THE PROGRAMME AGAINST AFRICAN TRYPANOSOMIASIS

REPORT OF THE TWELFTH PAAT ADVISORY GROUP CO-ORDINATORS MEETING

KASANE, BOTSWANA

18-19 OCTOBER 2006

Food and Agriculture Organization of the United Nations
Inter-African Bureau for Animal Resources of the African Union
International Atomic Energy Agency
World Health Organization of the United Nations

Acronyms

AAT	Animal African Trypanosomiasis
AfDB	African Development Bank
ARI	Advanced Research Institute
AU	African Union
CIRDES	Centre International de Recherche-Développement sur l'Elevage en Zone Subhumide
COCTU	Coordinating Office for control of trypanosomiasis in Uganda
CTVM	Centre for Tropical veterinary Medicine
DG	Director General
ESTA	Ethiopian Science and Technology Agency
FAO	Food and Agriculture Organization of the United Nations
FIND	Foundation for Innovative New Diagnostics
GFAR	Global Forum on Agricultural Research
GIS	Geographic Information Systems
HAT	Human African Trypanosomiasis
IAEA	International Atomic Energy Agency
IBAR	Interafrican Bureau for Animal Resources
ICIPE	International Centre of Insect Physiology and Ecology
IFAD	International Fund for Agricultural Development
IFAH	International Federation for Animal Health
IGAD	Inter-Governmental Authority on Development
ILRI	International Livestock Research Institute
IPM	integrated pest management
IS	Information System
ISCTRC	International Scientific Council for Trypanosomiasis Research and Control
ISO	International Organization for Standardization
ISRA	Institut Sénégalais de Récherche Agricole
ITC	insecticide-treated cattle
ITM	Institute of Tropical Medicine
LC	Land Cover
LCCS	Land Cover Classification System
LPI	Livestock Policy Initiative
LRE	Laboratoire Régional de l'Elevage
MoU	Memorandum of Understanding
NARS	National Agricultural Research Systems
NGO	Non-governmental Organization
PAAT	Programme against African Trypanosomiasis
PAAT-IS	Programme Against African Trypanosomiasis- Information System
PAG	PAAT Advisory Group Coordinators
PATTEC	Pan-African Tsetse and Trypanosomiasis Eradication Campaign
PCMU	Project Coordination and Management Unit
PROCORDEL	Programme de Recherche et Développement
SARD	Sustainable Agricultural and Rural Development
SAT	Sequential Aerosol technique
SIT	Sterile Insect Technique
STEP	Southern Tsetse Eradication Project
TC	Technical Cooperation
T&T	Tsetse and Trypanosomiasis
TTI	Tsetse and Trypanosomiasis Information bulletin
UCLT	Unité Centrale de Lutte contre la Trypanosomiase
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UNTFHS	United Nations Trust Fund for Human Security
UTCC	Uganda Trypanosomiasis Control Council
WHO	World Health Organization

FOREWORD

The twelfth PAAT Advisory Group (PAG) Coordinators' meeting was held in Kasane, Botswana, 18-19 October 2006.

Mr R.C. Mattioli, Focal Point of the PAAT Secretariat, gave a brief introductory note and highlighted PAAT mandate and activities.

Mr A.A. Ilemobade, PAAT Chairman, welcomed the participants and thanked the PAAT Secretariat for convening the meeting and the Botswana authorities for assisting the PAAT Secretariat in the meeting organization. The PAAT Chairman recalled the objectives of the Programme and of the meeting. PAAT's scope and interest are broad, embracing also the related dimensions of rural and animal health, land use, natural resources and socio-economic development. These public goods are all interconnected and brought together under one single PAAT umbrella. Doing so, PAAT creates the best opportunities to benefit from the inter-agency PAAT alliance and opens the door to a comprehensive landscape based approach, addressing arthropod borne diseases, farming systems, integrated pest management (IPM), environment, sleeping sickness and other human and animal health constraints to rural development. The action programmes drawn up under the auspices of PAAT are aimed at changing the disease stricken landscape into healthy rural development environments. PAAT supports this process directly through the analysis of landscape dynamics, applying satellite imagery, land cover maps, livestock distribution maps, spatial epidemiology and rural income densities, all applied in order to prioritise where and how disease affected rural areas may best be turned into healthy agricultural production environments. With the landscape focus gaining in importance, PAAT paves the way for a more rational approach to rural development in tsetse affected regions starting with the protection of people and their livestock. At the end of his introductory note, Mr Ilemobade welcomed the Deputy Secretary General to open the meeting.

The meeting was officially opened by Mr M.C. Chimbombi, Deputy Permanent Secretary, Ministry of Agriculture. He expressed the honour to host the meeting and thanked the Government of Botswana and national institutions for providing the resources for the meeting. Mr Chimbombi confirmed the commitment of his Government to eliminate the problem that tsetse and trypanosomiasis (T&T) pose to livestock, agriculture and tourism (sleeping sickness) industry development. He attributed the poor performance of the livestock-agriculture sector in Botswana to the presence of T&T. In fact, in the National Poverty Reduction Strategy, the elimination of trypanosomiasis is an area that needs attention. The Deputy Permanent Secretary mentioned the successful tsetse elimination operations undertaken in 2001-02 over 16 000 km^2 and an additional operation on 10 000 km^2 initiated in 2005 funded by Botswana with Namibia providing logistical support. At the end of his intervention, Mr Chimbombi declared the meeting officially open.

