expand. Their expansion should stimulate employment for the poorest of the poor.

By generating demand for these non-tradable goods and services, significant increases in agricultural production and incomes have second-round, indirect impacts that increase rural incomes and employment. The demand for the goods and services from the rural non-farm

sector is elastic with respect to income, implying that, as farmers' incomes rise, their expenditures on products of the rural non-farm sector increase more than proportionately.

Agricultural growth and development are therefore essential contributors to the relief of rural poverty, and promote pro-poor economic development. More and more empirical studies are providing support for this argument. Research has been directed at direct measurement of the relationship between agricultural growth and poverty reduction. Studies in India by the World Bank have been based on analysis of the virtually unique set of data on poverty numbers, collected across states and over time (Ravallion & Datt, 1999). These data show clearly that agricultural and rural growth can reduce poverty drastically, while industrial and urban growth reduce poverty little or not at all.

Warr (2001) found that while agricultural development in India reduced the incidence of poverty, industrial growth had the opposite effect. This result also applied to South East Asia, to Bangladesh (Woden, 1999) and Indonesia (Thorbecke & Jung, 1996). Cross-country analyses by Timmer (1997) and Bourguignon et al (1993) yielded similar findings. A recent study, based on a recursive statistical model found that research-led agricultural development generates sufficient productivity growth to yield high rates of return in Africa and Asia and thus has a substantial impact in reducing poverty, while productivity growth in industry and services has no or little impact (Thirtle, Lin & Piesse, 2009).

Another study of African countries based on economic modeling (Dorosh & Haggblade, 2003) showed the indirect effects of agricultural investment to be large. On average, inclusion of growth linkages nearly doubles the national income growth flowing from an initial investment in agriculture. Agricultural investments are also found to generate the largest impact on the poor.

There are thus strong intuitive arguments and considerable empirical evidence that agricultural growth is effective in reducing poverty, yet two qualifications are needed. One is that change takes time and time lags may occur between gains in agricultural productivity and the consequent fall in numbers of poor. The other qualification is that major inequalities in access to resources can limit the reduction in poverty.¹

¹ Timmer (1997) concluded from a cross-country analysis that the impact of agricultural growth is negligible when agriculture is dominated by very large farms. Mellor (2001) has argued that agricultural growth which benefits large, land-owning farmers has little effect on employment and incomes in the rural non-farm economy since they spend their added income on imported goods and capital-intensive urban goods.

3. Household multipliers of livestock sector growth

Within agriculture, growth by extending the area of land in use is constrained by dwindling reserves of unused fertile land. Expansion of agricultural production therefore largely depends upon intensification, by increasing inputs and/or changing technology to raise output per hectare, and diversification into alternative land-saving income generating activities. Livestock production provides an effective means of land use intensification, by supplementing income from crops, as a result of increased stocking rates or by shifting to increasingly intensive production systems. Increased output of animal protein and cash income per hectare from livestock production may be generated by shifting from grassland based systems to integrated mixed crop-livestock systems or by shifting from such mixed systems to intensive landless pig and poultry production.

The livestock sector makes a diverse set of contributions to rural livelihoods and to agriculture as a whole. Growth of livestock sector activity stimulates growth of the overall economy, through direct income impacts on households engaged in livestock production and via a web of indirect horizontal and vertical multiplier linkages across expenditure and supply chains.

The strength of income and poverty reduction impacts adducible to livestock sector growth, on agriculture and across the overall economy, depends on (i) the size of the livestock sector relative to agriculture and to the overall economy, (ii) the strength and extent of the linkages between the livestock sector and the rest of the economy, (iii) the use-intensity of the factor that the poor households are primarily endowed with (labour) in the livestock and linked growth sectors, and (iv) consumption patterns for meat, animal products and allied other food and non-food goods.

