Pro-Poor Livestock Policy Initiative A Living from Livestock

Research Report



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Livestock Productivity and Livelihoods in Developing Countries

D. Roland-Holst, J. Otte, and A. Costales

ABSTRACT

In this report, we apply a suite of new data and empirical methods to demonstrate how livestock can make a significant contribution to the livelihoods of the poor. This potential is far from being realized, however, and there is much wider scope for the promotion of livestock, especially among poor rural communities. Using new techniques, we show how information distilled from a variety of sources can be combined in an empirical approach termed 'integrated poverty assessment of livestock promotion' (IPALP). This technique elucidates the role of livestock in poverty alleviation and economic growth generally, strengthening the basis of evidence for policies that can better support pro-poor development. Using a very detailed new national Social Accounting Matrix and a dynamic Calibrated General Equilibrium Model, policy experiments are conducted to assess the impact of an economy-wide policy of trade liberalization, with and without concomitant livestock promotion. Our results reveal the complex indirect linkages between globalization and rural poverty alleviation. Generally speaking, the poor may not benefit directly from traditional export oriented development strategies, but by marketing food to rising income urbanites, they can participate in national growth more effectively. Livestock products, because they have high income elasticities, are ideal candidates in this context, but complementary policies are needed to facilitate productivity growth, quality improvement, and market access for smallholder livestock producers. Because of its general equilibrium perspective, IPALP captures the contribution of each of these to livelihoods. Tools for this kind of ex ante assessment can support the design of more effective policies for outward oriented growth and poverty alleviation.

1. Introduction

It is widely recognized that expanding capacity for livestock production and marketing can be a potent catalyst for rural poverty alleviation in developing countries. Livestock have a variety of characteristics that make them important contributors to sustainable rural income growth. They are marketable products of scalable household and community production systems, and are generally less vulnerable to perishability and critical harvest timing than many crops. As an agricultural product with relatively high income elasticity, livestock is particularly attractive as a means for rural households to participate in urban-based economic growth. Livestock are also productive assets, contributing directly to output through animal traction and indirectly as a store of wealth for future investment. Finally, they can contribute to soil fertility and recycling of agricultural waste.

To support it's own and other livestock development programs, PPLPI has undertaken to develop tools for Integrated Poverty Assessment for Livestock Promotion (IPALP), using its own programme as case studies. To improve general understanding about the role of livestock in poverty alleviation, while at the same time strengthening the basis of evidence on how policies can best support pro-poor livestock development, a suite of analytical techniques is being applied across the regions covered by PPLPI. In each case, four component elements are applied:

- 1. Analysis of initial economic conditions, relying on data ranging from macroeconomic indicators to detailed household surveys
- Econometric estimation and modelling of household-level production systems and labour markets, to better identify microeconomic income sources and the role of livestock in local production and markets.
- 3. Economy-wide analysis of national and external economic policies, with emphasis on the local incidence of these policies. Such policies include trade liberalization, WTO accession, market reform, tax policies, etc.
- 4. Scenario analysis of the detailed effects of PPLPI, in concert with national and international policies and market forces, to more clearly identify patterns local economic adjustment and, in particular, their implications for poverty alleviation.

The basic objective of this approach is to support more technically focused livestock policies with insight regarding economic conditions and behaviour. Integrated Poverty Assessment for Livestock Policy (IPALP) can serve as an evaluation tool both *ex ante* and *ex post*. Analysis of initial conditions can help better identify target groups and anticipate their needs for effective program support and market access. Continuing and *ex post* economic assessment can strengthen ongoing program implementation and improve effectiveness for future programs.



Figure 1: IPALP Flowchart

2. Initial Conditions

Perhaps more than any other factor, rural poverty is adducible to initial conditions. Farm households emerging from subsistence are the most universal example of this. They generally lag behind economic transition and are more constrained, by a broad spectrum of structural and institutional impediments, from participating in market-based structural change and ensuing growth trends. To better understand any policy targeted toward advancing this group, a review of initial economic conditions can be quite valuable. The insights thus obtained can also contribute to more effective assistance and more sustained benefits. This section provides an overview of salient economic data on Viet Nam generally and the Northern Mountain Region (NMR) in particular, a region that exhibits many characteristics universal to the poorest rural areas of the world. We move from the general to the particular, from macro to micro conditions. For the former, we rely on the usual official sources from Viet Nam, FAO, and other bilateral and multilateral agencies. For the latter, we are fortunate to have a combination of independent survey data and our own resources in the form of social accounting matrices for Viet Nam.

