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TSETSE AND TRYPANOSOMIASIS INFORMATION

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TSETSE AND TRYPANOSOMIASIS INFORMATION

The Tsetse and Trypanosomiasis Information periodical has been established to disseminate current information on all aspects of tsetse and trypanosomiasis research and control to institutions and individuals involved in the problems of African trypanosomiasis. This service forms an integral part of the Programme Against African Trypanosomiasis (PAAT) and is jointly sponsored by the Food and Agriculture Organization of the United Nations (FAO), the International Atomic Energy Agency (IAEA), the Inter-African Bureau for Animal Resources of the African Union (AU-IBAR), the World Health Organization (WHO), the Research Department for Livestock Production and Veterinary Medicine of the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD-EMVT), the British Government's Department for International Development (DFID) and the Institute of Tropical Medicine (ITM), Antwerp.

The half-yearly periodical is prepared for publication, in both English and French editions, by the Food and Agriculture Organization of the United Nations. Each annual volume consists of two parts and an index. Subscription is free for all recipients engaged in trypanosomiasis research and control, and requests for enrolment may be sent to: Ms Maria Grazia Solari, AGAH, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy (fax +39 06 5705 5749; e-mail MariaGrazia.Solari@fao.org).

Since the value of this information service depends to a great extent on the receipt of relevant material from research workers, campaign planners and organizers and field workers themselves, readers are requested to submit news items and copies of scientific papers and reports to the Editor: Dr James Dargie, Brunnstubengasse 43, 2102 Bisamberg, Austria (tel. +43 2262 61735; e-mail j.dargie@aon.at).

We regret that we are unable to supply photocopies of the papers quoted in the periodical.

Distribution dates and copy deadlines

	Copy deadline for news items	Distribution (English and French editions)
Part 1	15 April	July/August
Part 2	15 October	January/February

The Index will be distributed as soon as possible after the completion of each volume.

ABBREVIATIONS USED IN *TTI*

a.i.	active ingredient		LC_{50}	median lethal concentration
ACTH	adrenocorticotrophic hormone		LD_{50}	median lethal dose
ALAT	alanine aminotransaminase		M	molar
ASAT	aspartic acid aminotransaminase		mAEC	miniature anion-exchange
b.w.	body weight			centrifugation technique
BIIT	blood incubation infectivity test		McAb	monoclonal antibody
CATT	card agglutination test for		MW	molecular weight
	trypanosomiasis		NARS	National Agricultural Research
CD_{50}	median curative dose			Services/Systems
CNS	central nervous system		p.i.	post-infection
CSF	cerebrospinal fluid		PCR	polymerase chain reaction
DNA	deoxyribonucleic acid		PCV	packed cell volume
ELISA	enzyme linked immunosorbent assay		ppb	parts per billion (10^9)
HAT	human African trypanosomiasis		ppm	parts per million
HCT	haematocrit centrifugation technique		r.h.	relative humidity
GIS	geographic information system(s)		RNA	ribonucleic acid
GPS	global positioning system(s)		SIT	sterile insect technique
i.m.	intramuscular(ly)		sp(p).	species (plural)
i.p.	intraperitoneal(ly)		ssp(p).	subspecies (plural)
i.v.	intravenous(ly)		UV	ultra-violet
IFAT	indirect fluorescent antibody test		VAT	variable antigen type
KIVI	kit for *in vitro* isolation of		VSG	variant surface glycoprotein
	trypanosomes		WBC	white blood cell

Organizations

ANDE	Agence Nationale de Développement de l'Elevage
AU	African Union
AU/STRC	African Union/Scientific, Technical and Research Commission
BICOT	Biological Control of Tsetse by the Sterile Insect Technique
CEBV	Communauté Economique du Bétail et de la Viande
CEMV	Centre Universitaire de Formation en Entomologie Médicale et Vétérinaire
CGIAR	Consultative Group on International Agricultural Research
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
CIRAD-EMVT	Département d'Elevage et de Médecine Vétérinaire des Pays Tropicaux du CIRAD
CIRDES	Centre International de Recherche-Développement sur l'Elevage en Zone Subhumide
CNERV	Centre National d'Elevage et de Recherches Vétérinaires
CNRS	Centre National de Recherche Scientifique
CREAT	Centre de Recherche et d'Elevage, Avétonou, Togo
CRSSA	Centre de Recherches du Service de Santé des Armées Emile Pardé
CTVM	Centre for Tropical Veterinary Medicine
DFID	Department for International Development (UK)
DSE	German Foundation for International Development
EC/EU	European Community/European Union
EDF	European Development Fund
FAO	Food and Agriculture Organization of the United Nations