As of 2007 the average share of the livestock sector in global agriculture GDP was around 35 percent, varying regionally from a low of 23 percent in Low Income Countries (LICs) to highs of 43-45 percent in middle-income developing regions such as Latin America and the Caribbean (LAC) and Eastern Europe and Central Asia (EECA). While the stylized pattern of economic development is that the share of agriculture GDP in the overall economy tends to decline as countries move from lower to middle income levels, the share of the livestock sector in agricultural GDP tends to increase as countries move from lower to middle income status. This pattern is consistent with emergence and modernization of the agricultural sector. As countries move up in the development ladder, although the relative importance of agriculture in the total economic may decline, the sectors producing goods with higher income elasticities and with higher value-addition, such as livestock and animal products, fruits, and vegetables expand while formerly dominant staple goods contract in relative terms. Focusing on LICs such as those in sub-Saharan Africa (SSA), where poverty density and depth are highest, the importance of the

livestock sector as a catalyst for poverty reduction lies in the sector's superior growth potential within agriculture and the rural economy where the majority of the poor reside.

The second factor that influences the size of the income and growth multiplier effects from the livestock sector relates to the strength of linkages between livestock and the rest of the economy. Data from sample countries compiled by FAO in the RIGA – rural income-generating activities – database (Davies *et al.*, 2007) suggests that pure subsistence is rare, and that the vast majority of rural households are partly engaged in market activities, even if they also produce food for home consumption. Of 12 sample countries considered, farm households in a majority (7 countries) sold between 30 and 68 percent of their livestock output to the market, and the poorest households (bottom quintile) were as likely as their wealthier counterparts to sell about the same proportion of livestock produce. This confirms the primary linkage between rural livestock producers and the local economy, as suppliers of the primary product at the first-level exchange point in their respective agrofood supply chain.

The growth in demand for livestock products in developing countries is skewed toward more rapid demand growth in urban centres (in contrast to rural areas), as urbanization progresses in these countries. Thus, from the first market exchange link for livestock products in rural areas, the raw material will undergo product transformation and transport at various stages of processing and value addition along the supply chain, until it reaches the final consumers in the urban centres. Along this chain, the consumption and production income multipliers will operate to propagate output, employment, and income benefits across the economy.

The third factor determining the size of the income multipliers from growth in the livestock sector is the use-intensity of the factor that is the rural poor household's primary endowment, labour. It has been shown elsewhere that, globally, the highest densities of poor livestock keepers are found in the mixed crop-livestock systems in South Asia (SA) and sub-Saharan Africa (XXX ref). In general, these are integrated smallholder systems where crop by-products and residues are the primary feed for livestock, and where livestock is used either for draught power in farm operations, livestock manure is used as fertilizer to crops, or both. Related evidence (XXX ref) demonstrates that, among rural households raising livestock, the process of transforming crop by-products and residues into usable animal feed, and the process by which farm animals are used for draught power in farming operations, are undertaken mainly by household members using manual labour. When the farm is not self-sufficient in inputs, replacement stock and fodder are purchased from neighbouring households, usually locally sourced inputs also produced in labour-intensive production systems. In such systems, both the individual and community value-added components and producer rates of return are relatively high. In contrast, for intensive landless livestock production systems undertaken by commercial farms and 'semi-commercial' households in peri-urban areas, the main inputs to livestock production, i.e. the growing stock,

feed, and other additives, are supplied by commercial farms and formula feed suppliers. Under this system, there is far less value added for households other than those whose members work in such enterprises.

The fourth factor influencing the size of the income multiplier linkages extending from meat demand is high overall food expenditure shares in developing countries. The above-mentioned RIGA dataset of 12 countries showed that in the lower income developing country regions of SSA, SA, and EAP, more than half (53% to 61%) of total expenditure is devoted to food, with the rest going to non-food items. In contrast, high-income countries average only about 13 percent of disposable income spent on food.