Macroeconomic Trends

The last decade has brought significant economic and structural change to Vietnam. Initiation of economic and other institutional reforms, commenced when the government postulated its ultimate goal to transform the country from planned economy to a market-oriented one. The

introduction of *doi moi* starting in 1986 was quite effective and led to acceleration of economic growth, improving living standards and sharply reducing poverty.

	1992	2002
GDP at market prices (Dong trillion)	110	536
GDP (US\$ billion)	9.9	35.1
Real GDP growth (%)	5.2 ¹	5.8
Population (million)	68.5	80.3

Table 1: Annual Indicators

Source: GSO, IMF, World Bank ¹ average rate for 1982-1992

The annual growth rate of per capita GDP (in nominal terms) has been about 6 percent during 1992-2002. Viet Nam's GDP rose more than three times in this period despite the financial crisis in the region. The government is aiming for economic growth of 7.5-8 percent in 2004-2005. These figures are not unrealistic taking into account increasing income growth and the driving role of private consumption in country's GDP growth which is expected to growth of around 7 percent a year (EIU, 2003).

The structure of GDP reveals modest changes occurring in the economy in 1992-2002. Agriculture's share declined from 34 percent in 1992 to 23 percent in 2002, while the industry share has reached 38 percent in 2002, and the share of services has remained at about the same level - 39 percent. However, in 2002-2003 a growing domestic market created more optimistic expectations for the agricultural sector and services. According to GSO estimates the value added to agricultural GDP in 2002 increased by 4 percent.

	1992	2002
Agriculture	33.9	23.0
Industry	27.7	38.6
Services	38.8	38.5
Source: GSO, 2003		

Table 2: Structure of Viet Nam's GDP (%)

The active population employed in agriculture increased in the last decade by 1.36 percent per year and its share in total labour force has been the largest in the country's economy - 65.1 percent in 2001. Rural households remain a majority in Viet Nam - 75.3 percent of the total population, even the share of rural population has been declining moderately since 1991.

	1991		2000		2001		Annual growth rate
	thd. pers.	%	thd. pers.	%	thd. pers.	%	(%), 1991-2001
Total	67,242	100	77,635	100	78,686	100	1.70
Rural	54,015	80.3	58,864	75.8	59,217	75.3	0.96
Urban	13,228	19.7	18,772	24.2	19,469	24.7	4.72
Total labour force	30,135	100	36,702	100	37,676	100	2.50
Agricultural labour force	21,591	71.6	24,326	66.3	24,520	65.1	1.36

Table 3:	Population and	Labour Force	Structure
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The livestock sector is an important agricultural sub-sector and has contributed a substantial part to the country's agricultural production over the last decade. Since 1992, the share of the sector in agricultural GDP has increased by 2.2 percent. Share in the total GDP decreased in 2000 compared to 1992 as the trend has been observed in the entire agricultural sector.

Table 4: Livestock GDP (%)

	1992	2002
Livestock GDP to agricultural GDP	21.5	23.7
Livestock GDP to overall GDP	7.3	5.4
Sources FAOSTAT 2002, CSO 2002		

Source: FAOSTAT, 2003; GSO, 2003

The expansion of livestock production in recent was quite rapid in comparison with growth in the cultivation sector. The share of livestock production in total agricultural output increased from 17.9 percent in 1990 to 21.2 percent in 2002 (GSO, 2003) while the crops share declined by about 3 percent. During the last decade, the growth in this sector by 4.6 percent was about the same as in the agricultural sector and the crop sector (4.4 percent). The livestock sector in Viet Nam has developed more dynamic alley than other agricultural sectors in the last three years.

The majority of demand and demand growth for livestock products comes from within the country, and has a strong positive correlation with rising per capita income and increasing urban population share. In the last years the composition of domestic demand for food has been changing and shifting away from rice toward livestock products which have higher income elasticities (meat income elasticities across regions vary between 0.9 and 1.2 while for rice they vary between -0.6 and 0.4 (Goletti and Rich, 1998). Moreover, domestic demand growth for animal products in the country is likely to be more sustained in comparison to crops. The FAO estimations reveal further growth in this demand for all livestock commodities in the next decade.