ACKNOWLEDGEMENT

The PAAT Advisory Group Coordinators express their thanks and appreciation to the Government and people of Botswana for the warm hospitality extended to the participants and for the excellent facilities placed at the disposal of the meeting.

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12th PAAT Advisory Group (PAG) Co-ordinators Meeting
held 18-19 October 2006
in Kasane, Botswana

Recommendations

1. On the complexity of multiple funded and multi-institutional implemented projects, PAG recommends that:

- International institutions/organizations should assist in the formulation of practical guidelines for the implementation of field T&T intervention projects.

Action: PAAT and PAAT mandated organizations.

2. On technical and field operational aspects of T&T intervention, it is recommended that UN – PAAT mandated organizations should provide technical assistance in:

- defining set of baseline data to be collected;
- tsetse rearing methodologies;
- the application of area-wide integrated pest management;
- land use;
- livestock development programme(s);
- human and animal trypanosomiasis control measures;
- identifying institution(s) to collaborate on land use planning and environmental aspects of T&T projects.

Action: PAAT and PAAT mandated organizations.

3. On FAO Liaison Officers' network, the PAG urges that:

- urgent measures to be taken to revitalize the FAO Liaison Officers' platform;
- review of the Terms of Reference (TORs) of the Liaison Officers to be undertaken;
- The network explore effective harmonization with national PATTEC Co-ordinators.

Action: FAO Regional Office for Africa, Accra, Ghana; National PATTEC Co-ordinators.

4. On training, PAG recommends:

- To evaluate currently available training capacities and identify training gaps and needs;
- The harmonization/co-ordination of ongoing training activities in different projects and link them to the PATTEC initiative.

Action: PATTEC, National AfDB-PATTEC Project Co-ordinators.

5. On Land Cover mapping, PAG recommends:

- To continue in the refinement process of Land Cover mapping (higher resolution maps) and in the standardization process for decision support in T&T intervention.

Action: FAO.

6. On developing tsetse intervention costing models, PAG agrees on the urgent need:

- To develop guidelines on suitability and cost of various tsetse intervention techniques in different entomological/ecological situations for fly suppression and elimination.

Action: IAEA, FAO in collaboration with PAAT partners and stakeholders.

7. On re-orientation of PAAT's role, PAG agrees on the need:

- To consider enlarging PAAT role to embrace issues in tsetse infested areas related to rural development, poverty alleviation, and human health to further enhance PAAT contribution to the attainment of the MDGs.

Action: PAAT Secretariat.

8. On the use of Sequential Aerosol Technique (SAT) to suppress/eliminate tsetse fly, PAG recommends that:

- A position paper to be produced on SAT including its feasibility and limitations in different ecological situations and its potential environmental impacts.

Action: PAAT Secretariat.

9. On the possible risk of the merger of *Trypanosoma brucei rhodesiense* and *T.b.gambiense* in Uganda, PAG urges that:

- An advocacy be undertaken on assistance from the international community.

Action: Uganda Government and national concerned institutions/authorities.

10. On criteria for declaring an area free of tsetse and animal trypanosomiasis following intervention, the PAG recommends that:

- The developed criteria be simplified and published in a form of a position paper.

Action: IAEA, FAO and PAAT.

1. Brief and discussion on the last PAG meeting report – A.A. Ilemobade

The Agenda of the meeting was agredd to by members of PAG. Consequentely, the conclusions and recommendations of the last meeting, held in Addis Ababa, Ethiopia, September 2006, were discussed and endorsed.

2. Report of the PAAT Secretariat and FAO/PAAT activities – R.C. Mattioli

The participants were informed on FAO and PAAT activities since the last PAG meeting. Normative and technical assistance has been provided to PAAT partner countries.

FAO/IAEA/WHO/PAAT developed and presented a document which outlines possible assistance of the UN PAAT mandated organizations to tsetse affected countries along a phased, conditional approach. A joint IAEA-FAO project (US$1.7M) to support T&T intervention in the Southern Rift Valley of Ethiopia has been approved by the Japanese Government through the UNTFHS.

In partnership with DFID, FAO published a paper entitled “Mapping the benefits: a new decision tool for T&T interventions” which links quantitative economic variables to a GIS spatial framework in order to provide new insights and reinforce decision making process for intervention. Technical advice has been provide to the STEP project in Ethiopia and to planning T&T intervention in the six countries (Burkina Faso, Ethiopia, Ghana, Kenya, Mali, Uganda) benefiting from the AfDB financial support for T&T intervention.

Technical visits were paid to the above mentioned six countries, international research institutes based in Africa and Europe, and NARES to discuss and assess, *inter alia*, available facility, human resource development and training modules.

Distance learning training packages, in particular for e-conference moderators, have been disseminated. Also in relation to training activities, WHO trained on the spot, hands on, several staff from the Ministry of Health and Veterinary Services Department of various sleeping sickness affected countries on HAT control methods. WHO also organized an international training course on African trypanosomiasis in Tunisia, October 2005. Sixteen participants from HAT endemic countries and research laboratories attended the course. A regional training course on “Standardized baseline data collection for area-wide T&T management” was jointly organized by IAEA and FAO, March-April 06, Nairobi, in collaboration with Kenya authorities, and with substantial coordination assistance from ICIPE and support from ILRI and AU-PATTEC. Twenty-six participants from T&T affected countries attended the course.

