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Linking sustainable human and animal African trypanosomosis control with rural development strategies

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Abstract

This document analyses best practices for the strategic planning of mixed agricultural development in areas affected by trypanosomosis in people and livestock. Along with the other papers in the Programme Against African Trypanosomosis (PAAT) series, this paper has been produced to fulfil PAAT's remit to provide normative guidelines for dealing with tsetse and trypanosomosis (T&T).

The T&T problem lies at the heart of Africa's poverty. Estimates of gross national per capita income show that 20 of the world's 25 poorest countries are affected by T&T. Some 60 million rural Africans and 50 million of their cattle live in tsetse-infested areas. Trypanosomosis thus affects three key sectors: human health, livestock health and rural development. This paper places the T&T problem within the context of current thinking on how best to secure sustainable agricultural and rural development by providing an enabling environment and engaging in participatory processes within a sustainable livelihoods framework. Following a logical sequence, it takes the reader through four steps in the planning and implementation process while drawing on recent examples of T&T control (T&TC) programmes.

The first step involves setting priorities and making plans based on an appropriate analytical framework. Useful historical perspectives can be found in structural adjustment programmes that have embedded health, agriculture and rural development objectives in strategies for reducing poverty. In the health field, for example, the Alma-Ata and Bamako initiatives, which were designed to revitalize primary health care and increase equity of access, identified these multifactorial characteristics of poverty: 1) low levels of income, particularly among women and young people; 2) inadequate access to basic infrastructure and social/productive services; and 3) weak institutional capacities of community-based organizations (CBOs) and/or local organizations managed by the poor themselves. The key requirements for alleviating this poverty were found to be empowerment, economic opportunity, basic social services and infrastructure.

T&TC intervention was not included in the remediation list, nor is it mentioned explicitly in most current national Poverty Reduction Strategy Papers (PRSPs). Similarly absent are explicit strategies for livestock development, despite the essential contribution that livestock makes to the economies of many sub-Saharan countries and the important role it can play in poverty reduction. Given this context, the inclusion of T&TC interventions in national and regional planning is essential to reducing poverty in these areas. Such planning can also benefit from the use of geographic information systems (GIS) to help set priorities. Once suitable areas for intervention have been identified, ongoing projects and programmes in health and rural development can be considered alongside land-use plans. Additional insights can be obtained at the community level from community development plans, frameworks involving local councils and other local governing bodies, farmers' organizations, public and private extension/advisory agencies, research organizations and other relevant stakeholders such as line departments (health, forestry, livestock, land management, tourism and conservation).

The second step in formulating an effective T&TC intervention is identifying and then consulting the stakeholders who will be involved in implementing the programme. These stakeholders range from the farmers, livestock keepers and other rural inhabitants who are the ultimate beneficiaries of better human and livestock health to all of the people involved in the delivery, implementation, administration and funding of the programme. This work requires the alliance and coordination of many groups, including the community, the private and public sectors (together with research and development), non-governmental organizations (NGOs) and civil society organizations (CSOs). It also requires coordination across sectors – especially human health, livestock, wildlife, tourism and rural development. This paper discusses the importance of participatory processes, such as sustainable local participation and institutional instruments and arrangements, in furthering effective coordination. The importance of institutions – that is, the relationships, customs, policies and laws that govern everyday social and economic interactions – is a recurring theme in this paper.

The participatory paradigm depends on an understanding of the social relations and power dynamics/structure present in a particular poverty setting. Important factors that must be understood include social fragmentation, economic differentiation, power utilization and distribution and the other structures and mechanisms that lead to poverty or wealth. Such a framework implies the involvement of all stakeholders from the initial identification and monitoring phase through to the final evaluation. In this way, the programme can be underpinned by learning-by-doing and observational processes. The involvement and informed participation of local stakeholders can also be reinforced by building local-level capacity in T&TC techniques.

The third step in creating effective T&TC is analysing the requirements for implementation and delivery, especially within the context of approaches used over the past 50 years. For a T&TC intervention to be effective, it must connect the health and extension services that act as facilitators for rural populations and their organizations to research and training activities as well as to service providers. In recent years, public-private partnerships (PPPs) have been especially useful in controlling resurgent human African trypanosomosis (HAT), while government agencies have been primarily involved in policy planning and funding. Funding issues remain important, however. For example, in both human and veterinary medicine, there exist trade-offs between "horizontal" delivery (that is, through primary health care and veterinary services) and the need for specialized units to deal with a particular disease such as HAT. The degree to which communities mobilize labour and funds to support T&TC programmes depends a great deal on the extent to which these activities are perceived as public or private goods. Therefore, this paper looks at the public/private nature of the various components of T&TC interventions.

The fourth and final step in securing the benefits of T&TC intervention is the creation of an appropriate and enabling institutional environment. An example of a programme that faced the difficult challenge of linking T&TC with an integrated approach to health and livestock development is the Farming in Tsetse Controlled Areas (FITCA) project. In this context, the sustainable livelihoods framework offers particularly useful insights for analysing the effects of T&TC interventions on the

poor. The framework provides a checklist of important issues, highlights key elements and processes and emphasizes the interactions among factors that affect the livelihoods of poor people. By helping identify appropriate and efficient links among T&TC, human health delivery and livestock development strategies, the sustainable livelihoods framework also focuses attention on processes and structures that need to be reformed (as determined by assets identification and a diagnosis of the vulnerability context). Using a synthesis of macroeconomic, mesoeconomic and microeconomic perspectives, this paper highlights the structural and institutional factors mediating the effects of such policy reforms. Specifically, it discusses the mesoinstitutional forces at the interface between government and the private sector that urgently need to be reinforced. For example, for livestock development initiatives to reach poor rural households through an efficient policy chain, transaction costs and other mesoeconomic and intermediate-level constraints must first be reduced or mitigated.

Finally, the practical measures needed to reinforce and sustain T&TC have to be planned, budgeted for and implemented. These measures include, in general terms, support from the human and livestock health services, extension advice, market reinforcement and regulation. More specifically, they consist of technical activities required for the protection of gains already made by T&TC, such as surveillance for HAT and the creation and maintenance of barriers to prevent the reinvasion of zones previously freed of tsetse.

Acronyms

AAT	animal African trypanosomosis
CAADP	Comprehensive Africa Agriculture Development Programme (a programme of NEPAD)
CBO	community-based organization
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CIRDES	Centre International de Recherche-Développement sur l'Elevage en zone Subhumide
CSO	civil society organization
DFID	Department for International Development (UK)
ECOWAS	Economic Community of West African States
EISMV	École Inter-États des Sciences et Médecine Vétérinaires
FAO	Food and Agriculture Organization of the United Nations
FITCA	Farming in Tsetse Controlled Areas
GIS	geographic information system(s)
HAT	human African trypanosomosis
IAEA	International Atomic Energy Agency
IGAD	Intergovernmental Authority on Development
ICIPE	African Insect Science for Food and Health (formerly International Centre for Insect Physiology and Ecology)
ILRI	International Livestock Research Institute
ITC	International Trypanotolerance Centre
MDG	Millennium Development Goal
NEPAD	New Partnership for Africa's Development
NGO	non-governmental organization
OIE	Organisation mondiale de la santé animale (formerly Office International des Epizooties)
NSSCP	National Sleeping Sickness Control Programme
PAAT	Programme Against African Trypanosomosis
PATTEC	Pan-African Tsetse and Trypanosomosis Eradication Campaign
PPLPI	Pro-Poor Livestock Policy Initiative (an FAO programme)
PPP	public-private partnership
PRSP	Poverty Reduction Strategy Paper
SADC	Southern African Development Community
SARD	sustainable agricultural and rural development
SSA	sub-Saharan Africa
T&T	tsetse and trypanosomosis
T&TC	tsetse and trypanosomosis control (general term referring to all measures used to deal with T&T)
TBD	tick-borne disease
UEMOA	Union Économique et Monétaire Ouest Africaine
WHO	World Health Organization of the United Nations

Prologue

On a trouvé, en bonne politique, le secret de faire mourir
de faim ceux qui, en cultivant la terre font vivre les autres.
(In its wisdom politics has discovered the secret of starving to death
the very people who, by tilling the soil, enable the others to live.)