The projections of growth in demand for 2015 are following: 40 percent (since 1998) for beef meat, 73 percent for pig meat, 114 percent for poultry and 57 percent for milk (FAO, 2003).

Macroeconomic Reform

The Vietnamese government has applied a wide range of policy measures during the reform period aiming to activate market mechanisms and promote sustainable economic growth. Socioeconomic strategies of the government have focused on agricultural and rural development as agriculture produces more than one fourth of the country's GDP and over 70 percent of the population live in rural areas.

Foreign Trade

The Vietnamese government has undertaken a broad spectrum of trade liberalization initiatives in recent years, including WTO accession and bilateral trade agreements with several countries and trade blocs. Most prominent of these is the Vietnam-United States BTA, which has more than trebled Vietnamese exports in two years. Despite this opening, there is little indication that small holders in the country will be directly affected by international trade in the near future, and PPLPI should have a strong emphasis on livestock development for domestic marketing. Indirectly, it can be expected that trade growth will stimulate urban purchasing power, and consequently demand for high income elasticity agricultural products (e.g. meat and dairy) will accelerate. Through these linkages, PPLPI can help the rural sector capture trade-induced urban growth benefits.

Market Access, Prices, and Poverty

One of the defining characteristics of the subsistence oriented rural poor is limited market access. Agricultural households in remote areas face high trade and transport margins, limited information about opportunities in destination markets, and a complex array of institutional barriers that limit their ability to participate in national market developments. The correlation between limited market access and poverty extends widely in most developing countries because of weak transport and information infrastructure and other impediments to efficient distribution. Viet Nam is no exception in this context. Despite its potential for dynamic exportdriven urban growth, propagation of these effects to the rural hinterland continues to be limited by deficiencies in infrastructure and institutional barriers to completion of national markets for both agricultural outputs and inputs. In this section, we briefly review some important general characteristics of the market access problem, highlighting its contribution to persistent inequality and poverty in rural areas. Later, we shall see how livestock promotion can contribute to overcoming these barriers.

Before presenting empirical results on price dispersion, it may be useful to provide an example. Consider the agricultural terms of trade (*agtot*), localized to the individual household or village level. Depending upon distance and other barriers between this rural economic unit and a regional trading center, *agtot* can vary substantially. In particular, greater remoteness can be expected to adversely affect *agtot* (from a rural perspective) in two ways, reducing the denominator (prices of things rural households can sell) and increasing the denominator (prices of things rural households must buy from outside). Both these components undermine rural purchasing power and incentives for market participation, and contribute directly to rural marginalization, poverty, and inequality. Over the longer term, upward bias in prices of urban or international agricultural inputs, including agrochemicals and technology, can also retard adoption and agricultural productivity growth.

To give the reader a more immediate sense of the significance of these factors, the following figure depicts four relevant measures for Vietnamese rural households at the provincial level. Depicted below are a simple headcount measure of poverty, an index of agricultural specialization (degree of subsistence), a measure of market access (distance from a major national market), and finally an index of agricultural terms of trade (local agricultural output prices divided by input prices). Generally speaking, more adverse values (higher poverty, subsistence, distance, and lower *agtot*) are depicted in orange and preferable values in green. The similitude of these maps is visually quite arresting, and makes clear the linkage between all four variables for the rural poor in Vietnam. While they do not add analytical value to empirical analysis, maps like this can reveal economic characteristics very clearly and significantly expand the audience for IPALP.

Figure 2: Poverty and its Correlates across Viet Nam



3. Livestock and Market Participation in the NMR

To focus our microeconomic overview of initial economic conditions, we examine household survey data more closely to elucidate patterns of rural production and market participation, with particular reference to livestock. In the case of the NMR, we draw upon related survey work undertaken by IFPRI under JBIC sponsorship.¹ This study produced a variety of tabulations from the 1993 and 1998 Viet Nam Household Living Standards Surveys, several of which are relevant to the present discussion.