With regard to publications, in addition to the regularly published bi-annual Tsetse and Trypanosomiasis Information (TTI) bulletin, FAO is working on the standardisation of land cover mapping for T&T intervention. This activity will provide the basis for a PAAT Technical and Scientific Series publication. A draft document on guidelines for declaring areas T&T free was distributed for comment and further development, with a view to eventually produce a PAAT position paper. Another publication in the pipeline relates to a study which defines guidelines for sustainable human and animal African trypanosomiasis control and rural development strategies.

In relation to partnership with the private sector and following negotiations, UNIDO has agreed to participate in the FAO-IFAH initiative on Quality Control/Quality Assurance of trypanocides. FAO and UNIDO confirmed, at DG level, their support to develop joint activities on the matter within the framework of PAAT. A joint (FAO / IAEA / UNIDO / IFAD / IFAH) project proposal has been drafted and circulated among involved parties for comments.

The PAAT Chairman led a tw-man panel to carry out a review of ISCTRC and its Secretariat. The report and formulated recommendations were adopted by the ISCTRC Executive Committee at its 31st meeting.

FAO/PAAT activities also included active participation in international policy, scientific and technical fora, including:

- Regional Harmonization Workshop, Nairobi, Kenya, October 2005.
- Regional meeting of National Coordinators of AfDB and IAEA-TC funded projects, Vienna, Austria, December 2005;
- Consultants meeting on the "Role of pathogens and symbionnts in tsetse sterile technique", organized by FAO/IAEA, Vienna, Austria, March 2006;
- 31st ISCTRC Executive Committee meeting, Addis Ababa, Ethiopia, September 2006.

FAO/PAAT convened the 10th PAAT Programme Committee meeting, Florence, Italy, April 2006. The six AfDB beneficiary countries, PAAT mandated organizations, UNIDO, ARIs, donor representatives and other national, regional and international stakeholders attended the meeting. Country representatives outlined the implementation of the workplans of the AfDB supported projects.

At the end of this session, Mr Mattioli informed PAG of the end of the chairship tenure (three years) of Mr Ilemobade in November 06. Members of PAG endorsed the renewal for another three years of Mr Ilemobade as Chairman of PAAT.

3. Report from IAEA – U. Feldmann

Mr Feldmann gave an overview of current IAEA activities. These included the normative activities and building partnerships related to the production of "Generic design, technical guidelines and optimal location of tsetse fly mass-rearing facilities". This was complemented with draft a spreadsheet enabling Member States to identify size of tsetse factories, specify equipment needed and provision of cost estimates. Standard Operating Procedures (SOPs) for advanced mass-rearing of tsetse flies were also produced. Within this framework, a meeting was convened in Vienna in July 06 to advise on developing architectural blueprints for national and sub-regional tsetse mass-rearing facilities focusing mainly on Burkina Faso. Another consultants' meeting concerned the assessment of the minimal size of area-wide integrated pest management programmes, including SIT. The development of a mathematical model for planning and efficiency-assessment of different options of integrated area-wide tsetse control strategies have been initiated. Two e-learning modules, one related to SIT-relevant irradiation dosimetry and a second one to tsetse strain compatibility testing have been developed.

Research and method development actions focused on improving and developing quality assurance of tsetse-mass rearing, such as advancement in facilitated/automated sexing of tsetse and research on salivary gland hypertrophic virus. A collaborative research programme has been initiated on "Improved and harmonized quality control for expanded tsetse production, sterilization and field application", and a new one to be initiated in 2007 will concern "Improving SIT for tsetse flies through research on their symbionts and pathogens' designated".

The Agency's Technical Cooperation activities have provided support to the PATTEC Plan of Action through nine national technical cooperation projects (Botswana, Burkina Faso, Ethiopia, Kenya, Mali, Senegal, South Africa, Tanzania, Uganda) amounting approximately to US$3.4M in 2006 (foreseen 10 projects in 2007), and one regional technical cooperation project. Support was also given to a national workshop in Uganda (June 06) to define a detailed action plan for the collection of entomological base line data in the Lake Victoria Basin. A feasibility study for creating a zone free of remaining two tsetse fly species in KwaZulu natal, South Africa was funded.

From October 2005 to October 2006, 66 person-months scientific visits and fellowships relevant to T&T were hosted by the Agency.

Other activities have been mentioned previously in Mr Mattioli's presentation.

4. Report from WHO – P. Simarro

Recently, WHO has intensified its support to HAT affected countries in disease control activities and capacity building. As far as HAT control activities are concerned, 20 endemic countries have received assistance for screening (reagents for serological tests, equipment for diagnosis, financial support for mobile teams and free drugs for treatment) and surveillance network (monitoring and reporting).

Capacity building activities focused on training in diagnosis, case and programme management.

Mr Simarro provided an update of the epidemiological situation of sleeping sickness (SS). In eleven countries in which disease surveillance was not carried, no cases of SS were reported, absence of cases of SS was also reported in four countries where surveillance action was implemented; ten countries reported less than 50 cases per year, between 50 and 1000 cases per year were reported in eight countries and only three countries reported more than 1000 cases/year.

A new partnership was established between WHO and FIND (Foundation for Innovative New Diagnostics) to improve diagnosis of HAT. This partnership is a result of a grant of US$10M spread over five years from the Gates Foundation. Similarly, a consortium was created with a view to develop new drugs to treat parasitic diseases. The consortium, of which WHO is a member, has received in September 06 US$23M to develop new drug for second stage disease status and for the development of a new drug, orally administered, for the first stage of the disease. The collaboration between WHO and Sanofi-Aventis for free drug supply, amounting to US$4M and support to control activities (US12$M) continues. A platform for capacity building to develop clinical trials has been established.