FITCA	Farming in Tsetse Control Areas of Eastern Africa
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IAEA	International Atomic Energy Agency
IBAR	Interafrican Bureau for Animal Resources
ICIPE	International Centre of Insect Physiology and Ecology
ICPTV	Integrated Control of Pathogenic Trypanosomes and their Vectors
IFAD	International Fund for Agricultural Development
ILRI	International Livestock Research Institute
INRA	Institut National de Recherche Agronomique
IPR	Institut Pierre Richet
IRD	Institut de Recherche et de Développement (formerly ORSTOM)
ISCTRC	International Scientific Council for Trypanosomiasis Research and Control
ISRA	Institut Sénégalais de Recherches Agricoles
ITC	International Trypanotolerance Centre
KARI	Kenya Agricultural Research Institute
KETRI	Kenya Trypanosomiasis Research Institute
LCV	Laboratoire Central Vétérinaire
LNERV	Laboratoire National de l'Elevage et de Recherches Vétérinaires
LSHTM	London School of Hygiene and Tropical Medicine
MRC	Medical Research Council
MRU	Mano River Union
NITR	Nigerian Institute for Trypanosomiasis Research
NRI	Natural Resources Institute
OCCGE	Organisation de Coopération et de Coordination pour la Lutte contre les Grande Endémies
OCEAC	Organisation de Coordination pour la Lutte contre les Endémies en Afrique Centrale
OGAPROV	Office Gabonais pour l'Amélioration de la Production de la Viande
OIE	Office International des Epizooties
OMVG	Organisation pour la Mise en Valeur du Fleuve Gambie
PAAT	Programme against African Trypanosomiasis
PATTEC	Pan-African Tsetse and Trypanosomiasis Eradication Campaign
PRCT	Projet de Recherches Cliniques sur la Trypanosomiase
RDI	Rural Development International
RUCA	Rijksuniversitair Centrum Antwerpen
SADC	Southern African Development Community
SIDA	Swedish International Development Authority
SODEPRA	Société pour le Développement des Productions Animales
TDR	UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases
TDRC	Tropical Diseases Research Centre
TPRI	Tropical Pesticides Research Institute
TTRI	Tsetse and Trypanosomiasis Research Institute
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
UTRO	Uganda Trypanosomiasis Research Organisation
WHO	World Health Organization

CONTENTS

SECTION A – NEWS

THE 29TH INTERNATIONAL SCIENTIFIC COUNCIL FOR TRYPANOSOMIASIS RESEARCH AND CONTROL (ISCTRC) CONFERENCE

The International Scientific Council for Trypanosomiasis Research and Control (ISCTRC) is a statutory organ of the Africa Union and with its Secretariat located in the International Bureau for Animal Resources (IBAR) in Nairobi. The Council was established in 1948 to control tsetse transmitted African human and animal trypanosomiasis by coordinating research, capacity building and timely dissemination of necessary information.

The Council organized the first ISCTRC biennial Conference a year after it was established and continues to date, bringing together stakeholders that are responsible for management of tsetse and trypanosomiasis problem in the continent, international organizations and private sector to facilitate development of joint strategies. The 29th Conference promises to be a watershed Conference in the history of the Council. The Conference convenes for the first time in Luanda, Angola, from 1 to 5 October 2007 where 100 oral and poster presentations will be made to over 300 participants that work in the tsetse-trypanosomiasis research and development domain in Africa. The themes for the 29th Conference will focus on activities of Pan African Tsetse and Trypanosomiasis Eradication Campaign (PATTEC), Human Trypanosomiasis, Animal Trypanosomiasis, Capacity Building, Networking and Related Land Use and Environment. Each theme will be preceded by keynote speech in specialised area of knowledge that together with presentations will be discussed to develop specific time bound recommendations to improve the disease management approaches.

