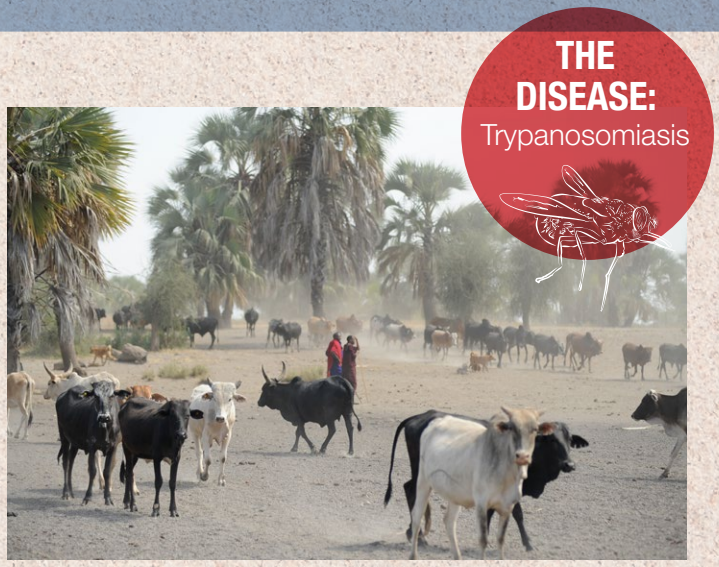
TDR-IDRC RESEARCH INITIATIVE ON VECTOR BORNE DISEASES IN THE CONTEXT OF CLIMATE CHANGE

FINDINGS FOR POLICY MAKERS

TRYPANOSOMIASIS IN TANZANIA

Tsetse-borne Trypanosomiasis in an Age of Climate Change



The background

Economic realities indicate that neither governments nor stock owners are prepared to prioritise large spending on the control of trypanosomiasis nor of its tsetse vectors. In addition, livestock owners are not always fully able to discriminate tsetse from other biting flies, and are often not conversant with the most cost-effective approaches to vector and disease control. This will inevitably lead to an increased risk of human, and animal, African trypanosomiasis (HAT and AAT)

These problems are exacerbated by increasing contact between tsetse, humans and their livestock. This is as a consequence of population growth, and expansion into previously unpopulated game areas. It is unclear to what extent the above changes in tsetse distribution are likely to happen, given unknown future changes in climate and in human and livestock numbers and their distribution.

There is some uncertainty around the exact changes in future temperature and climate – whether these will mirror those of the past few decades or whether the rate of change will accelerate or decelerate. It is therefore critical to continue monitoring the disease and climate variables in the future.

About the project

This policy brief forms part of the research project on Human African Trypanosomiasis: *alleviating the effects of climate change through understanding human-vector-parasite interactions.*

This programme is implemented by TDR-WHO, with funding support from the International Development Research Centre (IDRC) and in technical collaboration with WHO's Department of Public Health and Environment (WHO-PHE), WHO's Regional Office for Africa (WHO-AFRO), and the International Research Institute for Climate and Society (IRI), Columbia University, New York, USA

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Research Approach

1. Carried out major sociological studies, in villages west of the Serengeti game areas, to ascertain knowledge, attitudes and practice relative to tsetse and trypanosomiasis.
2. Analysed available meteorological records from the Serengeti region of Tanzania
3. Monitored tsetse and trypanosome infection levels in villages bordering game areas in the western Serengeti.
4. Investigated the relative efficacy and cost-efficacy of using insecticide versus trypanocide treatment of cattle as disease control interventions.
5. Developed recommendations for the restricted application of insecticides to minimise damage to dung fauna during tsetse and trypanosomiasis control operations.
6. Developed innovative models for tsetse and trypanosomiasis population dynamics, particularly as these processes will be affected by climate change.
7. Full details of experiments carried out, and the workers involved, are available on www.vbd-environment.org

Results

1. The sociological study showed that, contrary to earlier findings, farmers and others living to the west of the Serengeti wildlife areas are not familiar with tsetse and trypanosomiasis.
2. One of the study findings showed that community experience with control programmes remains in memories for decades. This highlights the importance of involving local inhabitants in the implementation of control programmes.
3. While farmers are interested, in theory, in tsetse and trypanosomiasis control, they are not much involved in practice. This may well be because of the effort and costs involved. They, and extension staff, also appear not to be familiar with the use of restricted application of insecticide as a much more economical approach to tsetse and trypanosomiasis control.
4. Our analysis shows that there have been increases in temperature in western Tanzania that are higher than global average increases.
5. Our research suggests that the tsetse and trypanosomiasis risk will be strongly dependent on the extent of future changes in climate.
6. We find that, where there are cattle in a tsetse area, the best method for controlling the flies and trypanosomiasis is to use restricted application of pyrethroid insecticides.

