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Decisions on livestock keeping in the semi-arid areas of Limpopo Province

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Decisions on livestock keeping in the semi-arid areas of Limpopo Province

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Abstract

One of the central questions facing South African agricultural and rural policy makers is whether poor rural households would take opportunities afforded to them through increased public expenditures in these areas. This study spotlights the rural livestock sub-sector in the poor semi-arid areas of the Limpopo province and investigates the factors behind the decision by households to keep livestock and also the rationale to keep given herd sizes. It tests the central hypothesis that poor households would invest in livestock when there are opportunities for them to do so in the form of infrastructure and other support services. The study finds that these poor households indeed do respond positively in cases where there are such opportunities by investing in livestock. These findings illuminate the need for deliberate investments aimed at promoting agricultural (particularly livestock) growth, and thereby creating opportunities for sustainable livelihoods in these areas.

1. Introduction

This study investigates the factors behind the decision by poor households in the semi-arid areas of the Limpopo Province, South Africa, to keep livestock, and also the rationale to keep given herd sizes. It studies how these decisions are influenced by the household's endowment of assets, their income levels, proximity to credit institutions, and access to basic services such as water.

Identifying constraints to rural poverty alleviation, finding sustainable sources of livelihoods in South Africa and implementing deliberate investments to support these is important for many reasons, most of which are well documented. The potential for agricultural growth and its possible contribution towards poverty alleviation has not been adequately studied. However, initial indications are that commercial smallholders in some areas have a comparative advantage in certain commodities such as livestock and irrigated citrus, which, if properly supported by targeted public investments, could result in multiplied income and employment benefits for the rural poor (Ngqangweni, 2000).

Livestock in South Africa, as in other developing countries, could be one of the important sources of livelihoods for the poor. They are estimated to contribute to livelihoods of at least 70 percent of the world's poor (Livestock in Development, 1999). For households affected by poverty, livestock products remains one of the few rapidly growing markets within the agricultural sector. It has also been shown elsewhere that the poor earn a higher income from livestock than the wealthy (Delgado, *et al.*, 1999).

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It is, however, a fact that, unlike the rest of sub-Saharan Africa, most of which is still at the early stages of agrarian transformation and industrial development, South Africa derives a very small (about 3 percent) and declining part of its GDP from agriculture. In addition, there seems to be increasing evidence that, compared to the rest of the region, rural households in South Africa obtain a large part of their income, and devote a significant part of their resources (especially labour), to non-farm activities (see Leibbrandt, *et al.*, 2000; Doward, *et al.*, 2001, among others). South Africa's agricultural economy, in these terms, is significantly different from the economies in the rest of sub-Saharan Africa. Given these facts, some might argue that agriculture is becoming less important in the economy of South Africa including its rural areas.

This paper, however, introduces a counter-argument that the relatively small share of agriculture in national income and the studies showing the importance of remittances and non-farm activities for rural households in South Africa hide the potential contribution of agricultural (and particularly livestock) income in providing self-driven livelihoods for the poor. This is especially true for poor and vulnerable groups who live in the marginalized rural areas within an otherwise advanced industry-based national economy. If it is correct that rural households' move away from dependence on agriculture is more as a result of lack of opportunities in agriculture rather than increasing opportunities outside agriculture, then it is important to know what factors can promote increased participation in this sector. This study tackles this problem and adds to such work as that of Makhura (2001), which provided insights into why certain households sell livestock, horticulture, maize and other field crops and others do not, and whose findings reinforced the need for South African rural policy to focus on building a strong support environment under which poor farmers operate.

2. Data collection and the model

The data was collected through a field survey. The survey entailed a single round of data collection from a sample of 585 households scattered in 24 villages located in three regions of the Limpopo Province of South Africa. Two questionnaires were administered, one for the household sample and the other for the village sample. Between 15 and 18 households were randomly sampled from each of the 24 villages. The interviews recorded data on village-level demographics, general economic and agricultural information, as well as household-level demographics, income, infrastructure, land, environment and women's roles.

The dataset is such that some households keep livestock and some do not. In addition, a set of household-level variables jointly affects both the decision of a household to keep livestock and the number of livestock kept, once the household has decided to keep livestock. Since an ordinary least square (OLS) regression would result in biased coefficient estimates, a Tobit model (after Tobin, 1958) was used. This is consistent with the hypothesized decision process that a household goes through: first to decide whether or not to keep livestock, and secondly, how much livestock to keep, conditional on having decided to keep livestock in the first place.

A two-step process was followed. First, a probit model was estimated using the entire sample with the dependent variable being recoded to "1" for all non-limit observations (where households keep more than zero livestock), and leaving all limit observations at zero. Second, a Tobit model was estimated using maximum likelihood estimation on the entire sample, leaving the dependent variable at the original observed values for all observations. The resulting Tobit coefficient estimates then show the joint effect of each independent variable on both the probability of the dependent variable being non-zero, and the level of the dependent variable.

The decision to keep livestock is represented in the following probit model:

Pr (LIVESTYN) = f (PHYASSET, INCOME, LANDBANK, YOUTHNO, PIPETAP, AGEHEAD, EDUHEAD, RESIDE, HHADFEM, STOCKING, ARABPERH)[3]

Where, LIVESTYN is a binary variable, with values 0 or 1, measuring whether livestock keep livestock (1) or not (0).

The Tobit model explaining the numbers of livestock kept after the decision to keep livestock has been made is as follows:

LIVSTOCK = f (PHYASSET, INCOME, LANDBANK, YOUTHNO, PIPETAP, AGEHEAD, EDUHEAD, RESIDE, HHADFEM, STOCKING, ARABPERH)

Where, LIVSTOCK is the dependent variable measuring the amount of livestock kept by the household (in Large Stock Units, combining cattle, sheep and goats).