The Conference will be attended by representatives of African member states, research organizations, non governmental organisations, international organizations and private sector that jointly implement the recommendations of the scientific Conference.

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BOOK PUBLICATIONS

1**. Shaw, A., Hendrickx, G., Gilbert, M., Mattioli, R., Codjia, V., Dao, B., Diall, O., Mahama, C., Sidibé, I. & Wint, W., 2006.** *Mapping the benefits: a new decision tool for tsetse and trypanosomiasis interventions.* Research Report. Department for International Development, Animal Health Programme, Centre for Tropical Veterinary Medicine, University of Edinburgh, UK, and Programme Against Animal Trypanosomiasis, Food and Agriculture Organization of the United Nations, Rome, Italy.

Trypanosomiasis is one of the greatest constraints to animal health in sub-Saharan Africa. It also affects human health, agricultural output and land use. However, despite its importance, decisions relating to trypanosomiasis control are often made on the basis of very limited information, which may lead to some extremely costly errors. The authors of this study address the decision-making process by innovatively combining the analytical potential of geographic information systems with production systems analysis and economics. The study presents economic variables in a way that is accessible to both decision-makers and those concerned with trypanosomiasis control in the field, and which should also provide insights into aspects of the control of other animal and crop health problems.

This study is a joint publication: as one of the "blue series" of Research Reports from the Department for International Development–Animal Health Programme (DFID–AHP), and as a Position Paper from the Programme Against African Trypanosomiasis (PAAT). This joint publication also reflects the shared funding of the work by the Food and Agriculture Organization of the United Nations (FAO), the International Atomic Energy Agency (IAEA) and DFID–AHP. It complements the other FAO publications in the highly successful PAAT Technical and Scientific Series as well as the three related publications in the AHP's blue series. It is also the first publication in any of these series to appear in both English and French.

The purpose of this study was to investigate the feasibility of linking quantitative economic variables to a geographical information system (GIS) spatial framework in order to provide new insights and reinforce the decision-making process for tsetse and trypanosomiasis (T&T) interventions. Hitherto, GIS studies have mapped a series of ecological, demographic and socio-economic indicators, but have stopped short of mapping a derived measure quantified in monetary units. Furthermore, the economic aspects of T&T control have historically been dealt with separately from their other effects, with results usually expressed in terms of benefit–cost ratios or extra income per head of livestock. Even when they have been expressed in terms of US dollars per square kilometre (US$/km$_2$) these results have not been mapped; instead they have been used as inputs for benefit–cost type analyses. In contrast, the approach developed here combines – for the first time – economic herd models with mapping of both breed/production systems and the expansion of livestock populations under various scenarios.

The first phase of the work tackled Benin, Ghana and Togo. The second phase extended the work to cover parts of Burkina Faso and Mali. A range of standardised livestock population, production and price data were collected at country, province and district level from each of these five countries, together with the most recent livestock population, cropping and disease data. These were amalgamated with the corresponding data layers derived and adapted from the Programme Against African Trypanosomiasis Information System (PAAT-IS). At the mapping stage, the data were extrapolated to cover the areas

around the five countries, notably including Côte d'Ivoire for which considerable data already existed in the authors' archives and databases.

Four breed/production systems were defined and mapped: a predominantly taurine system with minimal use of animal traction; a crossbred taurine×zebu system with moderate use of animal traction; a crossbred zebu×taurine system with very high use of animal traction; and a zebu system with moderate animal traction use. By combining these definitions with the new data and the PAAT-IS data layers, a new distribution map was produced that linked trypanotolerant and susceptible cattle breeds to production systems.

Existing information on the disease's impact on cattle production parameters was incorporated in a series of deterministic herd models, which projected the cattle populations and calculated the income derived from them over a period of 20 years. These modelled the situation both with and without the presence of trypanosomiasis in the "core" population area, (where cattle populations are currently located) and in the 'export' areas (into which cattle populations are likely to expand over the period analysed). Thus 2×2 or four interrelated models were produced for each cattle breed/production system. For the purposes of the study, each herd model had two main outputs: an estimate of cattle population growth and an estimate of income. Income from cattle was calculated as the value of meat, milk, animal traction, and herd growth less production costs. By comparing income in the absence and presence of trypanosomiasis, the potential benefits of T&T interventions could be estimated for the different cattle breed/production systems over the 20-year period. These were then discounted to their present value and converted to a single US$ amount, expressed as benefits per head of cattle present at the end of the time period and split between those generated by cattle remaining in the core area and those arising from cattle populations that had expanded into export areas.

