



Deutscher Tropentag, October 11-13, 2005, Hohenheim

“The Global Food & Product Chain—
Dynamics, Innovations, Conflicts, Strategies”

Prosperity at a Price? Balancing Opportunities from Cash Crops with Risks of Animal Disease and Drug Resistance

DELIA GRACE¹, PETER-HENNING CLAUSEN¹, OUMAR DIALL², HIPPOLYTE AFFOIGNON³, THOMAS
RANDOLPH⁴, DAO DRAMANE⁵

¹*Freie Universität Berlin, Institute of Parasitology and International Animal Health, Germany*

²*International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Chemoresistance Project, Kenya*

³*University of Hannover, Economics and Business Administration, Germany*

⁴*International Livestock Research Institute (ILRI), Livestock & Human Health, Kenya*

⁵*University of Ouagadougou, Burkina Faso*

Abstract

The largely successful innovation of cotton production using draft cattle is driving change in traditional subsistence farming in West Africa. But the new opportunities from integrating with global markets may perversely increase risks of cattle disease and drug resistance. In the cotton zone, where trypanosomosis is the most important cattle disease, a project funded by BMZ (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung, Germany) carried out socio-economic and epidemiological studies to investigate how disease dynamics are changing in response to changing farming systems. A Knowledge, Attitude and Practice study covered farmers (n=891) in south-western Burkina Faso (established commercially-oriented farming), South Mali (expanding commercially-oriented systems) and in Guinea (traditional systems still predominate). A strong gradient was revealed; commercial farming areas in the east had reduced indigenous trypano-tolerant cattle (down to 19.5%), high levels of sickness and death (22% annual morbidity and 34% case fatality) and high expenditure on trypanocide drugs (\$12 per household), while the traditional systems in the west had retained indigenous breeds (98%), showed less morbidity (22%), much less mortality (5% case fatality) and low expenditure on trypanocides (\$3.2 per household), with areas in between the two locations showing intermediate values. Epidemiological surveys in the same villages (n=77 villages, 5,429 cattle) showed a similar gradient of trypanosomosis prevalence (decreasing from 13.4% in Burkina Faso to 3% in Guinea). Studies that tested for drug resistance, which were carried out in a subset of 20 villages, revealed an analogous pattern of occurrence of drug resistance (decreasing from 100% in Burkina Faso to 0% in Guinea). A mathematical model (SEIR) was developed which showed how farming system, market-connectedness, cattle breed and drug inputs could influence disease prevalence and drug resistance. The model predicted that as commercially oriented farming practices extend, the problems of disease and drug resistance experienced today in Burkina and West Mali will spread to East Mali and Guinea. Project efforts are described that are oriented towards training and informing farmers, service providers and policy makers. These activities help to mitigate unanticipated and unwanted effects of market integration without jeopardising its benefits.

Keywords: Drug resistance, SEIR mathematical model, trypanosomosis, West Africa