3. Households' livestock keeping decisions

Table 1 presents the probit and Tobit results.

[3] Full description of variables is given in Table 1 with the results.

Table 1 Factors influencing the decision of households to keep livestock and numbers kept

Factors	Probit	Tobit
Assets		
Total value of farm and other assets owned by household (PHYASSET)	0.000013 (2.17)*	0.0002698 (4.08)**
Access to credit institutions		
Whether or not the village has access to a land bank (LANDBANK)	0.606 (2.39)*	18.113 (2.69)**
Infrastructure and services		
Whether or not the village has water pipes and taps (PIPETAP)	11.56 (2.87)**	237.308 (2.33)*
Household head characteristics		
Age of household head (AGEHEAD)	0.022 (2.69)**	0.704 (3.37)**
Arable land per head village-wide		
Arable land per head in village (ARABPERH)	3.756 (2.94)**	77.337 (2.40)*
Observations (N)	274	274
Pseudo R-square	0.11	0.06

Not significant: HH income (INCOME); Education of HH head (EDUHEAD); Percentage of members residing in HH (RESIDE); Number of adult women (HHADFEM; Number of youths (YOUTHNO); Stocking density (STOCKING)

Notes: z statistics in parentheses
* significant at 5%
** significant at 1%

Five of the 11 hypothesized variables explaining the decision of households to keep livestock, five are significant. Household endowment with physical assets is positively and significantly associated with the household decision to keep livestock. This proves the hypothesis that presence of household physical assets, as a proxy of households' wealth level, indicates how much the households can afford to invest in livestock. Wealthier households are more likely to keep livestock than those who are less-to-do.

The variable representing the households' access to credit services is significantly and positively associated with the households' decision to keep livestock. The results do support the hypothesis that access to credit services will influence the households' decision to keep livestock.

The presence of pipes and taps in the village indicates progress in terms of basic service and infrastructure provision in the rural areas. This in turn seems to be encouraging households to make the decision to invest in livestock.

Older household heads, the decision makers in the household, will decide to keep livestock. Younger ones will tend not to. This is consistent with a common occurrence in the rural areas of South Africa whereby younger household heads are more likely to migrate in search for urban employment, while older ones remain behind and supervise livestock farming.

Arable land per head, a village-specific variable, is significantly and positively associated with the household decision to keep livestock. This could probably be explained by the fact that in the study area, there is no proper fencing of both arable and grazing lands. As a result, livestock are left to freely move from grazing lands to arable lands. It could also point towards an explanation that when land is available, households would rather keep livestock than planting crops, given the semi-arid climate in the study area.

The rest of the variables are insignificant. These include household income, some household demographic variables, stocking density in the village, and arable land endowment in the village.

The numbers of livestock kept, conditional on the decision to keep livestock having been made by the household, are influenced by the same variables that influence the decision to keep livestock in the first place.

4. Discussion and policy implications

The findings of this study clearly illuminate the central argument made in this paper that, when opportunities are made available in agriculture for them, poor rural households will make use of them. In attempting to characterise livestock keepers in the study area, this study found that the poorer households currently are likely not to decide to keep livestock, while the opposite occurs with the wealthier households. In addition, once the decision has been made to keep livestock, the wealthier households will tend to keep more livestock than the poorer ones. This is an important finding for policy. It shows that the state of being poor affects the ability of households to make investment decisions that might be useful in achieving positive livelihood outcomes.

Households without access to credit institutions are likely to not make the decision to keep livestock and when the decision has been made, those who have access to credit institutions are likely to keep more livestock than those without access. South Africa has a wide range of financial services but these have had varying levels of success in serving the poor. These need to be better positioned in order to serve the needs of poor households.

Lack of rural infrastructure is also shown to discourage investments in livestock. Although there has been progress by South Africa's democratic government in undertaking public investment programmes aimed at the poor, the successes have been limited and have been biased towards urban areas. Speedy investment in rural roads, communications, power, transportation, and other basic infrastructure should take place so as to better link rural areas with the rest of the economy.

An understanding of the demographic structure in the rural areas is important in the making of policies to aid the poor. The current scenario whereby the older household heads tend to be the ones more likely to decide to invest in livestock seems unsustainable if agriculture is to be an important livelihood source. Programmes need to be set up to encourage more youth to be involved in farming and to educate them about its potential to derive livelihoods in rural areas. Also, the data used in this study showed that some female household heads do keep livestock (17 percent) in the study area. This is arguably true for most of South Africa's rural areas. Government support programmes should also be designed to meet the needs of rural women heads.

Interest in livestock keeping could also have been affected by lack of proper institutions specifically related to livestock keeping. The communal tenure arrangement is such that households share common grazing land. Maintenance of the land is non-existent and its use is disorganised as seen in lack of proper fencing, watering points and grazing rotation programmes. Part of the consequence of this is overgrazing and soil erosion. Institutions need to be set up to control the use of the grazing resources. Investments need to be made in maintenance of facilities on the grazing land. Extension officers could act as an important link between the government and rural communities and could also act to monitor the use of grazing land once proper investments have been made.

South Africa has generally had a disappointing experience with programmes aimed at promoting development of agriculture in the poor rural areas. Many of the parastatals that were tasked with agricultural development have withdrawn due to failure of development programmes. Much of the failures have been due to poor design. They had little to do with the potential of agriculture in these areas. Current government disillusionment combined with evidence that seem to suggest relative unimportance of agriculture in the livelihoods of the rural poor have overshadowed what seems to be a good potential for agriculture in rural areas. Policy makers should face the challenge of creating opportunities for agricultural investments by poor rural households with a renewed sense of urgency. Much has been done since the advent of a democratic government, but there is still a long way to go. Opportunities for pro-poor rural growth should be explored and exploited.

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