The final part of the study mapped livestock population distributions. By applying the estimates of the cattle population growth rates provided by the herd models to maps of the current distribution of cattle, it was possible to map the estimated distribution of livestock in 20 years' time. This future population was compared to the land's estimated carrying capacity to identify those areas where cattle numbers exceeded resources available to sustain them. For these situations, a step-wise spatial expansion model was applied to show how 'excess' cattle populations might spread into nearby areas where grazing was available. The cattle populations that remained in their original locations were those modelled as the core population; the cattle that spread to new areas were defined as the export herd. This spatial expansion model made it possible to quantify the potential benefits of the removal of trypanosomiasis from areas into which new cattle populations would migrate. The need to find ways to estimate the benefits from this type of expansion of livestock production has been a major unresolved issue in analysing the T&T problem.

The results of the work are depicted in a series of maps throughout the text, culminating in the map shown as the frontispiece to this report. This map illustrates the geographical distribution of the potential US$ benefits from the removal of trypanosomiasis throughout the zone studied. As with all modelling and mapping exercises, care must be taken not to interpret the figures as absolute values providing exact answers, but to keep in mind that combining a number of estimates in this way will always generate results that include a greater or lesser margin of error. That said, the resulting maps very clearly illustrate that combining economic and biophysical variables adds a dimension beyond that which has previously been mapped. The summary map highlights the enormous potential benefits to be gained over the 20-year timeframe from those areas where there is already a high reliance on

draught power: in the northern fringes of the tsetse distribution. It also shows that, within this time period, significant benefits from the removal of trypanosomiasis are unlikely to be gained in land to the south of this area for two reasons. Firstly, the cattle numbers are too low, even after expansion of cattle populations into new areas has been accounted for and, secondly, this area makes limited use of animal traction, even taking into account the potential for a significant increase in its use if the constraint of trypanosomiasis were removed.

The complexity of the analysis imposed a number of limitations that point to areas where either the modelling approach or the quality of the data could be improved. In particular, it was impractical to model more than the four production systems considered; these in themselves required 16 herd models, with the resulting US$ values mapped for 12 categories of cattle. The data on the effects of the disease on cattle production parameters are mostly based on in-depth studies conducted in relatively small localities. This inevitably adds more uncertainties about their extrapolation to large areas and slightly different production systems. Another tricky aspect to the study was in determining the level of tsetse challenge and the prevalence of trypanosomiasis in the cattle populations. In particular, the levels of challenge in the areas that are on the limits of tsetse distribution need more study. These aspects were factored into the calculations indirectly, as general effects of the disease within each production system. Finally, the economic models are also highly sensitive to the use made and the value of animal traction, and more fieldwork on these aspects would make the calculations more precise. Nevertheless, the results are in line with those found in other studies and modelling exercises.

From the point of view of decision-making within the field of T&T interventions, having mapped the benefits the obvious next step is to consider mapping the costs. This would, however, first require undertaking a similar exercise to the current one to combine cost models with spatial data. The regions that show benefits that exceed the costs calculated for different interventions could then be mapped, as could the benefit–cost ratios for the various control options.

Thus, this report provides "proof of concept" that mapping economic benefits in this way does add an extra dimension and new insights to the existing range of mapped variables. It goes beyond simply mapping cattle and tsetse distributions and makes it possible to calibrate the effects of the disease in relation to the key components of livestock incomes and to place a value on income generated in new areas into which livestock populations could expand. By combining a demographic variable with projections of economic benefits for a range of production system layers, and taking account of expansion into new areas, this approach could have wide applicability in the analysis of other production constraints affecting agricultural expansion and productivity.