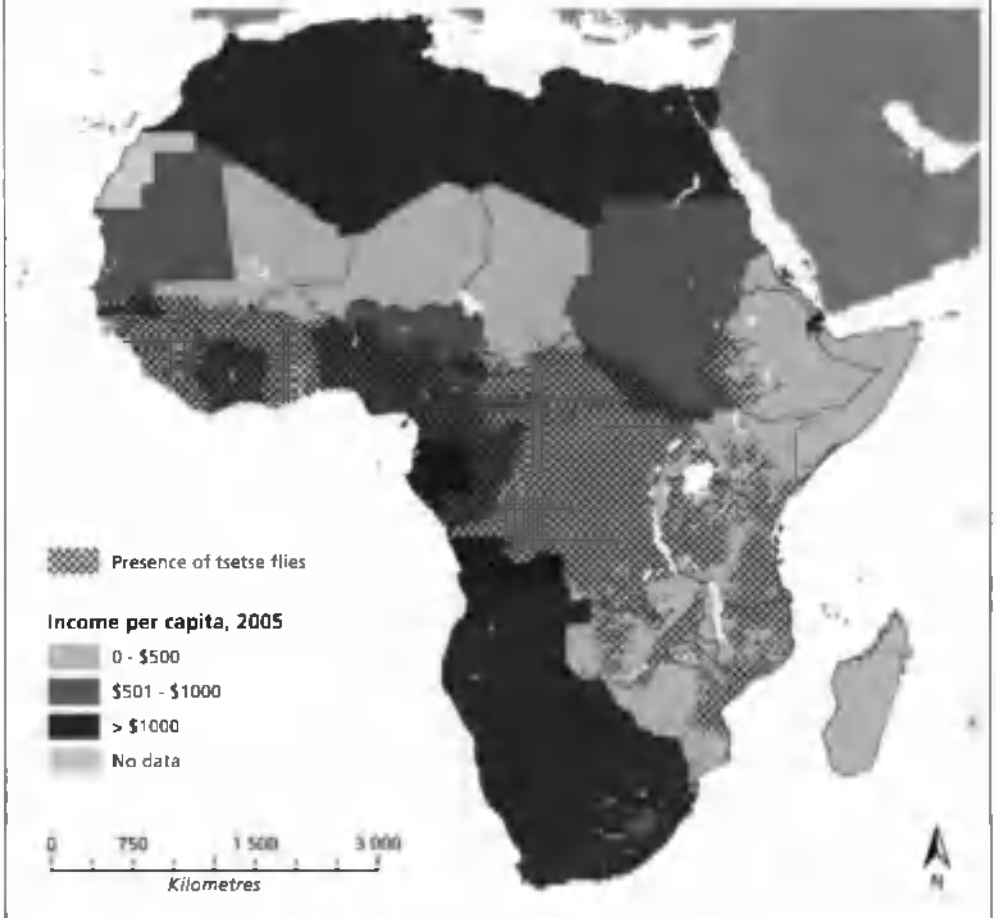
Voltaire

Africa comprises some 888 million people living in 54 different states, of which 37 are affected by tsetse and trypanosomosis (T&T). It is by far the world's poorest inhabited continent, and it is, on average, poorer than it was 25 years ago. In the World Bank's Development Indicators database (World Bank, 2008), African countries occupy 22 of the bottom 25 positions in terms of per capita income. Overall, Africa has stagnated in its development, even regressing in foreign trade, investment and per capita income. Such poverty has had widespread effects, including low life expectancy, political instability and rural deprivation. At its core lies the T&T problem. Of Africa's 37 tsetse-infested countries, 20 rank among the world's poorest 25 nations as determined by estimates of gross national income per capita (PAAT, 2008). The overlap between tsetse distribution and poverty in Africa is shown in Figure 1 on the following page.

In order to thrive, rural populations require an environmental and institutional framework that promotes and facilitates agricultural development. Enabled in this way, they can satisfy their basic socio-economic needs and live in good health. In areas of Africa where animal African trypanosomosis (AAT) and human African trypanosomosis (HAT) remain endemic, however, development has lagged. For this reason, the major impact of HAT and AAT on the health of human and livestock populations – and thus on agriculture – can no longer be neglected.

Africa's leaders recognized this reality in a declaration made at the 2000 summit in Lomé in 2000 by the heads of state of the member countries of the Organization of African Unity (now the African Union) and reiterated in Lusaka in 2001. On both occasions, the leaders emphasized their commitment to an Africa ultimately free of the threats of HAT and AAT. Indeed, during the last decade, great strides have been made in dealing with HAT through the implementation of a highly successful public-private partnership (PPP) that funded screening and treatment and also provided essential drugs for curing the disease. Meanwhile, under the aegis of the Pan-African Tsetse and Trypanosomosis Eradication Campaign (PATTEC), new programmes have been launched to create tsetse-free zones in six African nations. The success and sustainability of these programmes will depend on how well they mesh with an enabling institutional environment and with existing rural development strategies and projects. The outcome will also depend on whether farmers can be encouraged to adopt tsetse control technologies, some of which have become cheaper and more accessible in recent years. This paper specifically addresses the ways and means by which T&T programmes can support and consolidate these rural development efforts.

FIGURE 1
The interface between tsetse distribution and poverty in Africa



Source: PAAT, 2008

Chapter 1
The current situation

Aid per person in sub-Saharan Africa, expressed in constant 2002 dollars, fell from $32 per African in 1980 to just $22 per African in 2001, during a period in which Africa's pandemic diseases ran rampant and the needs for public spending were stark.

Jeffrey Sachs (2005)

World Health Organization (WHO) estimates indicate that some 50–60 million people are living in areas where they are exposed to the bite of the tsetse fly. Some of these people reside in presently active foci where they are at risk of contracting HAT, also known as sleeping sickness. During the late 1990s, according to the WHO (1998), about 300 000 new cases of HAT developed each year, yet only 30 000–40 000 were diagnosed and treated. Such low levels of surveillance are explained by the weaknesses of control programmes, the inherent difficulty in diagnosing the disease and the inaccessibility of some affected areas. Although these figures may appear relatively small when compared to other tropical diseases, they become more significant when one considers that a key characteristic of HAT is its tendency to switch from a situation of low endemicity into a rampant epidemic if uncontrolled, thus making it a major public health hazard. HAT flare-ups affect not only infected individuals but also the members of their families and the communities in which they live. In certain epidemic situations, more than 50 percent of a village's population can become infected. Because HAT mortality rates are high, such situations breed conflict, tension and panic. In such cases, survivors often flee, abandoning their homes and the surrounding arable land rather than risk further exposure to the disease. As a result, sleeping sickness has caused entire villages to disappear (WHO, 1998). According to recent epidemiological work (Odiit *et al.*, 2005; Fevre *et al.*, 2008), deaths in Uganda from the *Trypanosoma brucei rhodesiense* form of sleeping sickness were under-reported on the order of 12 to 1, with only 59 percent of cases reported. Another study (Lutumba *et al.*, 2005) showed that even during active surveillance, only 56 percent of patients suffering from *Trypanosoma brucei gambiense* were found and treated during a single screening exercise. These figures have serious implications for human welfare and disease control. In southern Sudan, recurring flare-ups of *T. b. gambiense* have been observed (Pagey, 2003), suggesting a similar situation may be developing there. This concern, however, has yet to be substantiated by extensive research.

Meanwhile, some 46 million cattle in sub-Saharan Africa (SSA) are estimated to be at risk of contracting AAT (Kristjanson *et al.*, 1999; PAAT, 2000). Occurrence of the disease is admitted in 37 countries covering some 8.7 million km^2, about a third of Africa's land area (Rogers and Robinson, 2004). A recent review of the status of trypanotolerant livestock by Agyemang (PAAT, 2005) indicated that most of the countries in West and

Central Africa consider tsetse-transmitted trypanosomosis a serious health threat to domestic livestock and a major impediment to agricultural development.

The detailed and significant work done over the last several decades on trypanosomosis in livestock has greatly enhanced our understanding of its spatial distribution (through the use of geographic information systems [GIS]), its socio-economic impact on farmers in many parts of Africa and alternative control measures (Jahnke, 1974; Camus, 1981; Jordan, 1986; African Trypanotolerant Livestock Network, 1988; Budd, 1999; PAAT, 2000, 2003a, 2003b, 2004, 2005; Kristjanson *et al.*, 1999; Shaw, 2004).

AAT is known to constrain livestock production in areas of great potential. As described in PAAT (2000) and updated in Shaw (2004), the presence of trypanosomosis has been shown to reduce calving rates by 1–12 percentage points in tolerant cattle breeds and by 11–20 percentage points in susceptible breeds and to increase calf mortality by 0–10 percentage points in tolerant cattle breeds and by 10–20 percentage points in susceptible breeds. The presence of trypanosomosis can also reduce offtake by 10–26 percent in trypanotolerant cattle and lambing and kidding rates by 4–38 percentage points. At the herd level, cattle offtake for sale or slaughter is likely to be reduced by 5–30 percentage points and the work performance of oxen can drop by 38 percent. Faced with these impacts, farmers have difficult choices to make concerning livestock purchases and sales. Often, they compensate with precautionary overstocking. In areas at high risk for trypanosomosis, herd sizes can run 25–60 percent larger than in low-risk areas. In general, the impact of trypanosomosis varies greatly depending upon the management system used by the farmer and the livestock's level of susceptibility.

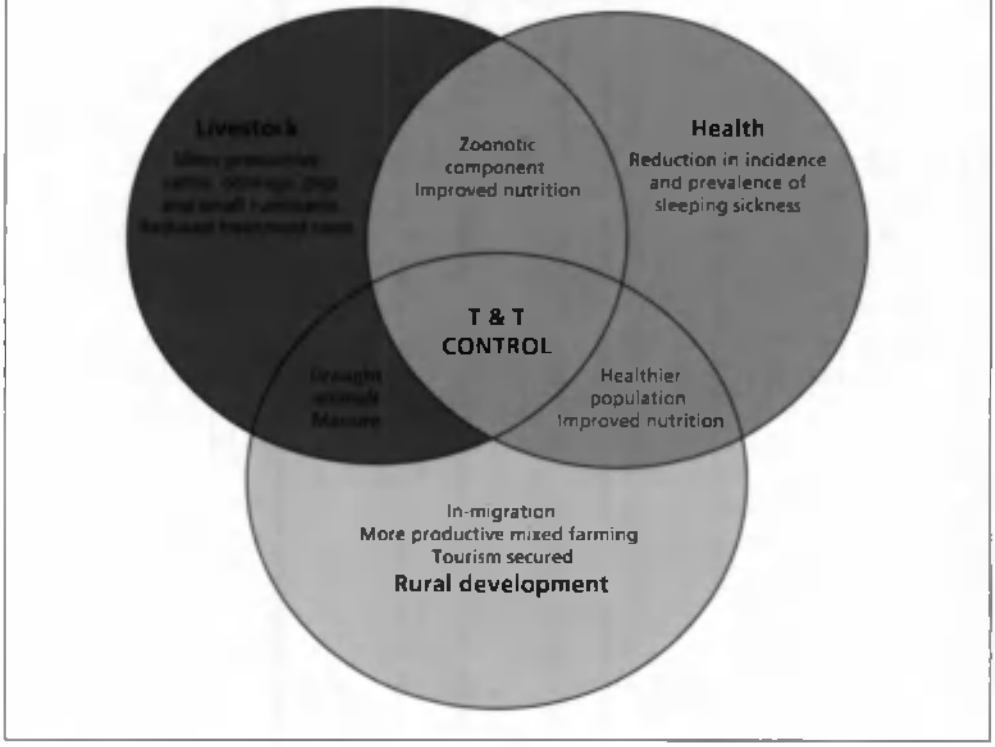
Although some scribes noted as early as the fourteenth century the existence in Africa of a deadly disease characterized by lethargy, it is generally believed that sleeping sickness did not overspread the African continent until the period of colonial penetration. Only then did major flare-ups begin to occur, devastating vast regions. In 1901, working in The Gambia, Forde discovered a parasite in the blood of a man infected with sleeping sickness (Forde, 1902). Following confirmation of his find by Dutton (1902), an enormous amount of work was undertaken on both the parasite and the vector. During the late 1920s and early 1930s, extensive programmes were established to combat the disease; and by the 1960s, trypanosomosis was almost controlled throughout the continent. This success led to complacency, and thereafter the control of sleeping sickness declined, largely because of a lack of interest on the part of many national health authorities. Only slowly and with great difficulty were control programmes reinstated following the recrudescence of trypanosomosis that occurred during the 1970s and 1980s (Cattand, 1988). At first, researchers focused on technical requirements such as the development of the new tools badly needed for surveillance and control work. Only later did they turn their attention to creating strategies that might be better adapted to the new primary health care structures set up following the Alma-Ata declaration (WHO, 1978) and the Bamako initiative (WHO, 1987). Meanwhile, in the absence of appropriate tools and resources to integrate sleeping sickness into these new structures, many endemic countries continued to deploy mobile control teams, operating in much the same way as they had during the first half of the twentieth century.