In the lower income regions of SSA, SA, and EAP, within agrofood, around 30 percent is spent on staples (e.g. bread and cereals). Income elasticities of demand for overall food, however, are low (typically less than unity), while income elasticities of demand for livestock products and non-food items are relatively high (greater than unity). Given this information and corresponding budget shares, as incomes increase, for each additional dollar of new expenditure, less than half would be devoted to food items, with non-food items getting the greater share of added income. Within the food group, the share of cereals and bread falls. Around 20 to 25 percent of each additional dollar of expenditure on food goes to meat and dairy products. Among the middle-income regions of EECA, LAC, and the Middle East / North Africa (MENA), the proportion of additional expenditure on meat and dairy products is even higher at 30 to 35 percent of food expenditures. Within the food group, livestock and dairy products have higher income elasticities than cereals and bread.

Expenditure patterns in developing countries suggest that a large proportion of additional income generated from growth in the rural livestock sector will continue to be spent on food products, among which livestock and dairy products will become increasingly important in the household food budget relative to staples. As higher levels of income are attained, however, the non-food component will also grow in both absolute and relative (share of expenditure) terms. The increasing importance within the food basket of livestock generally, and dairy products in particular, represents a strong expenditure linkage in emerging agrofood demand that can, at least in part, be met by rural households.

Using a panel dataset assembled from the World Bank's World Development Indicators Database and FAO's Internal Statistical Database, spanning the period from 1961 to 2003, Pica *et al.* (2008) found a statistically significant causal relationship between livestock sector development and economic growth in 36 of the 66 countries analyzed (almost 55 percent). Most of these countries were agrarian or emerging economies. In 33 of the 36 countries in which a statistically significant relationship was found, livestock sector development appeared to have

been an important driver of *per capita* GDP growth. In nine of these countries a bi-directional causality was also found. Only in three countries did increases in livestock sector productivity appear to be / have been driven by *per capita* GDP growth.

To give a more precise idea about the income potential of livestock promotion, Table 1 displays impact estimates from detailed national Social Accounting Matrices in the Global Trade Analysis Project (GTAP) database. The two columns comprise estimates of household multipliers for livestock production and livestock product processing, respectively, across major world regions. These results are static estimates of expenditure chain effects derived from Social Accounting Matrices in the GTAP database and weighted by country populations.

Table 1: Household income multipliers² for livestock production and processing, by region

REGION	Household multipliers	
	Primary livestock production	Livestock product processing
EAP	2.7	2.4
China	2.2	2.1
EECA	2.0	4.4
LAC	3.2	3.2
MENA	2.3	4.9
South Asia	4.7	4.3
India	4.7	4.4
SSA	2.9	5.4
West Africa	3.3	5.2
East Africa	4.3	6.8
Southern Africa	2.7	5.4
All Regions	2.9	3.2
High income countries	3.1	3.3

Source: Authors' estimates from the GTAP 7 database, 2010.

In general, the household income multipliers for both livestock and livestock products are higher in developing countries as a whole than in the group of high-income countries. This confirms the greater contribution of the livestock sector in general in spurring relatively higher and more sustainable income gains in other sectors of the economy in developing countries as compared to developed economies.

Overall, the magnitude of the multipliers from livestock production and livestock product processing are quite similar. Between regions and between countries, however, differences can be quite large, with multipliers for livestock product processing being markedly higher than those

² Incremental effect of \$1 additional spending on aggregate national household incomes.

of livestock production in the Middle East and North Africa and in sub-Saharan Africa. The primary reason for this is comparable resource endowments and economic structures within regions, especially for traditional sector activities. Comparing across regions, the livestock and processing multipliers are largest for South Asia and sub-Saharan Africa, indicating substantial livelihood potential from livestock sector development. Nevertheless, even in the other regions, which tend to have higher levels of *per capita* income and lower poverty rates, the livestock sector multipliers are substantial.