2. **IAEA-TECDOC 1559.** *Developing methodologies for the use of polymerase chain reaction (PCR) in the diagnosis and monitoring of Trypanosomosis. Final Results of an FAO/IAEA Coordinated Research Project. 2001-2005*

The Animal Production and Health Section of the Joint FAO/IAEA Division has promoted the use of modern nuclear based techniques in diagnosis and control of livestock diseases for the past 20 years. Support for methods exploiting the polymerase chain reaction (PCR) began in 1997 with a Coordinated Research Project (CRP) to develop PCR methods to study and diagnose a range of transboundary diseases affecting livestock. Trypanosomes produce a variety of diseases affecting both animals and man. The agents for the disease and immunology of the pathogen/host relationship are

very complex. Diagnosis of the disease has relied on more conventional methods such as direct assessment of organisms through a microscope and serological tests, such as complement fixation and haemagglutination, looking at the serum from animals to detect antibodies. The sensitivity and specificity of the tests have never proven ideal to allow either sufficiently low levels of organisms to be identified or to determine exactly which strain of trypanosome were causing the disease.

The work described in this publication examines many features of the use of PCR in the detection of trypanosomes. These include drug treatment of animals and man where it is imperative to understand whether an individual is infected at all, and to what extent that infection has progressed. The PCR offers a solution to the detection of organisms since theoretically it has an incredible sensitivity, since minute amounts of nucleic acid in samples can be amplified. The specificity of PCR also resides in the identification of absolutely specific parts of a genome and their detection. Theoretically the PCR offers the maximum diagnostic sensitivity and specificity profile. In practice there are many factors that affect the theoretical limits of the PCR. Sample taking, handling, extraction and processing all affect the sensitivity from field samples and reduce the diagnostic potential. The high specificity inherent in using specific probes means that the test is expensive where many probes have to be used for ultimate identification of a trypanosome. Working protocols for the use of specific probes have been determined. The handling and extraction of samples has been optimized. The use of universal primers for the detection of all trypanosomes has been examined with promising results. Validation of methods is paramount and this has been addressed. One of the key benefits from this CRP, as in all others, has been the cooperation generated between scientists from many countries. The links between more established laboratories with expertise and those just starting were forged and enabled accelerated development. The quality of work in all the laboratories has increased generally through the CRP. Such PCR-based tests will allow an unequivocal estimation of the effect of interventions in the eradication of trypanosomosis, such as those involving the sterile insect technology (SIT) in the tsetse control programmes. The officer responsible for compiling this publication was J.R. Crowther of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture.

Papers

Molecular detection of *Trypanosoma* infection: PCR and PCR-ELISA techniques, *M. F.W. Te pas*
New diagnostics for the detection of animal trypanosomoses, *A.G. Luckins*
Molecular markers for the different (sub)-species of the Trypanozoon subgenus, *F. Claes and P. Büscher*
Application of PCR/CSF for stage determination and therapeutic decision in human African trypanosomosis in Côte d'Ivoire, *V. Jamonneau, P. Solano, A. Garcia, V. Lejon, N. Djé, T.W. Miezan, P. N'Guessan, G. Cuny, P. Büscher*
Evaluation of different primers and DNA preparations for molecular diagnosis of human African trypanosomosis (French text), *M. Koffi, V. Jamonneau, L. N'dri, P. Solano*
Molecular differential diagnosis of African trypanosomosis in Uganda, *J. C.K. Enyaru*
Detection of *T. b. rhodesiense* trypanosomes in humans and domestic animals in South East Uganda by amplification of serum resistance associated gene, *J.C.K. Enyaru, E. Matovu, A. Nerima, M. Akolm, C. Sebikali*
The use of ITS1 rDNA PCR in detecting pathogenic African trypanosomes, *Z.K. Njiru, J.K. Kinyua, C.C. Constantine, S. Guya, J.R. Crowther, J.M. Kiragu, R.C.A. Thompson, A. M. R. Dăvila*
Genetic diversity of *Trypanosoma evansi* in Thailand based on a repeated DNA coding sequence marker, *N. Sarataphan, S. Boonchit, C. Siriwan, P. Indrakamhaeng*

Real-time PCR for detection of *Trypanosoma evansi* in blood samples using SYBR green fluorescent dye, *N. Sarataphan, K. Unjit, M. Vongpakorn, P. Indrakamhaeng*

Application of dried blood sample on FTA paper for detection of *Trypanosoma evansi* by PCR, *T. Chompoochan, K. Mohkaew, S. Ngamjiaue, N. Sarataphan*