In recent years, however, the WHO programme on the elimination of sleeping sickness, working in coordination with non-governmental organizations (NGOs) and bilateral agencies, has substantially improved the control and surveillance of trypanosomosis in a large number of endemic countries (Simarro, Jannin and Cattand, 2008). In 2007, for example, 10 769 new cases were reported – a dramatic reduction from 1997 and 1998, when nearly 40 000 cases were reported each year. Even so, there remain some areas, especially in countries experiencing civil unrest or difficult social situations, where the number of new cases continues to fluctuate, as does the number of people at risk (Cattand, Jannin and Lucas, 2001; DFID, 2001; Mattioli *et al.*, 2004; PAAT, 2005). Furthermore, even a small number of sleeping sickness cases can be economically damaging when those infected are tourists. The large amount of publicity occasioned by such incidents (Jelinek *et al.*, 2002) often adds tourism to the list of sectors negatively affected by T&T.

Linking AAT to HAT seems fundamental. There are two forms of HAT: One is a chronic form found in West and Central Africa and caused by *T. b. gambiense*; the other is an acute form found in East Africa and caused by *T. b. rhodesiense* (see Welburn *et al.*, 2004, for details of the epidemiology and history of HAT). In untreated individuals, the disease is always fatal. Past research has shown that domestic and wild animals can act as reservoirs of *T. b. gambiense* (Mehlitz *et al.*, 1982). However the epidemiological significance of such infection is difficult to assess. In a number of endemic villages, pigs live in close proximity to humans and could be a permanent source of infection. On the other hand, *T. b. rhodesiense* has always been known to be zoonotic, with the infection maintained in both wildlife and domestic animals. In southeast Uganda, cattle have been shown to be the principal reservoir of *T. b. rhodesiense*, and the recent geographic expansion of the human disease has been linked to cattle restocking programmes (Welburn *et al.*, 2001). Between 1998 and 2006, for example, the disease spread into eight new districts. Thus, policy-makers are now looking to identify new control strategies that are at once appropriate, cost-effective and sustainable. These include the regulation of cattle movement and restocking and the dissemination of relevant information to farmers and health staff alike. Meanwhile, Uganda has taken steps to table legislation mandating the treatment of cattle in areas where outbreaks of HAT occur.

Thus, tsetse-transmitted trypanosomosis is an intersectoral problem lying at the heart of African rural development. The potential benefits arising from T&T control (T&TC) are outlined in Figure 2 on the following page, which shows the overlaps among the three sectors (human health, livestock health and rural development) affected by T&T. Most widely found in livestock, trypanosomosis primarily affects cattle, small ruminants and donkeys. Thus, controlling the disease will not only increase the available supply of meat and milk but also benefit cropping by increasing the supply of manure, improving the work performance of draught animals and encouraging more farmers to acquire draught animals. Improvements in livestock productivity will also benefit, if indirectly, the health of rural people by increasing the amount of protein in their diets and thereby supporting their health.

FIGURE 2
The intersectoral nature of the benefits arising from programmes designed to control tsetse-transmitted trypanosomosis



Improvements in human health brought about by T&TC directly benefit rural development because healthier people are better able to engage in productive activities such as looking after their livestock and their crops. The rural development sector also benefits in some cases from immigration motivated by the better conditions that exist where tsetse are effectively controlled (PAAT, 2000). Furthermore, in those rural areas where tourism is an important component of economic activity, T&TC can help secure this source of income while leaving protection for wildlife and their habitats intact.

The involvement of the various organizations working in these three sectors (human health, livestock health and rural development) is a key factor in ensuring that the successes of T&TC interventions are consolidated and maintained.

Just as the impact of the T&T problem is spread over three sectors, so also is its impact felt at different socio-economic levels. These levels can be characterized as macroeconomic, mesoeconomic and microeconomic. At the macroeconomic level, trypanosomosis reduces the total stock of livestock by 10–60 percent (Kristjanson *et al.*, 1999; PAAT, 2000; Gilbert *et al.*, 2001). In mixed crop-livestock systems and cropped areas, yields and responses to new economic incentives are also reduced. In countries that are completely infested by tsetse, trypanosomoses reduce total agricultural production by 2–10 percent (PAAT, 2000).

All of these effects can be traced along an impact chain from the livestock keeper/farmer at the microeconomic level to the national economy at the macroeconomic level through the mesoeconomic level, which links them (Table 1). According to Bravo-Ortega and Lederman (2005), the marginal welfare effects found in past studies suggest that agricultural development has an important positive impact on national welfare, especially in developing countries (see also Irz *et al.*, 2001). In contrast, in industrialized high-income countries, marginal welfare gains from non-agricultural activities tend to be much greater than those derived from agriculture. This disparity underlines the need for sustained agricultural development in developing countries.

At the microeconomic level, an important concern is the need for effective management of technical and organizational learning processes among stakeholders – effective technology management being a necessary condition for sustained production and innovation. In view of the new economic exigencies, such management must be geared to optimizing the close interactions among producers, suppliers, services, specialized researchers and development institutions at the same time that it intensifies producer-user contacts.

At the mesoeconomic level, the primary focus is the specific environment in which farmers operate, especially the configuration of the physical infrastructure (transportation, communication and energy systems). Sectoral policies are also significant – in particular those that concern education and training, research and technology, agriculture, and regulatory systems that contribute to the emergence of specific national competitive advantages (e.g. environmental standards and technical safety standards). An import-protection policy, if limited in time and tied to clear performance criteria for emerging agro-industries with great development potential, can facilitate the process of building competitive advantages at the farming and agro-industrial level. Within individual countries, such policies, implemented on both the regional and the local level, have

TABLE 1
The nature of the microeconomic, mesoeconomic and macroeconomic impacts of the tsetse/AAT complex

Microeconomic	Mesoeconomic	Macroeconomic
• Reduced livestock ownership	• Increased vulnerability of livelihoods in rural areas	• Rural poverty
• Reduced livestock productivity, which translates into lower farm incomes	• Underutilization of high-potential agricultural areas	• Malnutrition
• Constrained use of draught animal power	• Reduced land and labour productivity	• Food insecurity
• Expenditures on veterinary drugs and time taken to care for sick livestock	• Inefficient marketing chains	• Rural unemployment
• Poor access to markets		• Migration
• Increased transaction costs		• Unsatisfied demand for livestock products
		• Imports of livestock products
		• Deficit in trade flows
		• Lowered gross national product
		• Government expenditures on T&T and research

gained in significance. Close interaction among regional and/or local administrations, research and development institutions and local groups can thus serve to enhance agriculture performance and the quality of agro-industries. The importance of the mesoeconomic level has been repeatedly demonstrated in developing countries when the creation of stable macroeconomic conditions fails to produce the expected economic reactivation. The reason is usually that the mesoeconomic level has been neglected.

This paper outlines an approach to the setting of normative guidelines for the strategic planning of livestock-agricultural development and sleeping sickness surveillance and control in areas affected by both AAT and HAT. These guidelines take into account the impact of trypanosomosis on three sectors and at three levels. This paper aims to complement the other papers in the PAAT Scientific and Technical Series and other recent studies by approaching the T&T problem from the point of view of policy design and identification of the key variables that need to be considered in order to link the various T&TC activities with sustainable rural development strategies. In this paper, the general term *T&TC* should be understood to mean measures ranging from the treatment of people and animals to all the various methods for reducing tsetse populations, whether ultimately resulting in their suppression or elimination.

In this context four main areas need to be addressed:

- determination of an appropriate analytical framework (a prerequisite for formulating T&TC policy) through clear priority-setting and planning;
- identification and consultation of the stakeholders who would be involved in implementing strategies for T&TC;
- description of steps and links for coordinating policy design and implementation of T&TC;
- identification of the accompanying measures required for successful, sustainable T&TC.

These topics are discussed in the next four chapters.

Chapter 2
Policy, prioritization, plans and projects

Poverty in Africa is predominantly rural .... Structural adjustments have dismantled existing rural systems but have not always built new ones. In many transitional economies, the rural situation is marked by continuing stagnation, poor production, low incomes and the rising vulnerability of poor people. Lack of access to markets is a problem for many small-scale enterprises in Africa. The rural population is poorly organized and often isolated, beyond the reach of social safety nets and poverty programmes. Increasingly, government policies and investments in poverty reduction tend to favour urban over rural areas.

International Fund for Agriculture Development (2007)

HISTORICAL PERSPECTIVE

During the 1980s and 1990s, market-led, outward-oriented policy reforms were adopted by all African countries, putting an end to decades of state-led, inward-oriented growth strategies. Approaches had long been dominated by macroeconomic stabilization and structural adjustment programmes sponsored by the International Monetary Fund and the World Bank. These gave priority to eliminating budgetary deficits, restoring macroeconomic stability and international financial flows and opening the national economies to global market forces. Yet, despite a relatively healthy world economy, economic growth in the developing world languished, especially in SSA. Then, during the late 1980s and early 1990s, the objectives of policy reform were widened to include measures designed to influence microeconomic efficiency. Domestic market liberalization and privatization of public enterprises were supposed to enhance a more stable macroeconomic environment and stimulate economic adjustments in line with the redefined structure of incentives.