Cooperation has also been activated with:

- CIRDES (Bobo Dioulasso, Burkina Faso) for SS surveillance and treatment in Dubreka and Island of Loos in Guinea;
- CTVM (Edinburgh, Scotland) to control SS in Uganda;
- PATTEC for increasing awareness on the PATTEC initiative and production and dissemination of information.

Mr Simarro concluded that WHO continued to provide support to PAAT and in particular to co-fund part of the PAAT Information System activities.

5. PAAT Information System: new features and future activities – G. Cecchi

An update of progress made in the development and management of the PAAT Information System (PAAT-IS) was presented. The PAAT website has been revised, expanded and made available also in CD-ROM format. Renewed impetus has been given to the use of GIS techniques; datasets of national and regional predictions of tsetse distributions have been made available for downloading from the website and new standardized metadata have been generated and disseminated. The new website structure now includes a section on "Disease and vector control", "Trypanotolerance", "Area-wide integrated pest management", "Integrated disease management" and "Guiding principles for decision making". Sections on "Donors" and "Activities" related to ongoing T&T interventions have been added to the website. A link has been created with GeoNetwork (the FAO's Spatial Data and Information Portal). This link allows sharing and disseminating trypanosomiasis-related GIS-datasets on equal basis within a wider group of stakeholders, well beyond the present T&T community. It has to be mentioned that data and metadata in GeoNetwork comply with international standards (ISO 19115).

Within the framework of the PAAT-IS activities, technical visits have been made to the six AfDB beneficiary countries (Burkina Faso, Ghana and Mali in West Africa, Ethiopia, Kenya and Uganda in East Africa) with a view to assessing strengths and weaknesses in GIS and Information Systems (IS) management. The main common weak points in these six countries are:
(i) the absence of a centralized database for storage and analysis of entomological datasets and (ii) limited skills in GIS and IS management. Possible future support of PAAT-IS to AfDB funded national projects have been identified as follows:

- To update predictive maps of tsetse absence/presence and abundance;
- To produce standardized land cover maps, customised for different activities related to T&T intervention (e.g. collection of baseline entomological datasets; implementation of T&T intervention; environmental monitoring of the impact of T&T intervention);
- To provide assistance to AfDB supported project activities to develop environmental monitoring procedures (land use change; biodiversity) and guidelines for land use planning and natural resources management.

6. Standardising land cover mapping for T&T intervention – G. Cecchi

A draft paper (in progress) dealing with standardization of land cover (LC) classification for T&T intervention was presented. Land cover datasets are essential in

planning and monitoring T&T intervention activities. The available land cover maps are not necessarily produced for the needs of tsetse intervention and often apply heterogeneous classification systems. Hence, not all existing tsetse habitats can be described with the available classes and no clear boundaries exist between classes. The FAO/UNEP Land Cover Classification System (LCCS) overcomes this problems and it is expected to be adopted as the international standard by the Internation Organization for Standardization (ISO). Standardization of LC classification for T&T intervention will allow:
(i) inter-operability with LC datasets and maps produced by external sources;
(ii) easy development of customized manuals on land cover survey for field operators;
(iii) promotion and facilitation of regional and international cooperation.

The position paper (being proposed for publication in the PAAT Technical and Scientific Series) will deal with:

- Standardized land cover of tsetse habitats: analysis at continental level;
- Customization of a national, LCCS compliant dataset: the Africover map of Uganda for T&T intervention;
- Customization of multi-national, LCCS compliant datasets: the Africover map of East Africa for T&T intervention.

A standard description of LC classes of tsetse suitability has been developed and applied for tsetse distribution maps. Although improvement in mapping tsetse distribution has been achieved, the proposed values for tsetse suitability of the standardized LCCS classes should undergo a thorough examination by experienced entomologists and other T&T specialists and, where available, field datasets could be used to perform proper validation.

7. The IGAD Livestock Policy Initiative project: the T&T component – T. Robinson and A. Shaw

The Inter-Governmental Authority on Development (IGAD) Livestock Policy Initiative (LPI), which comprises Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Sudan, Uganda, implemented by FAO's Animal Production and Health Division (AGA), has included T&T as a component of its policy for livestock development. In IGAD's area, 80 percent of land is arid or semi-arid with high level of poverty and food insecurity. A large proportion of the population depends on livestock for its livelihood and there is an increased demand for livestock and livestock products due to the demographic growth. Hence, there is an evolving requirement of livestock services and changing roles of actors involved. Policy and institutional framework need adjustment to accommodate trends in privatisation and decentralisation of livestock services, together with harmonisation of legislation and improved transboundary disease management.

The objective of the IGAD-LPI is to enhance the contribution of the livestock sector to sustainable food security and poverty reduction in the region. The purpose is to strengthen the IGAD capacity, member states, other regional organizations and other stakeholders to formulate and implement livestock sector and related policies that sustainably reduce food insecurity and poverty. The project is funded by the European Commission for a period of 5 years (2002-2005, budget US$7.5M).

As far as T&T is concerned, the basic questions requiring attention are:

- Where to control;
- How to control: which control strategies (i.e. control vs. eradication) and which control methods (e.g. drugs, pour-ons, baits, SAT, SIT);
- Whether to integrate work on animal trypanosomiasis with HAT control activities.