Recommendations:

1 **Support communities' tsetse and trypanosomiasis control efforts**

The study showed that farmers in western Tanzania sometimes confuse tsetse with other biting insects, are unfamiliar with transmission of trypanosomiasis and how the Restricted Application of Pyrethroid insecticides (RAP) can be used as a cost-effective control method. Therefore, training of livestock owners on the benefits of RAP is needed. This is with the aim of them becoming active participants in, and ultimately leaders of, the selected control effort.

2 **Investigate the expanded use of the Restricted Application of Pesticides (RAP)**

Livestock owners are prepared to spend money on tick control and this provides a possible means of carrying out tick and tsetse control simultaneously. Thus, the use of restricted application of those acaricides that are also insecticides has shown promise as a method that might be used to eliminate HAT and to, at least, control AAT in areas where livestock provide the majority of tsetse blood-meals.

3 **Community involvement in vector and disease control operations**

Elders in the community should be involved in planning control interventions together with the health and environment sectors, particularly since they are aware of the historical contexts of disease control in their environment, have insights into socio-cultural aspects of their communities, and may serve as spokespersons between beneficiary community and programme implementers. Women can play a more active role in community participatory approaches to vector and disease control.

4 **Continue and expand climatological monitoring in western Tanzania**

Given the uncertainty of future climatological changes, and our demonstration of the sensitivity of tsetse populations to such changes, it is imperative that climate variables are monitored into the future. The coverage of meteorological monitoring in western Tanzania is currently relatively sparse and could be strengthened.

5 **Continue monitoring vector population levels, and incidence of HAT and AAT in areas neighbouring the Serengeti game areas of western Tanzania**

The uncertainty, referred to above, regarding future climatological changes makes it imperative to continue monitoring vector population levels and the presence of trypanosomes in the tsetse vectors and their mammalian hosts.

6 **Quantify interactions between trypanosomiasis and other vector-borne diseases**

Use the finding of the current Project to provide the basis for a One Health approach to managing vector-borne diseases of humans and livestock (e.g., malaria, tick-borne diseases such as East Coast Fever, Rift Valley Fever). And, at a practical field level, expand the methods and studies developed in our Project to other tsetse-infested areas of eastern and southern Africa, particularly countries such as Kenya, Uganda, Zambia and Malawi that border the countries involved in the current Project.

7 **Contribute to WHO's strategy for eliminating Rhodesian HAT**

At a policy level; this should include, though not be limited to, attendance of selected key Project members at stakeholder meetings.

8 **Promote a comprehensive, integrated, multi-sectoral approach to increasing resilience to vector-borne diseases under climate change conditions**

9 **Focus on most pressing needs**

Given the unavoidable uncertainty of climate change projections, the most pressing need is to strengthen current disease control efforts to reduce disease rates, manage short-term climate risks and to increase resilience of long-term climate change.

10 **Continue support for applied research for policy and practice**

Summary of findings and recommendations

KNOWLEDGE OF TSETSE AND TRYPANOSOMIASIS

Many of the participants **did not know a lot about trypanosomiasis** and how to prevent it.

Therefore

Increase community involvement

TSETSE ABUNDANCE AND TEMPERATURE

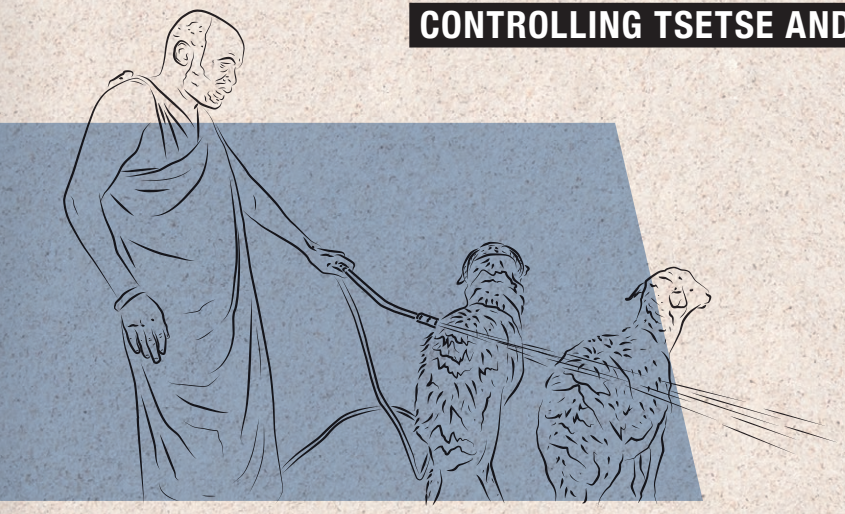
Findings showed that there has been an **increase in temperature**, and that **tsetse risk depends on the climate.**

Therefore

Continue and expand monitoring of

- **Climate variables**
- **Vector population levels**
- **Incidence of AAT and HAT**

CONTROLLING TSETSE AND TRYPANOSOMIASIS



Restricted application of pyrethroid insecticides (RAP) has both a **high efficacy** and is **cost-effective.**

Therefore

RAP use should be expanded.

For more information visit www.vbd-environment.org

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