In the field of human health, the 1978 Alma-Ata declaration called for a reduction of the gap between the health statuses of developing and developed countries, stating that "the promotion and protection of the health of the people is essential to sustained economic and social development and contributes to a better quality of life and to world peace". The key to attaining this goal, the document advised, was primary health care:

> *Primary health care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and community with the national health system, bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process.*

The declaration further stipulated that all governments should formulate national policies, strategies and plans of action to launch and sustain primary

health care as part of a comprehensive national health system in coordination with other sectors.

Following the Alma-Ata declaration, some reforms indeed took place. In a number of African countries, policies imbued with the spirit of Alma-Ata were developed, planned and implemented. In particular, some community-financed "village pharmacies" were created to supply essential drugs at the village and community level. But changes failed to occur at the expected pace, and the impact of reforms was low. The reason was often inadequate community involvement caused by a lack of communication, information and education.

The Bamako initiative (WHO, 1987), launched in 1988, was designed to revitalize the primary health care strategy while strengthening equity in access to health care. A decade later, however, several research initiatives concluded that this policy also did little to improve or increase access to health care among the most deprived and excluded population groups. According to Ridde and Girard (2004), its emphasis on financial sustainability and the viability of health care structures served only to marginalize further certain already disenfranchised population groups. Even so, in Ridde and Girard's opinion, the policy's exemption mechanisms for reducing financial barriers to the poor do represent a technically feasible solution. Currently, to support the goals of the Bamako initiative, African states are being encouraged to implement incentives, NGOs are being asked to consider planning as a tool for social change and donors are being urged to prioritize their investments according to principles of equity.

In the field of agriculture, the assumptions underpinning policy reforms were: 1) that governments would remove policy biases against farm products that increased agricultural growth and reduced poverty; 2) that, following privatization and budgetary cuts, the private sector would step in rapidly to provide goods and services that were previously supplied by state agencies (or marketed by parastatal agencies); and 3) that most farmers would respond rapidly to price incentives. Since the mid-1990s, however, despite some economic growth, persistent poverty and rising inequality have led to a fundamental shift in this policy agenda. National governments and multilateral agencies have adopted pro-poor growth and poverty alleviation as their overarching goals – with growth, in particular, coming to be seen as a necessary but not sufficient condition for poverty reduction (Zezza and Llambi, 2001).

In the academic literature as well as among national policy-makers and multilateral agencies, a consensus emerged that the structural adjustments made, especially during the 1980s, were not structural enough because they failed to focus on critical links among policy measures, intended objectives and actual outcomes (Stiglitz, 1986). By focusing almost exclusively on price reforms ("getting prices right") and macroeconomic variables, these policy reforms tended to ignore important structural and institutional traits that hindered progress towards economic growth and improved human welfare.

In this paper, the word *institutional* refers to what are sometimes described as the rules of the game – that is, the social, political and legal networks that

define social and economic relationships. It does not refer to organizations such as ministries, health services and NGOs. The insights offered by institutional analysis are explored in the classic text by North (1990). Examples of activities aimed at institutional reform would be improving governance, fighting corruption, reducing trade barriers, ensuring that Poverty Reduction Strategy Papers (PRSPs) address the underlying causes of poverty and empowering poor people (especially women in societies where they are disadvantaged) through better education and health.

The lack of progress towards these goals is still being felt at a very practical level. For example, the resources available to livestock keepers continue to be limited and are often inadequate to support private providers of veterinary services in remote locations. Complicating this problem is the limited knowledge that most livestock keepers have of the diseases they encounter and the drugs used to treat them. So, even when livestock keepers do possess the resources to pay for treatment of their animals, they often fail to understand what they are buying from private providers, as evidenced by numerous field studies. For this reason, supervision and control of private providers is difficult, and issues of correct dosage and the avoidance of drug resistance are often cited in this context.

In addition, policy-makers have only recently recognized the negative social effects caused by the reforms cited above. In response, they have begun to design safety nets for the newly unemployed and newly poor. Nevertheless, despite several attempts to introduce new dimensions to policy analysis, the need remains for a consistent theoretical framework capable of accounting for the various sources of policy and market failure.

POLICY FOR POVERTY ALLEVIATION

Fighting poverty requires, more than anything else, an understanding of the problem's multifactorial determinants. From the perspective of development economics, one can see that, historically, there has been a great deal of "compartmentalization", or mostly single-sector interventions targeted at the poor. These programmes and projects have been characterized most of all by their vertical nature. In recent years, however, alternative frameworks and development models have been proposed, including the sustainable livelihoods approach, that offer a more differentiated view of poverty. As outlined in Box 1 on the following page, the characteristics of the problem are threefold (Ly, 2001).

A first step in the process of integrating T&TC with other rural development activities is to examine the policies regarding land use, agriculture, livestock production and human health that currently guide government services; donor activities; and, above all, work on poverty alleviation in areas affected by AAT and HAT. The key documents are the PRSPs, in which each national government sets forth the macroeconomic policies it has adopted to fight poverty. Produced following the declaration of the Millennium Development Goals (MDGs), the PRSPs were prepared through a participatory process involving domestic stakeholders as well as external development partners such as the World Bank and

BOX 1
The multifactorial characteristics of poverty

1. **Low levels of income, particularly among women and young people:**
   - lack of access to development resources and services, including financial services and the inputs required for production;
   - lack of information or distorted information on economic opportunities;
   - disconnection from the local and national economies;
   - weak positions in marketing chains.

2. **Poor access to basic infrastructure and social/production services:**
   - water, health care and sanitation facilities;
   - education;
   - market facilities;
   - other integrated social and production services.

3. **Weak institutional capacities of community-based organizations (CBOs) and/or local organizations managed by the poor themselves:**
   - weak capacities in project formulation and management, especially in the identification of demand-driven projects;
   - lack of information about and the capacity to design and monitor contracts for basic social/production services and infrastructure projects implemented by contractors such as NGOs, the local private sector and the government;
   - weak capacity to supply the necessary data to macroeconomic-level organizations that analyse economic and social status for pro-poor advocacy, policy and action plans;
   - weak aptitude in networking, especially in building partnerships with local governments and with decentralized structures to ensure that these institutions respond to their needs.

the International Monetary Fund. Updated every three years with annual progress reports, these documents describe each country's macroeconomic, structural and social policies and programs over a time horizon of at least three years. Their purpose is to reduce poverty while promoting broad-based growth. More specifically, they identify associated external financing needs and major sources of funds. PRSPs can currently be accessed at the International Monetary Fund Web site via the link http://www.imf.org/external/np/prsp/prsp.asp. Box 2 describes the extent to which they have thus far addressed the T&T problem. While PRSPs do set useful poverty-reduction objectives, they do not yet meet the need for a combination of growth acceleration and sustainable government spending, nor do they provide a stable macroeconomic framework or ensure a more equitable international trade in agricultural products.

BOX 2

Locating a focus for T&T in Africa's Poverty Reduction Strategy Papers

Although PRSPs set out broad strategies for poverty alleviation, they typically do not contain detailed references to specific disease problems such as T&T.

Thus, some African PRSPs pay limited attention to agriculture and only briefly mention livestock. However, a number do recognize the important role of livestock in the economy of their countries and in rural poverty alleviation. For example, the 2002 Senegal PRSP has recognized that "beyond the fact that livestock represent a significant source of savings, it is also a very effective means of reducing the vulnerability of rural households". The importance of livestock diseases is also frequently highlighted, as by Zambia in its 2002 PRSP: "The causes for the high poverty in rural areas are varied. For example, small-scale farming connected with cattle rearing in the Southern, Western and Central Provinces attribute cattle disease as one of the major causes of poverty." In its 2007 PRSP, Zambia specifically mentioned the problem of trypanosomosis in the Eastern Province. Furthermore, Uganda's 2005 PRSP lists as its first two "priority actions for livestock" 1) the development of "a strategy for the livestock sector, covering disease control and addressing the needs of pastoralists" and 2) the undertaking of "necessary actions to control the spread of livestock diseases".

Burkina Faso's July 2004 PRSP emphasizes livestock and lists nine major programmes to support it, of which the third is "fighting animal trypanosomosis". Similarly, Mali's December 2006 PRSP lists three major projects to support livestock development, of which one is the creation of a tsetse-free zone.

With regard to human health, nearly all PRSPs mention the Big Three: HIV/AIDS, malaria and tuberculosis. Many also go on to mention Africa's many endemic diseases, but Cameroon's April 2003 PRSP goes a step further to include a specific budget line for trypanosomosis control in its health budget annex.

For those promoting T&TC, lobbying for its inclusion in PRSPs is an important step in ensuring that the work of T&T control is given prominence in national policies to alleviate poverty.

In most countries, national PRSPs were created with a view towards supporting socio-economic development, access to health care, sustainable livestock and/or agricultural development, rural development and food security. The poverty-reduction strategies outlined in each nation's PRSP have become, especially among highly indebted countries, the conventional strategic framework by which these countries determine:

- their medium-term development plans through consultation and participation;
- their specific objectives based on international standards as set forth in the MDGs;
- their medium-term macroeconomic and budget objectives, which link priorities with financing according to the resources available.

Local governments, private-sector groups and NGOs provide the working background for basic social services to operate effectively.

At the macroeconomic level, the main objective is to create a framework that will allow effective competition among farmers while at the same time promoting increased productivity. Such a framework should include a financial policy that ensures undistorted prices and favourable financing terms, a competition policy that prevents the emergence of monopolies and a trade policy that limits barriers to exports while at the same time avoiding adjustment processes that could overtax the response of potentially adaptable farmers. Trade liberalization within SSA could increase intra-SSA trade by 54 percent and thus account for over 36 percent of the welfare gains that SSA stands to receive as a result of global trade liberalization (Tupy, 2005).