Points to be considered in the formulation of T&T intervention strategy:

- 17 percent of IGAD cattle are at risk (16,5 million cattle);
- Countries with large numbers of cattle at risk are Ethiopia [4.8 million (15 percent of the national stock)], Kenya [4.5 million (40 percent)], Sudan [4.4 million (11 percent)] and Uganda [2.2 million (43 percent)];
- Agro-ecological, climatic conditions and livestock production systems.

Building on previous experience and work ("Mapping the benefits..." in West Africa) the plan is to produce cost maps and benefit maps for the IGAD Region to assist policy makers and advisors in PATTEC and IGAD members states to make informed decisions about the "where" and "how" to control trypanosomiasis. The "Mapping the benefits" work integrates three models with economic variables mapped for the first time. This template has been demonstrated useful in West Africa but it is also of general applicability. The IGAD "mapping the benefits" model will follow a step analysis which includes:

- The definition of the production systems and map their location;
- The development of herd models for each production system;
- Adding price, information about performance with/without trypanosomiasis;
- The calculation of losses/head of cattle applied to population/system.

Information will be collected on:
(i) location of production systems;
(ii) distribution of draught cattle;
(iii) distribution of dairy cattle;
(iv) livestock production parameters;
(v) prices of livestock outputs and inputs.

Each of these packages requires more detailed sub-sets of information for an accurate analysis of costs and benefits. For this purpose, a questionnaire will be soon distributed to national collaborators to acquire the necessary information. This study will be jointly carried out by FAO-IGAD LPI and FAO/PAAT.

8. Comparable costing of alternatives for dealing with tsetse: estimates for Uganda – A. Shaw, S. Torr, C. Waiswa, T. Robinson

The last two decades have seen a significant decline in both the veterinary and tsetse control services throughout sub-Saharan Africa. Sleeping sickness has re-emerged as an important health problem, with both *gambiense* and *rhodesiense* forms reaching epidemic levels. Dealing with animal trypansomiasis has been left almost entirely to farmers, who mostly rely on trypanocides, spending some US$30-40 million a year. Against this background, since 2000, there has been a movement to implement large scale "area-wide" programmes to control the vector, under the aegis of PATTEC (Pan African Tsetse and Trypansomiasis Eradication Campaign). PATTEC has been extremely successful in mobilising support for dealing with T&T, especially among African leaders, and in mobilising funds; currently AfDB is lending some US$67 million to six countries for the

creation of 180,000 km^2 of tsetse-free zones. It is important to those in the field of T&T that the planning and execution of this programme runs as smoothly as possible. Decision-making on choice of technique for suppression and elimination as well as on other issues (monitoring, accompanying measures, etc.) needs to be as informed as possible. This work deals with one of the key issues, the economic aspects of choice of technique within the context of PATTEC's initiative.

In Uganda, Zone 1 consists of four blocks of 10,000 km^2 each. On the many possible approaches to deal with the vector the following were considered:

- Use of bait technology with insecticide, in this case with traps;
- Use of bait technology using insecticide-treated cattle (ITC);
- Aerial spraying using fixed wing aircraft and the sequential aerosol technique (SAT) spraying five cycles;
- Use of sterile insect technique (SIT) following suppression of the fly population by one of the above means.

A tsetse population dynamics model was used to calculate the impact of the four techniques on fly population reduction rate. In order to provide a level playing field for testing and comparing all techniques a 10,000 km^2 (100 x 100 km) block was used as the basis for calculation. The timing of each technique was carefully worked out and then figures were discounted at 10 percent per annum to their present value in the year tsetse elimination started. Field costs, administrative overheads and necessary studies (tsetse surveys, sleeping sickness surveys, surveys of trypanosomiasis in cattle, environmental and tsetse monitoring) were all included (based largely on PATTEC proposal). Accompanying measures to deal with sleeping sickness and animal trypanosomiasis are crucial but being common to all strategies were therefore not costed. For simplicity, all costs are given per km^2 of tsetse infestation.

The results for tsetse isolated populations pointed out that ITC is the less expensive (from US$134 to US$392), followed by traps (range US$373-496), SAT (US$502-593) and SIT (SIT+25 percent ITC US$1015, SIT+80 percent SAT US$1305. SIT cannot be used in isolation, i.e. without previous tsetse suppression campaign). A model for non-isolated tsetse population was also developed. For both isolated and non-isolated populations the basic cost-hierarchy of ITC, traps (for savannah flies), SAT and SIT is maintained. Both SAT and SIT results are very sensitive to the cost of flying time, e.g. field cost for SIT falls from SU$761 to US$694 if cost of flying time down from US$700 to US$500. In the case of non-isolated tsetse populations, the barrier cost estimation is relatively modest (invasion from one side and only for three years). Barriers through the use of ITC are much cheaper but need testing.

Some conclusions can be drawn from this work:

- Cost hierarchy is confirmed and this ranking is robust;
- Cost differential are far greater at field cost level – as published studies have long emphasised;
- The high cost of SIT reflects its being additional to the cost of suppression;
- Combinations of techniques may, however, be the most cost effective approach in some circumstances, especially against *G.fuscipes*, so more combined strategies need costing and investigations.