Consider first the results presented in the following table, indicating sources of farm income for rural households in the NMR. Here we see that livestock represented only 11 percent of NMR farm income in 1993 and even less in (10%) in 1998. Moreover, both levels are significantly below than the global average contribution of more than 25 percent. These results indicate an important initial condition in the region under consideration – that livestock is a relative under-achiever among agricultural activities that can generate income.

	Net	Net	Income	Income		Contributio
	Income	Income	Share	Share	Growth	to
	1993	1998	1993	1998	1993-98	Growth
<u>Source</u>	1000VN	ID/HH/yr		Perce	ntages	
Crops	3,096	4,765	47	46	54	44
Livestock	751	1,032	11	10	37	7
Fisheries	205	291	3	3	42	2
Forestry	131	358	2	3	174	6
Enterprise	1,240	1,826	19	18	47	16
Wages	501	924	8	9	85	11
Transfers	625	1,078	10	10	72	12
Other	13	60	0	1	348	1
Total	6,562	10,334	100	100		100

Table 5: Sources of Rural Income and Income Growth in the Northern Mountain Region

Source: IFPRI (2002).

The next table reveals recent current patterns of animal husbandry in the region. The first column indicates the percent of households keeping animals of a given type, while the next two indicate their direct (marketable) economic significance. Pigs and poultry are ubiquitous in regional farms, with the former representing two thirds of livestock income and the latter 21 percent. Clearly, efforts to expand livestock production, which appears to be well below norms as a percent of

¹ See IFPRI (2002).

total farm income, should be focused in these categories. There is a well developed substrate of customary practice in raising these animals and they also represent agricultural products with high income elasticities, making them attractive candidates for capturing urban income growth trends by Viet Nam rural households.

	Percent of households	Net income ('000 VND)	Percent of income
Buffalo	14	129	6
Cattle	9	50	2
Pigs	90	1,392	67
Horses	1	2	0
Goats	0	-2	0
Chicken	88	427	21
Ducks / geese	30	44	2
Bees	1	22	1
Silk worms	2	7	0
Reptiles	0	1	0
Other	8	8	0
Total	95	2,079	100

 Table 6: Sources of Livestock Income, Northern Mountain Region

Source: IFPRI (2002).

Given that the rural poor already raise animals with significant economic potential, why doesn't this activity contribute more to household incomes? The results in the next two tables provide indirect evidence, and complement the mapping information above. The first table shows that the NMR (here called Northern Uplands) has among the lowest rates of marketed share in total agricultural output in the nation. Upon examination of the second table, the reason is clear enough. The poorest rural households are the most subsistence oriented, i.e. the least likely to be selling their produce in local, regional, or national markets. Given that livestock is one of the more complex traditional agricultural products to market effectively, it is hardly surprising that the poor, and by extension the poor regions, are below their potential in livestock marketing and therefore production. Conversely, effective policies for livestock promotion will have to overcome whatever institutional barriers that have thus far limited agricultural marketing by the poor. The results presented here indicate that this will be especially challenging for livestock, since its supply chain may be more complex than that of other traditional agricultural products. This inference also has implications for choice of the most appropriate target group. As has been observed elsewhere, livestock development aid may be more effectively targeted at "median poor" groups with minimal financial and institutional capacity that can assimilate and sustain the initial momentum of assistance. Positive experience with this group can then be expected to propagate, autonomously in the local economy and with follow-on assistance to more marginalized groups.

	1993			1998		
	Marketed	Share in		Marketed		
	Crop	Ag.	Monetized	Crop	Ag.	Monetized
Region	Otuput	Output	Income	Otuput	Output	Income
Northern Uplands	20	31	51	27	36	56
Red River Delta	21	33	59	27	41	65
North Central Coast	21	33	54	26	40	66
South Central Coast	21	31	60	38	45	69
Central Highlands	59	61	79	61	32	68
Southeast	50	51	80	61	53	88
Mekong River Delta	50	51	75	64	61	83
Total	30	38	63	38	45	70

Table 7: Commercialization of Rural Production by Region

Source: IFPRI (2002).