Putting together policies aimed at improving the health of poor people and reducing the impoverishing effects of ill health requires broad-brush thinking across all the relevant levels of policy-making. At the macroeconomic level – that is, the level of the government's national budget – the major concern is the amount of resources allocated to the problem. An important secondary concern, however, is how these resources might be reallocated to serve poor people better. Another key level is that of the health system, where the primary concern is improving incentives so that the system will function better for poor people. Finally, at the microeconomic or service-delivery level, the focus is on how to implement specific activities to reach poor people. Work at these three levels is interdependent. Those people working at the service-delivery level cannot succeed without the cooperation and assistance of people working at the other levels. The PRSPs are meant to develop approaches to tackle weak points, enhance coordination and improve delivery. In doing so, they certainly offer an opportunity for people working at all these levels to work together.

Obviously, the macroeconomic, mesoeconomic and microeconomic levels all have their significance in the health delivery field. At the microeconomic level, affected rural populations must have access to knowledge and suitable, reliable local health services. Primary health workers based in rural communities must be able to satisfy the local demand for diagnosis, baseline treatment and simple medical acts through their dispensaries. Similarly, for livestock, veterinary posts and community animal health workers are needed at the village level (FAO, 2002). At the mesoeconomic level, health centres to which patients are referred must be able to provide the necessary follow-up. Similarly, at the macroeconomic level, hospitals must in turn have a connotation of excellence and be able to resolve the problems of patients referred to them. Being the ultimate reference in a particular nation, they should be active in research and development and in that context establish close links with external (possibly worldwide) specialized organizations and research centres. In order for the reference chain to be effective, information must flow from the bottom to the top. There must also be appropriate environmental conditions for health staff and suitable supplies and infrastructure, as well as good transportation and functioning communications. A feedback process that carries information from the top to the bottom is also essential for effective follow-up once patients return to their original residences. Although

such a process is now being considered more seriously than in the past, it remains grossly underestimated and rarely implemented. The chain of information is often broken, and useful feedback almost never occurs.

PRIORITIZATION

Having examined the national policy background, the next steps are to analyse priorities with respect to the HAT and AAT situations and to draw inferences as to what type of T&TC is called for and where it should be implemented. The last few years have seen the development of several highly innovative approaches to setting priorities for T&TC. All of these have included a strong spatial element and incorporated the use of advanced GIS and modelling techniques, thus diverging strongly from the simple economic and technical feasibility studies undertaken in the 1980s and 1990s. These new approaches have been strongly supported by PAAT.

The approach summarized in PAAT (2004) is based on combining:

- livestock and human population data;
- land cover, production system and land-use data (including forest, game reserves and national parks data);
- predictive models of the presence and absence of tsetse and detailed surveys of trypanosomosis prevalence in livestock;
- indicators of the feasibility of undertaking tsetse control, such as boundaries of river basins for area-wide programmes to create tsetse-free zones.

These data were then combined to highlight areas where disease losses were high, where tsetse control on a large scale was feasible and where existing production systems would benefit greatly from the removal of the constraint of trypanosomosis.

An approach based on similar variables but integrating them with economic calculations was produced by Shaw *et al.* (2006). It combined:

- predictive models of the absence and presence of tsetse;
- mapping of production systems based on cattle breed, herding patterns and use of animal traction;
- projections of the output of cattle over 20 years in the absence and presence of trypanosomosis;
- projections of cattle population growth and spatial expansion over 20 years in the absence and presence of trypanosomosis.

The final product was a monetary map showing the potential benefits over 20 years from the removal of trypanosomosis. As with the work described in PAAT (2004), this study highlighted the high cost of trypanosomosis in West Africa's cotton belt – notably in the Sikasso region of Mali, in southwestern Burkina Faso and in northwestern Côte d'Ivoire.

Robinson (2005) created a similar map for Uganda using variables that stopped short of financial mapping. Instead, he used stakeholder meetings and other participatory exercises to weight the various variables. The ultimate outcome was a map of priority areas with layers weighted according to their importance, as determined by the consensus that emerged during the stakeholder meetings (Box 3 on the following page).

BOX 3

Example from Uganda: a multistakeholder, consensus-based methodology for T&T prioritization integrating poverty, HAT, AAT and rural development in a GIS framework

The Government of Uganda requested assistance from the International Livestock Research Institute (ILRI) and the FAO's Pro-Poor Livestock Policy Initiative (PPLPI) to support its T&TC work with an exercise designed to identify priority areas for intervention. The work was undertaken in four steps designed to address the issue of where to control trypanosomosis.

1. Define the objective

The objective was defined thus: "to control animal trypanosomosis with the aim of reducing poverty".

2. Produce standardized maps showing key variables

The key variables included:

- tsetse distribution (indicating the estimated risk of trypanosomosis)
- length of the growing period (LGP) for crops
- intensity of crop production
- distribution of rural people living in poverty
- distribution of the cattle population
- distribution of poor livestock keepers (PLKs)

A weight was assigned to each of the key variables, as shown in the chart opposite.

PLANS AND PROJECTS

The final step in effectively integrating T&TC into rural development strategies involves the creation of an exhaustive inventory of plans and projects affecting priority areas. This inventory should indicate how much support beneficiaries can expect to receive from local health and livestock services, as well as how activities such as the increased use of animal traction might be supported.

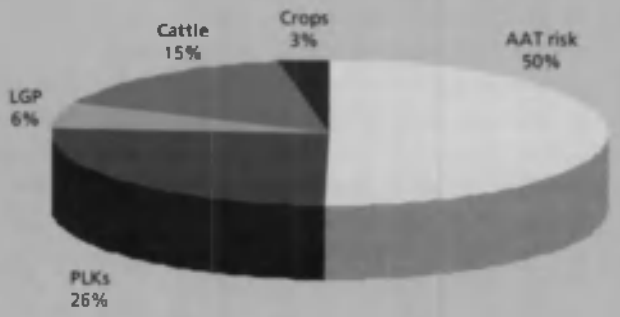
Land-use planning

Most African countries have published land-use plans. However, the extent to which they are prescriptive and the extent to which they are enforced varies greatly. A recent compendium can be found in Nolan (2006). The most accepted and enforced pieces of legislation are those that create forest and wildlife reserves. They are generally respected by local people even though rights of access vary. For example, cattle are usually forbidden in wildlife reserves, whereas grazing is sometimes allowed in forest reserves. Typically, boundaries are clearly drawn and well known. In the PATTEC Phase 1 area of Ghana, for instance, 16 discrete areas ranging in size from 1 to 132 km^2 and totalling 939 km^2 have been set aside as forest reserves (M. Abavana, personal communication).

3. Consult stakeholders

This step had several components, including:

- the identification of key stakeholders (e.g. local governments, the national government, national agricultural research organizations, NGOs, universities, donors, private-sector groups, international organizations);
- the initiation of a participatory process for identifying and prioritizing potentially mappable criteria;
- the development of a consensus on the weight to be assigned each criterion.



4. Identify priority areas for T&TC

By weighting each of the decision criteria and then adding them together (in a process called weighted linear combination), priority areas for intervention were identified and mapped.

Source: based on Robinson, 2005

In some countries, particularly in southern Africa, there remains in place some generalized zoning based on land-use systems imposed during colonial times. Elsewhere, particular land-use experiments have been introduced such as the group ranches in Kenya, which are located in some of the country's most heavily tsetse-infested areas. Land-use rights and responsibilities in these countries are enshrined in periodically updated legislation that includes provisions for sustainable land-use and conservation of soil resources. An example is the draft legislation currently being prepared in Ethiopia, entitled "The Southern Nations, Nationalities and Peoples Regional State Rural Land Administration and Utilization Proclamation" (Government of Ethiopia, 2007). This law includes provisions such as:

> *The development plan proposed by individuals, investors and governmental and non-governmental organizations must not lead to land or environmental degradation. If any person is found guilty of damaging the land or the environment, he shall be subjected to the court and sentenced. Thereafter, he shall have the obligation to rehabilitate the land or the environment.*

and:

> *The biodiversity in rural wetlands shall be conserved and utilized as necessary, in accordance with a suitable land-use strategy.*

In most tsetse-affected countries, the clearest component of land-use planning is the setting aside of land for specific restricted uses: grazing, forestry, conservation and wildlife. The laws do vary from country to country. For example, grazing and collection of fallen wood is allowed in forest reserves in some nations, while in others it is illegal. Africa's game reserves, in particular, form a key part of its natural resources and heritage and also of its ability to attract tourists and thus earn foreign exchange. Most African game reserves are also rich in tsetse, which benefit both from the receptive habitat and the easy availability of animal hosts. Tourists sometimes complain of the physical presence of tsetse. More importantly, though, some have recently contracted HAT (Jelinek *et al.*, 2002), leading to negative publicity.

Cases of HAT among tourists factored in the decision to eliminate tsetse from 16 000 km² of Botswana's Okavango Delta, a world heritage site (Kgori, Modo and Torr, 2006). For many years, tsetse were controlled in this area using targets, considered unsightly but environmentally benign. But growing awareness of the risk to tourist health and to the health of livestock on the fringes of the delta presaged the shift from suppression to eradication. Initial environmental monitoring has since shown that the eradication campaign has not had negative environmental side effects (Perkins and Ramberg, 2004).

TABLE 2
Selection of recently implemented projects in priority T&TC areas in Burkina Faso and Ghana

Project title	Field of activity	Area of intervention	Implementing and funding agency
Pan-African Programme for the Control of Epizootics	Animal health	International	African Union
Fodder Conservation	Agriculture and livestock	National (Burkina Faso)	
Soum Province Livestock Development Project	Livestock, agriculture and environment	Soum Province (Burkina Faso)	Government of Burkina Faso African Development Bank
Support for Institutional Strengthening of the Professional Organizations for Modern Livestock Keepers	Livestock	National (Burkina Faso)	French Government Priority and Solidarity Fund
Sustainable Development and Poverty Alleviation project	Agriculture, livestock, land tenure, food security and the environment	National (Burkina Faso)	French Government Priority and Solidarity Fund
Project of the Support of the Livestock Keepers of Western Burkina Faso	Livestock	Western Region (Burkina Faso)	French Government Development Agency
Livestock Development Project	Livestock	Northwestern Ghana	Government of Ghana
Lassia Tonli Agricultural Project	Agriculture	Northwestern Ghana	NGO
Nandom Agricultural Project	Agriculture	Northwestern Ghana	Catholic Church
Tumu Agricultural Project	Agriculture	Northwestern Ghana	
Rural Development Project	Rural development	Northwestern Ghana	Rural Action Aid Programme (Ghanaian NGO)

It is important when implementing T&TC to make an inventory of existing land-use legislation and to determine how such legislation will affect land-use changes that may arise from, for example, successful tsetse clearance. Linked to this is the need to liaise with environmental protection agencies whose brief includes ensuring that the potential environmental impacts of planned activities are appropriately addressed.