The modelling approach has produced realistic ex-ante cost calculations to guide decision-makers, but raises questions which need to be confirmed by field work. Studies are

needed to collect more field evidence of scale on which cheaper techniques can be deployed, trials of what works best with specific flies. High cost of accompanying measures (administration, monitoring, socio-economic and environmental studies) needs to be questioned. There may be lessons to be learnt from past projects (strengths and weaknesses).

9. The AfDB funded T&T intervention in Uganda: update on the technical implementation and anticipated PAAT support – L. Semakula

The AfDB funded (loan) project ("Creation of sustainable T&T free areas in East and West Afica: the Uganda component") is foreseen to be executed in three phases, each phase corresponding to a zone to be freed from T&T. The project is implemented by the Ministry of Agriculture, Animal Industry and Fisheries and coordinated by COCTU with the support of the PCMU (Project Coordination and Management Unit). The PCMU is composed of a Project Coordinator, a Project Entomologist, a GIS Specialist, a Monitoring and Evaluation Officer and an Accountant. The project was officially signed by the Government in May 2005 and the loan was received in January 2006, with the first disbursement obtained in April 2006 (last disbursement foreseen in December 2011). A National Steering Committee and a Procurement Contracts Committee were created in April 2006. Additional administrative and financial arrangements necessary for starting the project implementation and executing field activities have been partially completed in September 2006.

The project coordination and management are assured by the PCMU which is supervised by the National Steering Committee and the Uganda Trypanosomiasis Control Council (UTCC). PCMU has requested the Auditor General to appoint an Audit firm to audit the project. Technical training was provided to the GIS specialist; PCMU and AfDB convened a resident planning session (10-13 October 2006) to develop a comprehensive training needs action plan and community awareness creation for the period 06-10. A MoU has been signed with the private sector (CEVA, Industrial Capital), CTVM, University of Edinburgh and Makere University to stamp out sleeping sickness using mass treatment of cattle with trypanocides and epicutaneous application of insecticides. For this a grant of US$500 000 has been provided of which US$300 000 is for drugs and insecticides and US$ 200 000 for field operations. The Uganda T&T intervention plan foresees, *inter alia*, the use of SIT to eliminate the flies from the project area and relies on the Kaliti (Ethiopia) tsetse mass-rearing facility for tsetse supply. This is still a critical issue since the rate of production of the tsetse colony of the Ethiopian fly factory does not allow it to produce and deliver needed/requested quantities of tsetse sterile males in the short/medium term. Hence, PAAT support is requested to technically explore the feasibility of using SAT as suppression/elimination technique of tsetse flies.

10. The AfDB funded T&T intervention in Ethiopia: update on the technical implementation and anticipated PAAT support – T. Alemu

The loan provided by AfDB (US$14.6M for a period of six years) to the Ethiopian Government is supporting in the on going Southern Tsetse Eradication Project (STEP) which aims at eliminating the T&T threat from an area of 25,000 km^2 in the Southern Rift Valley of Ethiopia using an area-wide, integrated pest management approach. The project, implemented by the Ethiopian Science and Technology Agency (ESTA), has as ultimate objective to enhance the national agricultural and poverty reduction effort and reduce the

pressure on the highland resources by improving the conditions necessary for sustainable agricultural and rural development.

The removal of tsetse from the area follows a phased approach with the full participation of the communities. The management of the project is assured by ESTA, a STEP Steering Committee, a STEP Technical and Advisory Committee and a Project Coordination and Management Unit (PCMU). PAAT and PAAT mandated organizations (e.g. FAO, IAEA) are among STEP's partners. Current project staff comprises 41 technicians and 54 auxiliaries. A community based tsetse suppression activity is on going using insecticide treated cattle and impregnated targets; monitoring of vector density and disease occurrence is carried out. The implementation of the AfDB funded project has not started yet. In addition to the AfDB loan, a joint FAO-IAEA project, funded by the Government of Japan (US$1.7M), through the United Nations Trust Fund for Human Security (UNTFHS), and jointly executed by STEP, FAO and IAEA has been approved and is about to start. This project focuses on providing support of on going STEP activities for AW-IPM (vector and disease removal), information management, environmental monitoring, land use planning, socio-economics and training activities.

The Ethiopian Government has established a tsetse rearing and irradiation centre in Kaliti (approximately 40 km from Addis Ababa). The colony of *Glossina pallidipes* has been successfully established and mass rearing is in progress. The present colony size is estimated in 66,000 females with a growth in pupae production of 17,000/week. Adult fly mortality is below 1 percent. An embryonic colony of *G.fuscipes fuscipes* has been established through shipment of flies from Bratislava. The full foreseen capacity production of the tsetse fly factory in Kaliti is estimated at 1 million sterile males/week.

Major difficulties in project implementation concern insufficient staff to supervise and provide quality assurance of field activities, lack of training of communities involved in tsetse suppression activities and lack of direct income from continued tsetse control, particularly outside communal areas.

Issues that require particular attention can be summarized as follows:

- To ensure long term technical assistance to enhance tsetse rearing and sterile male management;
- To make available skilled experts to guide and monitor AW-IPM including SAT application and sterile male release;
- To provide adequate training to local staff to meet project needs;
- To establish workable management structure and systems;
- To identify proper institutions that could collaborate on land use management and environmental aspects of the project;
- To urgently solve the issue of purchasing/providing an industrial irradiator for Kaliti Tsetse Rearing and Irradiation Centre.