Building on analysis of detailed data from Senegal, Roland-Holst and Otte (2006) conclude that, although lower income rural households receive smaller absolute gains from the livestock value chain than higher income groups, the relative benefits to them are much greater. This further strengthens the case for livestock as a pro-poor 'development instrument', as the marginal effect of improving livestock supply conditions will disproportionately benefit the rural poor majority. Multiplier decomposition analysis revealed that the small absolute livestock-livelihood gain for the poorest comes almost entirely from direct production income. Both rural quintiles 1 and 2 earn more than three-quarters of their livestock-related income directly from animal (product) sales, exiting the food value chain at the earliest stages. Higher income rural households have less direct participation in livestock production. Despite this, they receive the largest absolute multiplier benefit, almost entirely indirect, from food processing and retailing. These more complex downstream linkages to food value creation are the key to higher aggregate income gains for this group and have important implications for the net results of sub-sectoral policies. Given that higher income groups generally have more indirect linkages to the livestock sector, they may capture a large percentage of overall agrofood value creation, even from policies targeted elsewhere (*ibid.*).

Within an inter-sectoral framework, the sizes of household livestock sector multipliers presented in Table 1, although high, are not relevant unless they are compared with the multipliers for other sectors of the economy. If the multipliers of other economic activities are larger than those of the livestock sector, then there is little justification for promoting growth in the livestock sector as growth in other sectors will have stronger income impacts on household incomes. Table 2 presents the ratio of the household multiplier for livestock production to the respective values of comparison (sub-)sectors, such as crops or fruit and vegetables, and manufacturing and services across major world regions and economic grouping (country values are again weighted by population). A ratio greater than unity indicates that the livestock sector multiplier is larger than that of the comparison sector. The computed estimates for the ratios under 'Fruits and Vegetables' for two regions have been adjusted to exclude two countries that are obvious outliers: Malaysia in East Asia and the Pacific, and Nigeria in Sub-Saharan Africa. Their inclusion significantly inflates the weighted regional values, as well as the overall value for Developing Countries.

Table 2: Ratio of household multipliers of livestock production to multipliers of other sectors by major world region

Region	Crops	Fruits & Vegetables	Manufacturing	Services
EAP	1.5	1.1	1.1	1.0
China	1.4	1.6	1.2	1.2
EECA	1.8	0.8	1.1	0.8
LAC	1.6	1.1	1.4	1.1
MENA	1.3	1.1	1.3	0.9
South Asia	1.3	1.1	1.6	1.5
India	1.3	1.1	1.6	1.6
SSA**	1.8	1.4	1.5	1.1
All Regions	1.5	1.2	1.4	1.3
High income countries	1.4	0.9	1.4	0.9

Source: Author estimates from the GTAP 7 database, 2010.

Table 2 reveals that across all developing country regions and for all comparisons, the ratio is always close to or above unity, indicating that, at the very least, the livestock sector is as strong as the other sectors in promoting household income growth. Across all developing country regions, the income multiplier for livestock production is around 50 percent higher than that of crops, while it is only marginally higher than that of fruits and vegetables. Compared with manufacturing and services, livestock sector growth has 1.4 and 1.3 times the household multiplier effect. Within regions, there is substantial variation in the extent to which livestock income multipliers exceed those of the comparison sectors, indicating variation in the degree to which these sectors themselves are integrated with the rest of the national economy.

A specific country example of the comparative impact of various agriculture subsectors on growth and poverty is Diao and Pratt's (2007) work on Ethiopia. As an agrarian economy, Ethiopia is characterized by a very high poverty incidence, a dominant proportion of the population (85%) living in rural areas, and agriculture is the main livelihood activity. Taking 2003 as a base year, poverty incidence at the national level was 44.4 percent. The study established that the 'business-as-usual' scenario, where there is stagnant growth in the agricultural sector, would bring about a sluggish growth in the whole economy, and lead to rising poverty incidence.