Determination of the *Trypanosoma congolense* and *Trypanosoma evansi* antibodies detection ELISA for the diagnosis of surra in cattle in Thailand, *D. Tuntasuvan, T. Chompoochan, W. Bunnoy, K. Mohkaew, E. Winger, J.R. Crowther*

Molecular diagnosis of trypanosome species, *G.Viljoen, J.M. Romito*

Using PCR for unraveling the cryptic epizootiology of livestock trypanosomosis in the Pantanal, Brazil, *A.M.R. Dávila, H.M. Herrera, T. Schlebinger, S.S. Souza, Y.M .Traubcseko*

Evaluation of a polymerase chain reaction assay for the diagnosis of bovine trypanosomosis and epidemiological surveillance in Bolivia, *J.L. Gonzales Rojas, T.W. Jones, K. Picozzi, H.R. Cuellar*

Bovine trypanosomosis in the Bolivian Pantanal, *J.L. Gonzales, E. Chacon, M. Miranda, A. Loza, L.M. Siles*

Experimental infection of buffaloes, *M. V. Ngoc, K. Nguyen*

Detection and classification of *Trypanosoma cruzi* genotypes in animals of an endemic area of Chile, *A. Solari, M. Rozas, X. Coronado, C. Botto-Mahan, S. Ortiz*

Evaluation et validation des amorces ITS pour l'amélioration du diagnostic PCR des trypanosomoses animales Africaine, *I. Sidibé*

Détection de *Trypanosoma congolense* type savane par la PCR-ELISA dans des échantillons de sang de bovin, *I. Sidibe*

Molecular markers for the different (sub)-species of the Trypanozoon subgenus, *F. Claes, E. Agbo, M. Radwanska, M.F.W. Te Pas, P.B. Büscher*

Specific enzymatic amplification of DNA *in vitro*: the polymerase chain reaction (PCR) protocols, *P. Henning Clausen*

Amplification of *Trypanosoma* (Trypanozoon) *brucei* DNA

Amplification of *Trypanosoma congolense* forest DNA

Amplification of *Trypanosoma congolense* savannah DNA

Amplification of *Trypanosoma vivax* DNA

DNA Bank, *A. Diallo*

Trypanosoma spp. ring test protocol, *G. Viljoen*

Detection of PCR products via oligochromatography (dipsticks), *F. Claes*

UPCOMING CONTRIBUTIONS TO THE PAAT TECHNICAL AND SCIENTIFIC SERIES

1**. Cecchi, G., Mattioli, R.C., Slingenbergh, J., de la Rocque, S. & Feldmann, U., 2007.** *Standardizing land cover mapping for tsetse and trypanosomiasis decision making*

In this paper the Land Cover Classification System (LCCS), developed by the Food and Agriculture Organization (FAO) and the United Nations Environment Programme (UNEP), is proposed as a tool to harmonize land cover mapping exercises carried out in the context of tsetse and trypanosomiasis (T&T) research and control. The potential of land cover maps to describe and predict tsetse habitat at different resolutions is also explored.

In chapter one, the LCCS-compliant Global land cover of Africa of the year 2000 and the predicted areas of suitability for tsetse provided by the PAAT - Information System (PAAT-IS) are matched to study the broad patterns of the association between land cover and the three groups of tsetse flies (i.e. *fusca, palpalis* and *morsitans*).

In chapter two, a standardized legend for land cover mapping in T&T decision making is proposed, which is based on the products and methodology developed by the FAO-Africover project. The 26-class legend derives from thematic aggregation of more than 500 land cover classes present in the original multi-purpose Africover maps of eight T&T affected countries (i.e. Burundi, Democratic Republic of the Congo, Kenya, Rwanda, Somalia, Sudan, Uganda and United Republic of Tanzania). The legend is used to describe tsetse habitat across several countries in a harmonised and coherent manner. A review of the literature allowed matching of standardized land cover classes and suitability for tsetse. The practical and conceptual difficulties posed by the validation of the estimated classes of suitability are discussed; in this regard, one method linking land cover datasets at different resolutions gave positive results.

In chapter three one case study, namely Uganda, illustrates how country maps compliant with LCCS can be analysed in more detail and customised to better meet the requirements of tsetse habitat mapping. In this section, a detailed description of the land cover classes is provided, including key factors for estimating tsetse habitat suitability.