		1993 Marketed	Share in			1998 Marketed	Share in	
Quintile		Crop Otuput	Ag. Output	Monetized Income		Crop Otuput	Ag. Output	Monetized Income
Poorest	ſ	23	34	53		30	33	57
	2	26	29	56		37	46	67
	3	31	43	66		39	46	72
	4	35	45	71		44	51	78
Richest		42	49	74		50	56	85
Total		30	38	63	•	38	45	70

Table 8.	Commercialization	of Rural Production by	v Household Income Status
I able 0.	Commercianzation	or Rural Frouuction D	y nousenoiu income status

Source: IFPRI (2002).

4. Household Income, Expenditure, and Livestock

Amongst other sources, data from the second Vietnamese Living Standard Measurement Surveys (VLSS II) carried out in 1997-98 and 2002 were used to analyse patterns in livestock and land ownership, household income and its components. In the larger urban areas, livestock ownership is relatively low, but higher in small urban areas (Figure 3). On the other hand, most households in the rural areas own livestock with the exception of the rural Southeast region where the proportion declines to 1 in 2 families. Livestock ownership is particularly high in the mountainous areas, in the Red river delta region and along the Central coast. Households mostly own pigs and chicken, followed by cattle, ducks and other animals. Pigs are owned by 47.6 percent of households own pigs in the rural Northern mountains, Red river delta and central coast areas. The same trends arise for chicken ownership in these regions and also for the rural Central highlands.



Figure 3: Proportion of Households Owning Livestock by Region

Source: VLSS 1998

Urban incomes are generally higher and more diversified than in rural areas, and in the latter livestock plays an important role generally and for lower income groups in particular. Regionally, the wealthiest rural areas are the rural Southeast region and the rural Central highlands, while the poorest rural populations are the Mekong river delta and the North-Central coast. In urban areas the main contributors to total household income are self-employment and other income sources. This starts to change in urban transition areas, and agricultural income in the rural sector eventually ranges from 41 percent in the rural Southeast household income to 70 percent the Central highlands.

Livestock income has important distributional characteristics, both geographically and especially in equity terms. As a share of household income, livestock income is highest in the rural Northern Mountains, Red river delta, Central coast and Central highland areas. More importantly or our purposes, livestock ownership and income is more important for (non-marginal) poor households than for others in Viet Nam. Figures 4-7 make this dependence clear from several perspectives. Firstly, figures 4 and 5 demonstrate that ruminants (mainly water buffalo) and pigs are more prominent in the asset portfolio of the lower income households. Figure 6 shows that livestock is a larger portion of household expenditure requirements, the lower is household income, while figure 7 indicates the same pro-poor aspect of income from livestock.

For policy analysis, figures 4 and 5 are particularly important. This is because of the simple fact that economic policies will benefit the poor if they raise returns to asset classes that belong to them. Clearly, livestock is especially important to the poor, and thus livestock targeted policies will be pro-poor.

Fig 4: Asset value of buffalo as multiple of household income



Fig 6: Expenditure on livestock products as a share of household income







Fig 7: Income from livestock as a share of household income



Source: Viet Nam Household Living Standards Survey, 2002 Iny = logarithm of household income

Unlike products of formal sector activities, like manufacturing and services, livestock and its downstream food, fibre, and other products make a more direct connection between consumers and rural households. Even when animals and their products are processed, high proportions of value added still accrue directly to domestic producers, and these are most often lower income households in developing countries. Using a detailed social accounting matrix for Viet Nam, the following table compares household income multipliers for livestock and animal products with income effects arising from demand for other goods and services.

It is noteworthy, among other things, that the lowest livestock multiplier is higher than any of the comparison demand categories, reflecting lower household value added in the formal sector and weaker income stimulus in particular for the country's rural poor majority. Indeed, when the average livestock multiplier is compared in ratio terms with each agricultural and formal sector alternative, the cumulative household income impact is at least 50 percent higher and often much more so. These results suggest livestock can offer superior opportunities for poverty alleviation among agricultural activities, and that it even dominates goods usually associated with dynamic economic growth (Electronics, Manufacturing, etc.).