In order to identify the types of investments with the largest impact on agricultural growth, and consequently more pervasive economic growth and poverty reduction, the authors presented a disaggregated economy-wide model that elucidates growth and poverty reduction linkages involving the major subsectors in the agricultural economy. The four agricultural subsectors, staple crops, livestock, traditional exportables (coffee), and non-traditional exportables (fruits,

cotton, horticultural products, among others) - were evaluated, assessing their contribution to economic growth and poverty reduction by exogenously increasing the productivity growth rate of one sector, while maintaining the growth of the others at baseline levels. For the assessment of each subsector to be comparable, the exogenously determined rate of growth in each, independent of the others, should lead to a reasonable and comparable rate of growth in the agriculture GDP up to the year 2015, in line with the MDG1 target of halving the incidence of poverty by that year.

The economic structure of agriculture in Ethiopia is such that the staple crops subsector dominates, representing 65 percent of agricultural value-added. The livestock subsector is the second largest, contributing around a quarter (26%) of value-added. Combined, the two subsectors account for 91 percent of agricultural value-added. Two other subsectors accounted for less than five percent each in value-added. Obviously, if the productivity growth in all subsectors were identical, the larger ones will more dramatically affect agricultural GDP, overall economic growth, and poverty. On the other hand, smaller subsectors have greater capacity to grow rapidly, and the investment required to effect such productivity growth would be smaller. Viewing the same relationships from another perspective, for given feasible target growth rates in agricultural GDP, determined at 3.4-3.5 percent per year up to 2015, smaller subsectors need higher rates of productivity growth to achieve similar overall impacts, while it will suffice for the larger subsectors for productivity to grow at relatively lower rates. In the simulation, the respective individual productivity growth rates above the baseline were determined to be the following: 1.5 percent per annum for the staple crops subsector, 3.4 percent of the livestock subsector, 13 percent each for the non-traditional crops, and 7 percent for the coffee subsector. The respective impacts on overall economic growth and poverty reduction depend not only on the size of the subsector but also on the extent and strength of linkage between the subsector and the other subsectors in the economy.

4. Scenarios for livestock sector promotion

The discussion above makes it clear that livestock can make important contributions to rural poverty alleviation, and that emerging market trends appear to be increasing livestock's potential in this context. The magnitude of such impacts, as well as their relationship to other geographical and institutional characteristics, remains an empirical question. The best way to assess livestock's potential is of course on a case by case basis, but for the present discussion we will suffice to provide some general macroeconomic estimates of how productivity growth in livestock and allied sectors can contribute to national economic growth. Using a dynamic forecasting model calibrated to the GTAP 7 global database, we projected economic growth over

the period 2010-2030 under different scenarios of livestock sector productivity growth. Table 3 summarizes the five core scenarios.

Table 3: Scenarios used to

Scenario	Name	Description
1	Baseline	Global economies proceed with Business as Usual policies, on consensus forecast growth rate.
2	1% Higher Livestock Productivity Growth	Developing countries experience livestock productivity growth of 4% per annum, about 1% above the historical average for developing country agriculture over the last 40 years (Table 4).
3	1% Higher Meat and Dairy Productivity Growth	Scenario 2, combined with productivity growth in livestock products (meat and dairy) (i.e. the processing sector?) of 4% per annum.
4	2% Higher Livestock Productivity Growth	Developing countries experience livestock productivity growth of 5% per annum, about 2% above the historical average for developing country agriculture over the last 40 years (Table 4).
5	2% Higher Meat and Dairy Productivity Growth	Scenario 4, combined with productivity growth in livestock products (meat and dairy) of 4% per annum.