At the microeconomic level, a new approach called participatory land-use planning seems particularly promising. It brings together farmers, livestock keepers and other stakeholders to reach a consensus regarding the uses to which land will be put. FAO has applied this approach in its Livestock Environment and Development initiative, and Ethiopia currently plans to use it in its Southern Tsetse Eradication Project.

Creating project inventories

Project inventories covering the fields of human health, rural development, agriculture, draught animals, livestock and veterinary medicine can help identify pre-existing structures that, in turn, can help implement T&TC. In this way, the effects of T&TC can be consolidated and its benefits taken up and maintained. Such inventories require field visits because many of the projects they record are implemented by local governments and local NGOs. Typically, these visits uncover a greater range of activity than was expected. The data in Table 2 give some indication of this range. Actual field inventories, of course, need to show much greater detail, including the type of intervention being planned and undertaken and the people and organizations involved.

Chapter 3
Involving the stakeholders

IDENTIFYING THE KEY PLAYERS

The involvement of all stakeholders is vital to the success of any enterprise. This is especially true in the case of T&TC because T&TC is a cross-sectoral activity (involving at the very least the medical and veterinary services), and individuals in one of these fields are often unaware of what individuals in another of the fields are doing. That is, the networks of acquaintance and cooperation that exist within one sector – say, the animal traction department of the ministry of agriculture – often do not extend to other sectors, such as the veterinary group in charge of vaccinations or maternal and child health providers in the local hospital. For T&TC programmes to be successful, they must identify and engage an unusually wide constituency of stakeholders. The main groups of stakeholders are listed in Table 3. The ways in which they interact are illustrated in Figure 3 on page 23.

TABLE 3
Roles, players and playing fields in T&TC

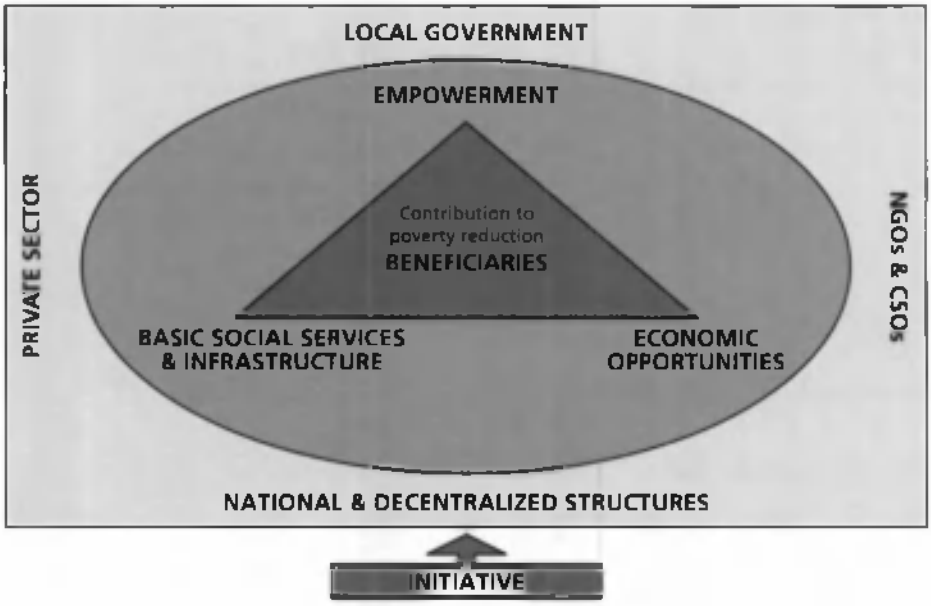
Roles	Players	Playing fields
Political orientation	Sector ministries:	National
	Ministry of health	
	Ministry in charge of livestock	
	Ministry in charge of food systems	
	Ministry in charge of tourism	
	Ministry in charge of wildlife, conservation and national parks	
	Coordination committees	
Advocacy	Sector ministries	National
	Government agencies	
	Technical experts	
Planning	Sector ministries	National
	Environmental protection agency	Regional/local
	Other government agencies	Community
	Technical experts	
	NGOs	
	Intersectoral teams	
	Community leaders	
	Community organizations	
	Community members	
	Community private services providers	

(cont.)

TABLE 3 *(cont.)*

Roles	Players	Playing fields
Resources provision	Sector ministries	National
	Environmental protection agency	Regional/local
	Other government agencies	Community
	Local governments	
	NGOs	
	Community leaders	
	Community organizations	
	Community members	
	Community private services providers	
Training and capacity building/ strengthening	Technical experts	National
	NGOs	Regional/local
	Sector leaders	Community
Monitoring and appraisal	Sector ministries	National
	Environmental protection agency	Regional/local
	Other government agencies	Community
	NGOs	
	Community private services providers	
Supervision	Sector ministries	Regional/local
	Government agencies	Community
	Environmental protection agency	
	NGOs	
	Community organizations	
	Community members	
	Low-level workers	
Services provision	Sector ministries	Regional/local
	Government agencies	Community
	Environmental protection agency	
	NGOs	
	Community leaders	
	Community organizations	
	Community members	
	Community private services providers	

FIGURE 3
The role of different stakeholder groups: a conceptual framework for poverty alleviation



PUTTING TOGETHER A STAKEHOLDER INVENTORY

The main government ministries that belong in the stakeholder inventory are relatively easy to identify. More difficult to find are the smaller groups active on the local level. Although some Web sites claim to keep track of NGOs active in different fields, their lists are often out of date because of the high mobility of the organizations involved. Table 4 on the following pages lists some of the organizations active (at the time of this writing) in areas where PATTEC's Phase 1 of creating tsetse-free zones is scheduled to be implemented. While some international NGOs – such as Farm Africa, World Vision and Heifer Project International – have long histories of involvement in the field of African livestock development, the work of smaller, local NGOs can be crucial to the success of a project. Similarly, in the field of medicine, Medecins Sans Frontières is pre-eminent, but many small NGOs also help with local health issues.

TABLE 4
Organizations promoting rural development in PATTEC Phase 1 project areas in Ethiopia and Ghana

Organization	Area of intervention
A) GOVERNMENT SERVICES	
Ministry of health (General)	Human health
Ministry of food and agriculture (Ghana)	Eight technical directorates: Crop services Agricultural extension services Plant protection and regulatory services Agricultural engineering services Animal production Veterinary services Fisheries Women in food
Bureau of agriculture and rural development (Ethiopia)	Agriculture Livestock
Environmental protection agency	Acts as a referee for all activities with environmental implications
Pastoralists development commission (Ethiopia)	Agriculture Livestock
Soddo veterinary laboratory (Ethiopia)	Livestock
B) INTERNATIONAL NGOS	
World Vision	Rural development
Farm Africa	Rural development (with a very strong commitment to livestock)
Action Aid	Rural development
Churches	Human health Livelihoods (including livestock)
Worldwide Fund for Nature	Conservation and wildlife
C) NATIONAL OR LOCAL NGOS	
Rural Aid Action Programme (a local NGO limited to northwest Ghana)	Human health Livelihoods (including livestock) Education
Agri-Service Ethiopia/Amaro Integrated Food Security Programme	Agriculture Livestock
Ethiopian Rural Self Help Association/Kutcha Integrated Rural Development Programme	Agriculture Livestock

(cont.)

TABLE 4 *(cont.)*

Wolayta Development Association (Ethiopia)	Agriculture Livestock
Kore Development Association (Ethiopia)	Agriculture Livestock
Konso Development Association (Ethiopia)	Agriculture Livestock

The next level of analysis involves determining the total capacity of the service providers most directly affected. For example, when planning HAT interventions involving local health services, it may be necessary to create the type of inventory illustrated in Table 5. Such an inventory would also be required for veterinary services. In Burkina Faso, for example, the government's veterinary services department maintains 12 regional headquarters, 45 provincial headquarters and 100 veterinary clinics. There are also 63 private veterinary practices and clinics in the country.

TABLE 5
Health facility inventory: PATTEC project area, northwestern Ghana

Facility	Number
Government hospitals	6
Private hospitals	3
Mobile clinics	765
Private clinics	5
Government health centres/clinics	60
Private maternity homes/clinics	3
Traditional birth attendants	966
Community-based surveillance volunteers	1 005
Guinea worm volunteers	385

Source: compiled by M. Abavana

SUSTAINABLE STAKEHOLDER PARTICIPATION

Paradigm of participation

In recent years, decision-makers and policy analysts have come to recognize that the participation of local community stakeholders is essential for sustainable poverty reduction. This concept has, in fact, become a fundamental part of the development lexicon, and among certain analysts it has even become a dogma. For this paradigm to be effective, however, it must be based on sincere institutional convictions.

The effectiveness of the paradigm also depends on an understanding of:

- social relations and power dynamics/structure in a particular poverty setting;
- social fragmentation and economic differentiation;
- power utilization and distribution;
- structures and mechanisms that impoverish and enrich.

Such a framework, although new, leads to the re-emergence of intellectual perspectives and policies long discredited and neglected by technical professionals and organizations. To be effective, however, this framework must be built around an accepted focus. Specifically, it must be based on institutional instruments and arrangements that follow from:

- an identification and preparative process using local knowledge;
- the reduction of dependence on external assistance and the fostering of self-implication among local communities, institutions and organizations so that they might better confront their problems;
- the adjustment of projects to match specific social or economic environments, location-specific historical resources and technological endowments;
- better access to services for vulnerable groups.