11. The AfDB funded T&T intervention in Mali: update on the technical implementation and anticipated PAAT support – A. Djitei

Three species of tsetse fly (*Glossina morsitans submorsitans, G. palpalis gambiensis, G. tachinoides*), infesting about 240 000 km^2 (20 percent of the total land), are present in the country. According to Mr Djitei, in Mali approximately 20 percent of the total population (12

million) is exposed to sleeping sickness and about 2.7 million cattle are at risk of trypanosomiasis. Every year more than one million trypanocide treatments are administered to cattle. This amount represents over 50 percent of the total sale of veterinary drugs.

Tsetse control campaigns, with the support of IAEA, were conducted from 2003 to 2005: fly population was reduced over an area of 4 500 km^2 of the the Niger river bassin. However, following a disruption of the tsetse reduction campaign, the last control revealed an increase of the fly population in the peri-urban area of Bamako. In order to eliminate once for all the tsetse problem, the Government foresees the use of SIT from an initial target area of 32 000 km^2 (i.e.15 500 km^2 in the Niger basin and peri-urban area of Bamako, and further 16 500 km^2 in the Bani basin from the northern limit to the border with Burkina Faso). This project will be executed with the financial contribution (loan and grant) of AfDB and the Malian Government. Project components are:

(i) suppression and eradication;
(ii) capacity building;
(iii) sustainable land management;
(iv) co-ordination and management.

These components will be complemented with thematic maps generated with the use of GIS. Data to be collected regard tsetse fly distribution and population dynamics, animal and human trypanosomiasis prevalence, socio-economics, environment (for environmental impact studies). In the tsetse suppression campaign, the participation of the rural communities is envisaged.

The use of SIT, for tsetse elimination, targets mainly *G. p. gambiensis* along the river basins; under study is the possibility to establish a tsetse colony in the country. The total budget of the fly elimination operation is estimated at US$11.5 million (AfDB loan: US$9.5 million; AfDB grant: US$0.4 million; Malian Government contribution: US$1.6 million). The support requested to PAAT concerns equipment and chemicals, studies on land use and socio-economic analysis, providing expert services for GIS and capacity building (training courses).

12. The Botswana experience with tsetse intervention (e.g. SAT) and related environmental issues – Nlingisisi Babayani, Casper Bonyongo, Sikhumbuzo Modo, Kefentze Motshegwa,Portia Otlaadisa, Dominic Mazvimavi

The tsetse fly aerial spray operation against *G.morsitans centralis* in the Kwando and Linkati areas was reported. Aerial spray in Botswana started in the 1970s to replace ground spray with persistent pesticides. Following SAT tsetse distribution shrunk from 25,000 km^2 to 5,000 km^2. Last cases of HAT were recorded in 1981 and nagana (animal trypanosomiasis) limited to sporadic outbreaks. In 1991 SAT was discontinued due to environmental concerns and replaced by insecticide impregnated targets which, however, failed to suppress tsetse population. In 1998 tsetse density in the northern Okavango delta reached pre-spray levels with a resurgence of bovine trypanosomiasis in 1999 (300 cattle died). The Government of Botswana approved an integrated T&T control programme which involved the re-introduction of SAT followed by SIT as a contingency measure.

In July 2000 all cattle at risk of trypanosomiasis were treated with trypanocides every four months (more than 30,000 cattle treated). The treatment campaign ended in April 2002.

Aerial spray started in June 2001 and was concluded in August 2002 with tsetse elimination as objective. In the work plan the use of SIT was foreseen to complete fly elimination. However, SIT was not required since SAT achieved the objective to eliminate tsetse. The Sat operation in 01 treated 7,180 km^2 in the northern Okavango and included high tsetse density areas like Mombo and Guai. In 2002 a further 8,600 km^2 were sprayed in the southern delta and included the district of Maun. At the end of the SAT cycles (6 cycles in 2001 and 5 cycles in 2002), no tsetse flies have been caught or reported by workers or visitors in the delta since the end of the second SAT cycle. Regular monitoring surveys confirmed the elimination of the flies (i.e. no flies caught) up to June 2006. Also, regular veterinary surveys confirmed the absence of cases of animal trypanosomiasis in cattle and horses around the Okavango delta. The Okavango 2001/2002 SAT operation seems to be a success story and hopefully play a role in the advocacy for the use of the technique elsewhere in sub-Saharan Africa. The cost of aerial spraying and insecticide alone (i.e. exclusive of recurrent expenditures) was US270km^2$. Main factors which have contributed to a successful SAT campaign can be attributed to the following:

- The terrain is flat/undulating, perfect for SAT application;
- The distribution limits of fly population were geographically well circumscribed;
- Strong political support to eliminate T&T from the area;
- Well elaborated work plan;
- Flexible public procurement process;
- Little external influences, i.e. the project was wholly funded by the Government of Botswana.

Following the elimination of tsetse and trypanosomiasis from the Okabvango delta it was logical to apply the same approach in northern Botswana to eliminate tsetse completely from the country. This could only be achieved successfully if tsetse along the border with Namibia, in the Caprivi area, could also be removed. The 06 operation, therefore, became the first regional collaborative operation in the AU's PATTEC initiative.

Environmental monitoring studies carried out by the Harry Oppenheimer Okavango Research Centre, in association with BioTrack (Macquarie University, Australia) failed to detect any long term or irreversible impact due to SAT on non-target species.

13. Main points during the round table general discussion – Moderator P. Holmes

Country representatives expressed the desire to establish a harmonized mechanism for requesting technical assistance to PAAT and PAAT-mandated organizations for the planning and implementation of AfDB funded projects and for identification of other priority areas for T&T intervention.