Product	Multiplier	Product	Multiplier
Buffalo & Cattle	2.02	Vegetables & Fruit	0.93
Other Livestock	1.84	Other Crops	0.61
Raw Milk	2.24	Textiles	1.09
Silk & Wool	2.03 Electric Equipment		0.74
Beef	1.37	Machinery	0.38
Other Meat	1.68	Other Manufacturing	1.14
Dairy Products	1.87	1.87 Trade	
Leather	2.04	Bus Services	1.36
Livestock	2.03		
Processed Food	1.74		

Table 9: Household Income Multipliers from Livestock and Other Demand Categories

Source: Authors' calculations based on Viet Nam SAM.

The implications of these results are clear. Smallholder livestock promotion belongs within the core development strategies for countries like Viet Nam, even as they aspire to pursue urban and export oriented industrialization. Because of superior income effects for rural poor majorities, these policies will not offer superior results in terms of poverty alleviation, but also substantial additional growth leverage from increased domestic purchasing power.

5. Scenario Assessment

The poverty reduction opportunities from livestock promotion, as well as its potential as aggregate growth catalyst, are even more apparent when we consider policies that could increase smallholder productivity and market access. To elucidate these pathways we have developed an economy-wide forecasting model that captures Viet Nam income distribution at an unprecedented level of detail. The framework is a standard Calibrated General Equilibrium (CGE) model, implemented with a Social Accounting Matrix (SAM) that accounts for income and expenditure patterns for 600 household types across the country (rural and urban deciles in each of 30 provinces).

The SAM itself makes the link between livestock and poverty reduction very apparent. The following figure shows Lorenz curves, for total income and poultry income, computed across all 600 household groups. Obviously, the Gini coefficient for poultry income is substantially smaller than that of all income, clearly demonstrating that general promotion of poultry income will benefit the poor more than neutral economic growth. Of course, targeting smallholder livestock for higher value creation would be even more beneficial in this respect.



Figure 8: Lorenz Curves for Total Income and Income Derived from Poultry

The model can be applied in either comparative static or dynamic mode, with the latter covering the period 2010 to 2020. In the scenario examples below, we use it for comparative static experiments related to smallholder livestock productivity. In particular, we assume that a set livestock policies are implemented for the pig (Fig 9) and poultry (Fig 10) sector that increase productivity by 25 percent over a five year period. Finally, we assume that distribution margins in the livestock sector generally are reduced by 50 percent over the same period.



Figure 9: Productivity Growth for Pigs



Figure 10: Productivity Growth for Poultry

The positive linkage between livestock and poverty can of course work both ways. As part of our research on Avian Influenza, we have conducted experiments to estimate economy-wide household income effects from large scale poultry losses, as these might arise from pandemic bird infection or comprehensive control measures to pre-emptively slaughter birds. The following figure shows how household incomes would be impacted if half the nation's poultry stock were lost. Obviously, such an event would be extremely detrimental, not only in terms of absolute poverty but also because it would significantly contribute to higher national inequality.



Figure 11: Household Income Effects of a 50 percent National Poultry Loss



6. Conclusions

For PPLPI, the Integrated Poverty Assessment of Livestock Policy (IPALP) approach serves as an essential evaluation tool both *ex ante* and *ex post*. Analysis of initial conditions can improve identification of target groups and anticipate their needs for effective programme support and promotion of market access. Whether or not the desired policy changes will actually take place depends, to a significant extent, on how effectively proponents can present their arguments to policy and decision makers at various levels, within the context of the prevailing political economy. Tools such as these can support the design, promotion, and implementation of more effective policies for equitable and sustainable economic growth.

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8. Disclaimer & Contacts

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David Roland-Holst

Rural Development Research Consortium 223 Giannini Hall University of California Berkeley, CA 94720 - 3310 USA Tel: +1 (510) 642 – 4823 Fax: +1 (510) 524 – 4591 E-mail: <u>dwrh@rdrc.net</u>

Nguyen Do Anh Tuan

Director, Southern Office (SCAPS) Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD) Ministry of Agriculture and Rural Development (MARD) Ho Chi Minh City, Viet Nam E-mail: ndatuan@ipsard.gov.vn; ndatuan@gmail.com

Joachim Otte

Pro-Poor Livestock Policy Facility; FAO - Animal Production and Health Division Viale delle Terme di Caracalla 00153 Rome, Italy Tel: +39 06 57053634 Fax: +39 06 57055749 E-mail: Joachim.Otte@fao.org

Or visit the PPLPI website at: www.fao.org/ag/pplpi.html