The direct pathways to participation are listed in Annex 1 on page 63.

Like the willingness to pay, which depends on the will of the consumer, the willingness to empower depends on the will of informed and knowledgeable governments and other key partners. Implied is the involvement of all stakeholders, from the initial identification and monitoring phase to the final evaluation; and doing so ensures that the work will be underpinned by learning-by-doing and observational processes.

Success thus requires alliance and coordination among communities, the private sector, the public sector (including research and development), NGOs and civil society organizations (CSOs). In addition, the policy linkages among livestock, health and the other sectors necessary for development (education, agriculture, credit, etc.) should not be ignored.

Approaches toward participation

To foster participation, the quality of such participation needs to be considered and appreciated. From an instrumental perspective, participation can be viewed as a means to an end. Inversely, from a developmental or educational perspective, it can be viewed as empowerment and, therefore, both an end in itself and a means to self-development.

This approach will be practical to the degree that it is function of:

- the mapping of poverty and assets
- the targeting of beneficiaries
- one's willingness to empower stakeholders
- the identification of key partners at the intracommunity and extracommunity levels

Mechanisms and actions

The mechanisms to ensure the participation of farmers as stakeholders in the elaboration of policies and the design of frameworks consist of putting them at the "negotiation table" and offering them alternatives from which they can chose and about which they can offer suggestions for improvement. Participation has to be clearly defined because there are different participation levels. Each participant needs to have a clear understanding of the level at which he or she will be involved and the role that he or she will be asked to play. The chain of events during the participant's recruitment must be sufficiently detailed so that he or she can understand and agree to the desired involvement. Ultimately, however, stakeholders will have to develop a sense of ownership and overtake the role of the outsiders promoting the project. The different participation pathways are described in Annex 1 on page 63.

At the community level

Insight into the organization of participants at the community level can be found in local development plans that bring together local councils and other local governing bodies, farmers' organizations, public and private extension/advisory agencies, research organizations and other relevant stakeholders (such as the forestry, livestock and land management departments responsible for rural development interventions, including T&TC).

One way to facilitate the planning process and make it more efficient is to build on and reinforce the capacities of community and livestock keeper organizations. The procedure for creating a community framework conventionally involves the following steps:

- defining the problems (the diagnostic phase), involving all stakeholders;
- developing strategies and selecting technical options suitable for the community's specific environment;
- identifying funding mechanisms and negotiating the participation/contribution of beneficiaries;
- developing projects to be included in the community project portfolio;
- developing implementation strategies.

In this way, T&TC can be more easily integrated with other local development initiatives and programmes relating to human health (malaria, schistosomiasis, etc.) and natural resources management (land, forestry, etc.). The involvement and informed participation of local stakeholders can be further reinforced by building local capacity in T&TC techniques. It is essential that communities become involved at the design stages of such work and that a clear consensus be reached about what communities can provide and what needs to be provided for them by outside resources and over what period of time.

Liaison with NGOs such as those listed in Table 4 on pages 24–25 is crucial. Such groups are often involved in tsetse control activities, treating livestock with trypanocides and introducing livestock into new areas. Information exchange and the provision of technical expertise can be vital to the success of such measures. Without access to proper expertise and advice, workers might wrongly introduce susceptible animals into a new disease environment or prescribe incorrect drug dosages. In the field of human health, local practitioners need similar access to information on unfamiliar diseases. (Information and a simulation model that can assist organizations in the planning and implementation of tsetse control operations are available at www.tsetse.org.) NGOs and other groups working on tsetse control, human health and livestock development and health in tsetse-infested areas should take advantage of access to information, especially relevant technical expertise, so that their activities can be optimized.

In the field of tsetse control, participation at the community level has been much debated (Laveissière *et al.*, 1994; Barrett and Okali, 1998; PAAT 2003a; Dransfield and Brightwell, 2004). Such participation is essential to the success and sustainability of T&TC. However, given the many conflicting demands on people's time and resources, especially in poor communities, it is essential that programme managers make clear the amounts of money and/or labour that must be committed for the project to be sustained. The extent to which T&TC interventions are private and public goods, or are merely perceived that way, is an important issue in this context. For further discussion, see Swallow and Woudyalew (2004), Kamuanga *et al.* (2001) and the end of Chapter 4.

At the national level

National PRSPs currently in the preparation or implementation stage must include clauses making the involvement of stakeholders mandatory. The identification of administrative transaction costs at the mesoeconomic level (and subsequent follow-up) will also lead to the genuine involvement of T&TC beneficiaries. Such conditions are a sine qua non for the optimal orientation of PRSPs in financing T&TC, livestock development and human and animal health.

At the regional and continental levels

This bottom-up approach can also be pursued at the regional and continental levels to influence institutions that set policy for rural life and ensure that those institutions consider T&TC as a means of improving rural livelihoods. Such an approach would increase the likelihood of T&TC's inclusion in the strategy papers of such regional organizations as the Economic Community of West African States (ECOWAS), the Union Économique et Monétaire Ouest Africaine (UEMOA), the Intergovernmental Authority on Development (IGAD) and the Southern African Development Community (SADC). It would also ensure that T&TC remains on the agendas of such international research institutions as African Insect Science for Food and Health (ICIPE), the International Livestock Research Institute (ILRI), the International Trypanotolerance Centre (ITC), the Centre International de Recherche-Développement sur l'Elevage en zone Subhumide (CIRDES) and the École Inter-États des Sciences et Médecine Vétérinaires (EISMV).

At the continental level, the primary challenge is to make sure that T&TC issues are explicitly considered under each of the four "pillars" set forth in the Comprehensive Africa Agriculture Development Programme (CAADP), a programme of the New Partnership for Africa's Development (NEPAD). (For further information, visit www.nepad-caadp.net.) These issues include:

- improvement of human and livestock health
- land and water management
- rural infrastructure
- trade-related capacities for improved market access
- agricultural research
- technology dissemination and adoption

Ultimately, such consideration will help integrate PAAT and PATTEC objectives and activities into the African institutional setting for development.

Also at the continental level, international organizations such as FAO and WHO are mandated to provide recommendations, guidelines and information for the development and establishment of global policies for effective agriculture and human health care.

Last but not least, PAAT should continue in its present role as a source for information and expertise, providing databases to experts and T&T networks and bringing together their energies and dynamism so that T&T issues can become even more deeply embedded in pro-poor policies and approaches.

Chapter 4
Implementation and delivery

THREE GENERATIONS OF TSETSE AND TRYPANOSOMOSIS INTERVENTIONS

First-generation interventions

Until the late 1970s and for much of the 1980s, tsetse control was nearly always considered a public good and funded as such by governments. Interventions utilized a variety of techniques, which evolved over time. Initially, these included bush clearing and game hunting. Later, ground and aerial spraying with residual insecticides were added. During the late 1970s and 1980s, the prevailing emphasis on environmental considerations and the need to reduce costs led to the refinement of a wider range of tools. In particular, the use of traps and the application of insecticides to cattle were revisited. As a result, traps and targets began to carry odour baits; cattle began to receive insecticide treatments through dipping, spraying and pour-ons; aerial spraying operations began using non-residual insecticides; and the sterile insect technique was introduced (see Maudlin, Holmes and Miles, 2004, for a review of the development and application of these techniques). Meanwhile, growing interest in the innate resistance of host animals to the parasite led to a great deal of work on trypanotolerant livestock (African Trypanotolerant Livestock Network, 1988; PAAT, 2005). Through all of this, livestock keepers continued, year in and year out, to treat their animals with trypanocides, the cost of which dominated in many areas the livestock keepers' expenditures on animal health.

The history of sleeping sickness control in Africa is entwined with the history of the continent as a whole. During the first two decades of the twentieth century, a number of colonial administrations realized that for their colonies to develop economically, certain basic structures were required. Such progress could take place, however, only if sufficient labour were available. Aware that trypanosomosis was becoming epidemic in nearly every occupied territory, they established a variety of "sleeping sickness surveillance and prophylactic services". In 1917, Dr Eugène Jamot developed a new approach based on the following rules:

- Fixed-post surveillance is ineffective.
- Diagnostic and treatment capabilities must be mobile.
- The entire population must be surveyed exhaustively, even by coercion.
- The tools best adapted to obtaining the most effective results in the shortest possible time must be used.
- Indicators must be elaborated in order to follow up the actions and determine success.
- The means for implementation must be a special unit with motivated and competent staff able to work in rural environments.
- This unit must be administratively, financially and technically autonomous and must have a strong team spirit.

Jamot's approach was adopted by the French, Belgian, Portuguese, Spanish, German and British colonial authorities, who rapidly set up control structures throughout SSA. As a result, by the 1960s, the disease was considered controlled, if not eradicated. Sleeping sickness thus provided the major impetus for the gradual development of colonial medical services. Nevertheless, many Africans soon came to perceive these efforts as one more element in the ongoing conquest and exploitation of their continent.

Second-generation interventions

By the late 1980s, in line with more general developments in the field of human and animal delivery (Leonard, 1993), T&TC efforts began to face increasing funding shortfalls. Other ways had to be found to deliver these services – especially ways that could recover some of the cost from the ultimate beneficiaries. One obvious solution was to involve communities by encouraging them to provide the necessary labour, but this approach met with limited sustained success (Barrett and Okali, 1998; Kamuanga *et al.*, 2001; Dransfield and Brightwell, 2004). As Dransfield and Brightwell state, "Farmers and communities have not controlled tsetse because, with few exceptions, they were not given the opportunity. Continentwide, tsetse control has remained as top-down as before."

Thus, by the 1990s, a wide range of techniques for controlling or eliminating tsetse populations had been developed and tested. None, however, was found to be valid for all production systems, ecological zones and national and regional economies. Two key factors impeding the work were increasing drug resistance among trypanosusceptible populations and the difficulty of sustaining tsetse control in areas where T&TC programmes had been successful. D'Ieteren *et al.* (1998) and Agyemang in PAAT (2005) have argued that these problems can be solved using selective breeding (either within breeds or through crossbreeding) to enhance trypanotolerance. Whatever the merits of this approach, the general consensus has been that more integrated strategies are needed – especially ones that take into account the changing physical, socio-economic and technological environments and that empower farmers and livestock keepers.