There was a request to explore the feasibility of the application of SAT in other areas, particularly in the Southern Rift valley of Ethiopia. In addition, it was suggested to that PAAT should be asked to produce guidelines on the use of SAT and to publish them under the format of a PAAT Technical and Scientific Series publication.

Meeting participants were concerned over the lack of established, regular training programmes addressed to field operators for implementation and execution of field actions.

Annex 1

12th PAG MEETING

Kasane, Botswana

18-19 October 2006

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Annex 2

12th PAG MEETING

Kasane, Botswana

18-19 October 2006

AGENDA

Opening address and introduction (Dr M.C. Chimbombi, Deputy Permanent Secretary, Ministry of Agriculture, Prof. A.A. Ilemobade, PAAT Chairman,)

1. Report of the PAAT Secretariat and FAO/PAAT activities (R.C. Mattioli)

2. Report from IAEA (U. Feldmann)

3. Report from WHO (J. Jannin)

4. PAAT Information System: new features and future actitivities (G. Cecchi)

5. Standardising land cover mapping for T&T intervention (proposal for a PAAT Position Paper) (G. Cecchi)

6. The IGAD Livestock Policy Initiative project – the tsetse and trypanosomiasis (T&T) component in the IGAD countries and its economic analysis (A. Shaw on behalf of T. Robinson)

7. Comparable costing of alternatives for dealing with tsetse – estimates for Uganda: update and discussion (A. Shaw)

8. The AfDB funded T&T intervention in Uganda: update on the technical implementation and anticipated PAAT support (L. Semakula)

9. The AfDB funded T&T intervention in Ethiopia: update on the technical implementation and anticipated PAAT support (T. Alemu)

10. The AfDB funded T&T intervention in Mali: update on the technical implementation and anticipated PAAT support (A. Djiteye)

11. The Botswana experience with tsetse intervention (e.g. SAT) and related environmental issue (N. Babayani, S. Modo, K. Motshegwa, P. Otlaadisa)

12. Environmental issue of SAT (D. Mazvimavi and C. Bonyongo)

13. Terms of reference of PAAT Support Team to AfDB funded project and priorities and needs in the six AfDS beneficiary countries (Moderator: P. Holmes)

14. Discussion workshop: How PAAT and PAAT mandated organizations (AU/IBAR, FAO, IAEA, WHO) can support the six AFDS beneficiary countries (Moderator P. Holmes)

15. Conclusions and Recommendations. Next meeting.

Annex 3

12th PAG MEETING

Kasane, Botswana

18-19 October 2006

TIMETABLE

Wednesday, 18 October

09:00 – 09:30
Opening address and introduction (Dr Micus Chimbombi, Deputy Permanent Secretary, Ministry of Agriculture and A. Ilemobade)

09:30 – 10:30
Report of the PAAT Secretariat, including FAO/PAAT activities (A. Ilemobade and R.C. Mattioli)

10:30 – 11:00
Coffee break

11:00 – 11:30
Report from IAEA (U. Feldmann)

11:30 – 12:00
Report from WHO (P. Simarro)

12:00 – 12:30
PAAT Information System: new features and future activities (G. Cecchi)

12:30 – 14:00
Lunch break

14:00 – 14:30 (and 30 min. discussion)
Standardising land cover mapping for T&T intervention (proposal for a PAAT Position Paper) (G. Cecchi)

15:00 – 15:15
The IGAD Livestock Policy Initiative project - the tsetse and trypanosomiasis (T&T) component in the IGAD countries and its economic analysis (A. Shaw on behalf of T. Robinson)

15:15 – 16:00
Comparable costing of alternatives for dealing with tsetse – estimates for Uganda: update and discussion (A. Shaw)

16:00 – 16:30
Coffee break

16:30 – 17:30
The AfDB funded T&T intervention in Uganda: update on the technical implementation and anticipated PAAT support (L. Semakula)

17:30 – 18:00
The AfDB funded T&T intervention in Ethiopia: update on the technical implementation and anticipated PAAT support (T. Alemu)

18:00 – 18:30
Discussion

18:30 – 20:00
Gathering together

Thursday, 19 October

09:00 – 11:00
The Botswana experience with tsetse intervention (e.g. SAT) and related environmental issue (K. Motshegwa)

11:00 – 11:30
Coffee break

11:30 – 12:30
Environmental issue of SAT (D. Mazvimavi and C. Bonyongo)

12:30 – 13:00
Terms of reference of PAAT Support Team to AfDB funded project and priorities and needs in the six AfDB beneficiaries countries (Moderator P. Holmes)

13:00 – 14:30
Lunch break

14:30 – 15:00
The AfDB funded T&T intervention in Mali: update on the technical implementation and anticipated PAAT support (A. Djiteye)

15.00 – 16.00
Discussion workshop
How PAAT and PAAT mandated organizations (AU/IBAR, FAO, IAEA, WHO) can support the six AfDB beneficiaries countries (Moderator P. Holmes)

16:00 – 16:30
Coffee break

16:30 – 17:30
Discussion workshop (cont'd)
How PAAT and PAAT mandated organizations (AU/IBAR, FAO, IAEA, WHO) can support the six AfDB beneficiaries countries (Moderator P. Holmes)

17:30 – 18:15
Conclusions and recommendations
Next meeting