Finally, the standardized description of the land cover classes according to LCCS and the tables of class aggregation are provided as annexes.

Standardization of land cover mapping is an important step towards the harmonization of the Information Systems (IS) and of the GIS-based Decision Support Systems (DSS) for trypanosomiasis intervention. The adoption of LCCS within T&T control programmes will greatly benefit regional cooperation and facilitate the use of existing and upcoming land cover maps.

The high resolution of the datasets discussed in the report (within a range of scales from 1 : 200 000 to 1 : 50 000) will make possible the production of a new generation of risk maps, based on a deeper understanding of the landscape and environmental dynamics that drive the distribution of tsetse in Africa. Habitat modifications are increasingly induced by human actions, either at global scale, as in the case of the climatic change, or at local scale, like in the processes of urbanization and agricultural expansion. The challenges posed in the future by trypanosomiasis are likely to be shaped by those drivers to the extent that no appropriate intervention can possibly be contemplated without considering them.

2**.** *Spatial datasets for the management of the trypanosomiasis problem: an environmental approach*

The present note describes work in progress within the PAAT Information System for the identification and dissemination of the best global GIS datasets available in the public domain. This activity aims at improving and harmonising planning, implementation and evaluation of tsetse and trypanosomiasis (T&T) interventions.

There is an increasing amount of spatially explicit information freely accessible through internet that has proved to be very useful in assisting all aspects of the T&T decision making process. Still, the potential of such a wide and dynamic source of information has yet to be fully exploited. Field project managers/planners, though recognizing the importance of GIS for targeting and streamlining operations, may not be aware of the existence of datasets

that could greatly contribute to cost-saving, a more efficient use of financial resources and eventually leading to more effective interventions. In other instances there may be a lack of adequate capacity for handling and integrating the GIS techniques into the project cycle.

During a first phase, a thorough review of public domain global geospatial datasets was carried out. Data were selected in consideration of their relevance for T&T decision making, spatial resolution (i.e. scale), accuracy and update. The major products identified concern tsetse distributions, human and livestock population densities, agro-ecological zones, protected areas, digital elevation models (DEM) and satellite imagery. For each data layer a short description is provided, followed by information on data access and related web sites. Preliminary collated information, in form of a draft document that includes the review of GIS datasets, was shared with PAAT partners during PAAT statutory meetings and via e-mail.

In the ongoing second phase, the selected datasets are processed and analysed to support an informed T&T decision making. This activity would greatly benefit from a closer collaboration with PAAT partners and their feedback on implementation of T&T field operations. T&T intervention operators should provide suggestions to orient the analysis according to projects' requirements.

The selected datasets were presented in greater detail during an Interactive Training Workshop held at FAO-HQ in Rome from 27 November - 8 December 2006. The workshop addressed the issue of harmonization of GIS-based Decision Support Systems (DSSs) and Information Systems (ISs) in T&T intervention and was attended by approximately 20 participants, including key GIS specialists from tsetse affected countries, FAO staff from different divisions and external experts. Participants acknowledged the importance of the initiative and recommended PAAT to continue supporting partners in the affected countries in the fields of information management, spatial analysis and harmonization of methodologies.

Ideally, the review of global datasets should be followed by a section devoted to national and local datasets. A call for short contributions to be published as case-studies within the PAAT Technical and Scientific Series was opened to PAAT partners and GIS specialists who are active in planning and implementation of T&T intervention projects. Particularly needed are notes addressing the following issues:

- review, collation, harmonisation and new inside analysis of available/historical entomological and parasitological datasets using GIS/Database applications;
- planning and implementation of baseline entomological/parasitological surveys to complement/improve historical knowledge;
- establishment of national Information Systems for managing T&T related information.

THE WHO/TDR PROGRAMME

1. **Foundation for Innovative New Diagnostics and WHO collaborate to improve diagnosis of sleeping sickness with a Gates Foundation grant.**

The Foundation for Innovative New Diagnostics (FIND) and the World Health Organization (WHO), with a grant from the Bill & Melinda Gates Foundation, announced that they will begin work on the development and evaluation of new diagnostic tests for human African trypanosomiasis, also known as sleeping sickness. African sleeping sickness, a major public