

# **Livestock Policy Analysis Brief No. 2**

## **Profitability, efficiency and comparative advantage of African cattle meat and milk production: The case of trypanotolerant village cattle production\***

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Trypanosomosis, a cattle disease transmitted by the tsetse fly, is a major constraint to increased meat and milk production and rural incomes in mixed crop-livestock systems of more humid areas of sub-Saharan Africa. Trypanosomosis affects roughly 10 million square kilometres in 37 African countries and has caused losses of as much as 16% and 14% in meat and milk production, respectively.

The exploitation of genetic resistance to trypanosomosis through the use of indigenous trypanotolerant breeds of cattle is one approach to the control of the disease. The approach offers potential for increased cattle production and farm incomes, and reduced imports of dairy and meat products.

But under what circumstances are trypanotolerant village cattle enterprises economically viable? In this study, the profitability, efficiency and comparative advantage of trypanotolerant N'Dama and West African Shorthorn (Baoulé) cattle breeds are estimated using cost-benefit analyses in five sites in The Gambia, Côte d'Ivoire, Togo and Zaire. All four countries are net importers of beef and milk, and are currently attempting to increase cattle production through the use of trypanotolerant cattle breeds.

### **Study sites**

The study villages of Gunjur and Keneba in The Gambia and Boundiali in northern Côte d'Ivoire are located in regions where trypanotolerant cattle are found. Meat and milk production, and more recently animal traction, are commonly practised in the region. In contrast, the villages of Avetonou in southern Togo and Idiofa in western Zaire are situated in areas where cattle keeping was virtually unknown until external organisations introduced cattle for meat production.

Cattle herds in the two sites of introduction in Togo (Avetonou) and Zaire (Idiofa), were smaller than in The Gambia and Côte d'Ivoire. The live weight, reproduction, lactation and mortality statistics in Avetonou and Idiofa also exhibited differences. Cows in these two sites had better reproductive performances, cattle of all ages and sexes were heavier, and subject to lower mortality rates. Lactation offtake was, however, higher in the sites of origin of trypanotolerant cattle, i.e. The Gambia and Côte d'Ivoire.

### **Results**

Profitability of trypanotolerant cattle production is measured by the private and social rates of return. A rate of return lower than the opportunity cost of capital indicates inefficient investment.

At all five sites studied, trypanotolerant cattle production yielded private rates of return greater than the opportunity cost of capital of 10%. The private returns were modest in Gunjur and Boundiali because of the high implicit costs of herding. In both sites, cattle owned by sedentary crop farmers were herded and managed by agropastoralist Fulanis who were paid in cash or kind (milk) for their services.

Even though herding costs were high in Keneba, returns were much higher because of the larger total quantity of milk produced. Financial returns were more robust and profits more attractive in Togo and Zaire due to the subsidised acquisition of cattle and despite benefits being limited to cattle and meat offtake.

Economic (social) rates of return were outstanding in Keneba and high in Boundiali and Gunjur. All three sites had moderate herding costs as the pastoralist Fulanis had low opportunity costs of labour. Social returns were modest in Idiofa and were less than 10% in Avetonou because of the particularly high costs of imported N'Dama breeding stock and the small size of herds. Unlike sites of origin where revenues from milk represented almost half the total social benefits, social revenues were comparatively low in sites of introduction where fresh milk was not consumed.

The extent of policy distortion and market failure is indicated by the divergences between private and social prices of major inputs and outputs associated with cattle production. This also indicates distortions and reveals constraints and possibilities for beef and milk production. In the absence of policy distortions, private and social prices are equal and, hence, there is no divergence in revenues, costs of tradable inputs, costs of non-tradable inputs and profits. Divergences in revenues (from milk and beef) and tradable inputs (veterinary treatments, purchase of N'Dama cattle) were strong in Boundiali and Avetonou because of overvalued exchange rate policies which discriminated against traded products such as milk (in Boundiali) and beef and N'Dama cattle (in Avetonou).

In Keneba and Boundiali, located inland, large divergences were apparent for imported milk due to high transport costs, which increased the border equivalent producer prices. In Keneba, Boundiali and Avetonou, policies implicitly taxed outputs of cattle producers.

Divergences in costs of domestic factors increased private prices in the Gambian sites and Boundiali due to market imperfections. Divergences in profits which are the sum of all the divergences indicated higher private costs and lower private revenues depressing private profits in the Gambian and Ivoirian sites. Herding labour appears as a major constraint in these sites, as does the exchange rate policy in Côte d'Ivoire.

Overall, producers were implicitly subsidised in Togo and Zaire, whereas they were implicitly taxed in The Gambia and Côte d'Ivoire. There is a comparative advantage in producing meat and milk for the local market in the Gambian and Ivoirian sites and in producing beef in Zaire.

## **Prospects for trypanotolerant cattle systems**

Trypanotolerant cattle represent a solution to the problem of livestock production in regions of Africa affected by trypanosomosis. Expansion of trypanotolerant cattle systems should, however, consider alternative trypanosomosis control strategies, the local availability of breeding stock, the level of disease risk etc. In sites where cattle are newly introduced, the level of costs needs to be kept particularly low because benefits are often limited to beef and breeding stock production and farmers face high risks by engaging in an enterprise they are unfamiliar with.

In all the study sites, previously unexploited grazing land was brought into productive use and economic returns and comparative advantage were high. This indicates that resources for trypanotolerant cattle production are efficiently allocated, that the sector is competitive and contributes to national welfare.

The price divergences and constraints identified show that producers in introduction sites were explicitly subsidised. The case of Zaire provides a good example of a successful and profitable introduction of village cattle production, beneficial to farmers and not unduly subsidised. In Togo, however, the incentive structure was so heavily distorted by the high level of subsidies that it was impossible to derive any clear information on farmers' adoption of interventions or on how resources should be allocated in the longer term.

The herding system was a major impediment to increased returns in The Gambia and in Côte d'Ivoire. The secondary role of cattle to crop cultivators and their specialisation explains the share contract applied to herding at these three localities. Following the devaluation of the FCFA in 1994, the competitiveness of the livestock sector in Togo and Côte d'Ivoire should have improved (since traded outputs can be produced with the use of few traded inputs). The reduction in European Union (EU) export subsidies for livestock products brought about by the General Agreement on Trade and Tariffs (GATT) and reforms in the EU's Common Agricultural Policy also represent positive developments which should boost the African livestock sector.

\* This work was undertaken when the author was a graduate associate with the International Livestock Centre for Africa (now the International Livestock Research Institute).

For more information on this issue see: Itty P. 1996. Profitability, efficiency and comparative advantage of African cattle meat and milk production: The case of trypanotolerant village cattle production. *Agricultural Economics* 14 (1):33-44.