Table 4: Average annual growth of agricultural output

REGION	1970–1979	1980–1989	1990–1999	2000–2006
SE Asia	3.68	3.59	3.13	3.54
China	3.09	4.60	5.17	3.87
EECA	1.47	0.77	-3.88	1.81
LAC	3.07	2.37	2.87	3.13
Brazil	3.83	3.73	3.29	4.41
MENA	2.94	3.37	2.73	2.34
South Asia	2.56	3.39	3.00	2.19
India	2.69	3.52	2.94	2.00
SSA	1.31	2.60	3.10	2.20
North America	2.17	0.73	2.03	1.10
Oceania	1.79	1.25	2.93	-0.04
Western Europe	1.54	0.94	0.46	-0.35
Developing countries	2.82	3.46	3.64	3.09
Developed countries	1.88	0.86	1.21	0.39
World	2.23	2.13	2.04	2.22

Source: Jha, Roland-Holst, Sriboonchitta, and Behnke (2009).

Macroeconomic impacts of the four counterfactual scenarios (scenarios 2 to 5), expressed as percentage change in terminal year (2030) real GDP, are summarized in Table 5 below. A number of salient features are apparent from even casual inspection. Even modest technical progress in the livestock sector can have important economywide impacts, particularly in regions where livestock is a prominent source of livelihood (e.g. West Africa). Extending productivity gains downstream to livestock products and processing amplifies these gains significantly, but of course these benefits may be less likely to accrue to the poor. Finally, doubling the increment in productivity growth has different effects on agriculture (Livestock) and food processing (Meat and Dairy). Macroeconomic impacts of livestock sector productivity growth are more than doubled (sometimes trebled), while there appear to be diminishing macroeconomic returns to

technological progress in the downstream activities. Expanding livestock production appears to induce less resource diversion than does expansion of processing activities, and also the wealth effects of expanding the primary sector appear to induce stronger expenditure multipliers. For these reasons, public policy might more appropriately target primary sector development, leaving downstream investments to private sector interests. More research is needed to identify the growth channels linking these sectors to the rest of the economy and particularly to household incomes, but it is clear from these results that investments in livestock productivity can make a difference for aggregate growth and real living standards.

Table 5: Macroeconomic impacts of livestock sector promotion (real GDP percent change from Baseline scenario in 2030)

	Scenario 1 L Prod 1%	Scenario 2 L&M Prod 1%	Scenario 3 L Prod 2%	Scenario 4 L&M Prod 2%	Ratio Scenario 3 & 1	Ratio Scenario 4 & 2
EAP	1.0	1.9	2.4	2.7	2.5	1.4
China	1.1	2.2	2.7	3.0	2.4	1.4
EECA	0.7	1.4	1.7	1.8	2.3	1.3
LAC	0.7	1.3	1.6	1.7	2.4	1.4
South Asia	0.8	1.6	2.0	2.2	2.4	1.4
India	0.7	1.3	1.6	1.7	2.3	1.3
MENA	0.7	1.4	1.7	1.8	2.3	1.4
SSA	0.9	1.7	2.4	3.1	2.8	1.8
West Africa	1.9	3.8	5.4	7.4	2.9	2.0
East Africa	1.2	2.5	4.0	6.0	3.3	2.4
Southern Africa	0.6	1.1	1.5	1.7	2.5	1.5
All Regions	0.8	1.6	2.0	2.3	2.4	1.4
High income countries	0.0	0.1	0.1	0.2	3.2	2.0
Weighted Average	0.9	1.7	2.1	2.3	2.4	1.4

5. Conclusions

Livestock deliver many essential products and services to the rural poor around the world. This brief report examines their potential to contribute to poverty alleviation via marketing of animals and their products. Many studies have identified ways in which livestock sector development is pro-poor, and we lend a global perspective to that argument by observing how emerging economies shift consumer demand towards animal source food products and thereby present dramatically expanding markets. Results from a variety of studies cited here, as well as our own estimates of the underlying trends and growth potential, suggest that livestock sector development can be a potent catalyst for livelihood improvement among the world's rural poor

majority. The challenge of implementation remains, but if market access can be improved for smallholder livestock producers, self-directed poverty alleviation will follow.

6. References & Further Reading

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