All recognize the importance of having consistent guidelines for the prioritization, appraisal and evaluation of T&T interventions; and PAAT has led the way in creating such guidelines across a range of subjects. In addition to the series of papers PAAT has itself produced, PAAT and other organizations have also commissioned work in this field. In particular, the explicit incorporation of livestock keepers' views led to the development of rule-based guidelines for making management decisions about the appropriateness of T&T control options in a given situation (Snow and Rawlings, 1999; PAAT, 2005).

In the field of HAT control, Cattand, Jannin and Lucas (2001) and Cecchi *et al.* (2009) set out ways in which consistent criteria for surveillance could be applied by mapping identified foci of the disease and updated prevalence data. The use of GIS technologies to map a wide range of variables important to T&T planning also led to the development of the PAAT information system, as outlined in Gilbert *et al.* (2001). The use of GIS for prioritization was explored by Hendrickx (2001), and an economic component was included in Shaw *et al.* (2006).

Over the last decade, huge strides have been made in dealing with the resurgence of HAT, which became much more prevalent during the 1980s and 1990s. A key to the success of these efforts had been their reliance on PPPs (see "Ensuring effective delivery" on the following page, Box 4 on page 36 and Box 5 on pages 38–39).

Approaches that explicitly consider risk are increasingly being integrated into T&T work. An example is the Health and Environment project (de La Rocque *et al.*, 2001), which illustrates how geospatial datasets can be collected and analysed to capture the crucial relationships between three interwoven systems (agro-ecological, socio-economic and pathogenic). It is interesting to note that this project included, beyond the classical technical and environmental approaches, a socio-economic dimension – focused exclusively on the ethnicity or typology of producers, spatial use and land management. In this way, resources and risks were assessed in terms of: 1) the identification of priority intervention areas; 2) the selection of control strategies; 3) the selection of self-managed, integrated and adapted means; and 4) the indicators for spatial management.

Mattioli *et al.* (2004) promote institutional entente as a means of underpinning a sound technical approach – given that such an approach recognizes that the complexity of the problem requires a joint multidisciplinary approach involving specialist inputs from different specialized partners. It is vital that close interaction and strong alliances be maintained with mandated international organizations, which can help the different stakeholders ensure that T&TC-oriented programmes are ongoing.

Third-generation interventions

The future offers a new generation of interventions, based on existing techniques but with a new centre. Specifically, these new interventions, characterized by the linking of T&TC to sustainable agriculture and rural development (SARD), will attempt to realize the MDGs while at the same time promoting public health policies with a strong poverty focus. This concept, first enunciated in 1992, became the basis of the SARD Initiative, launched under the aegis of FAO in 2002 (see http://www.fao.org/sard/en/init/). As stated on its Web site, the objective of the initiative is:

> *to achieve SARD by supporting pilot efforts and building the capacity of rural communities, disadvantaged groups and other stakeholders to improve access to resources (e.g. genetic, technological, land, water, markets and information), promote good practices for SARD and foster fairer conditions of employment in agriculture. It provides catalytic support to strengthen the capacities, initiatives and innovations of farmers, fisherfolk, pastoralists and other rural people to achieve SARD and provides a framework through which local, national and regional initiatives related to sustainable agriculture and rural development can be recognized, supported and, if appropriate, replicated to contribute to improving rural livelihoods.*

The T&T problem should be seen within the context of rural poverty and agricultural development because it has direct and severe implications for current and future land use, rural development and human welfare (Ilemobade, 2001). Such a conclusion is obvious when one considers the ways in which animal trypanosomosis constrains livestock productivity and the use of draught power and spills over into all aspects of livestock production and mixed farming.

Furthermore, in endemic foci of the disease, human trypanosomosis has a similar impact on the rural economy, primarily because the incidence of the disease tends to be greatest in economically active adults but also because of its epidemiology. The disease can change from low endemicity to an epidemic situation rapidly, and it is almost always fatal in untreated individuals.

It is worth mentioning that in analysing the options described above, one finds a lasting domination of technology-based approaches. Programmes appeared to be largely technology driven, and livestock keepers became participants simply because their labour was essential to make the programmes successful. In recent years, however, the field became somewhat polarized between proponents of area-wide interventions and those who prefer community-based approaches to achieving cost-effective, sustainable T&TC (PAAT, 2003a; Mattioli *et al.*, 2004). Kamuanga (PAAT, 2003a) explicitly describes the sociocultural factors that need to be considered for practical operations and the proper functioning of programmes: "Most of the failures of development projects occur when the communities concerned have been left out of the processes related to the design, formulation and implementation of the projects." For Kamuanga, social pathways need to be identified and individuals and communities empowered. Instead, local institutions are seldom explicitly included in projects because the relevant policies have not been designed to facilitate local participation.

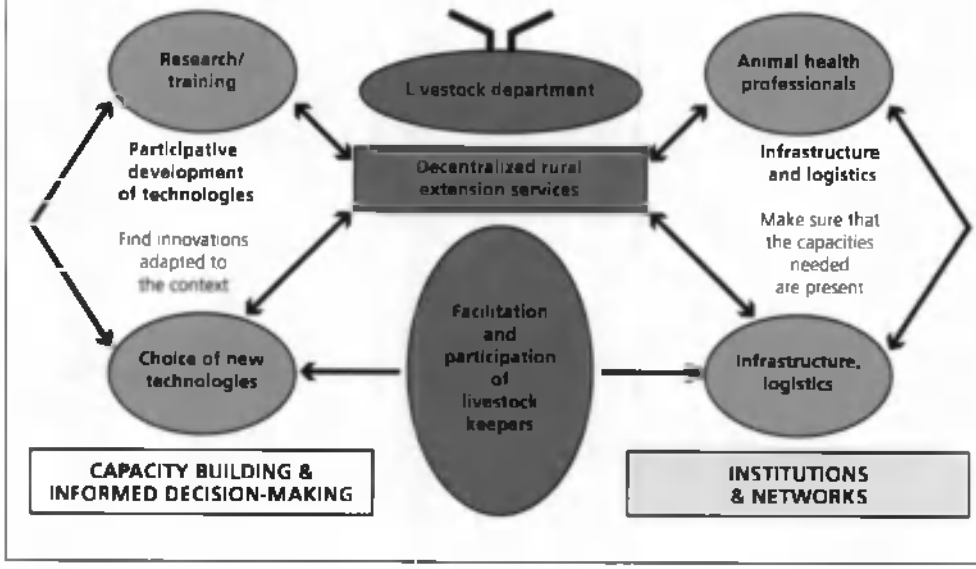
The next generation of T&TC interventions offer the potential to make good these deficiencies. A broad consensus is now emerging that while some situations require an area-wide approach to creating tsetse-free zones, others may benefit from new, low-cost approaches that allow farmers themselves to protect their stock while also reducing tick burdens. Such new approaches include insecticide-treated mosquito fences, insecticide-treated mosquito netting (for the protection of zero-grazed cattle) and insecticide-treated cattle.

ENSURING EFFECTIVE DELIVERY

Institutional design required

Mercoiret (1994) and Bonnal and Dugué (2000) emphasize the importance of having an institutional design that can help reduce transaction costs and other mesoeconomic constraints at the microeconomic level of the farm household. In this way, the policy chain becomes more efficient. This suggests a networking approach – specifically, a representation and consulting system that would facilitate the coordination and implementation of extension services for T&TC. One solution might be a rural development "butterfly" (Figure 4) that links livestock keepers and their organizations (though extension services, which act as their facilitators) to research and training as well as other services. Under this novel structural organization, government activity is mostly involved in policy planning and the funding of public goods.

FIGURE 4
A rural development "butterfly" for animal trypanosomosis, showing the pathways that link (through extension services) livestock keepers and their organizations to service providers of research and training



In the human health field, a similar pattern has emerged, with ministries of health being linked on the one hand to research groups and on the other to health services in the field. These, in turn, interact with NGOs providing human health interventions and with local CBOs.

Public-private partnerships

Nurturing partnerships with the private sector is vital to effective T&TC. Historically, the main private partners have tended to be medical and veterinary pharmaceutical companies. As the result of two highly successful partnerships, one with Sanofi-Aventis and the other with Bayer AG, WHO ensured the continued production of the only drugs used to treat HAT at a time when production might otherwise have ceased. Furthermore, these manufacturers have supplied the drugs free of charge since 2001 and have agreed to continue to do so until 2012. The other members of these partnerships have been bilateral aid agencies and NGOs, as described in Box 4 on the following page.

BOX 4

Highly successful multicountry public-private partnerships to control human African trypanosomosis

The PPP-supported HAT surveillance and control programme is based on:

- access of people at risk to diagnosis and treatment through National Sleeping Sickness Control Programmes (NSSCPs). WHO will assist these programmes in implementing control activities. Capacity building through in-service training and thematic workshops at the national, regional and international levels will be provided, as well as reagents and equipment for screening and diagnosis and drugs for treatment.
- strengthened surveillance through the creation of mobile teams for active case-finding and the establishment of a network for passive surveillance.
- guidelines and policies jointly elaborated with the health services of disease-endemic countries and delivered to national implementing bodies through coordination seminars. The projected harmonization of control methods and tools should enable NSSCPs to share and compare their results.

Harmonization of surveillance and control policy

One of the major objectives of WHO is to harmonize its surveillance and control policy with the tools and methods used by national programmes in the field. Such harmonization consists of:

- selecting operational sequences of field actions;
- defining the operational value of diagnostic tests;
- choosing appropriate treatment schemes;
- identifying synergetic sequences of actions;
- defining appropriate indicators for programme follow-up and impact assessment.

Partnerships for funding and implementing T&TC can thus involve a wide range of groups, from UN agencies to local CBOs, as illustrated in Figure 5.

The Stamp Out Sleeping Sickness programme in the Lake Kyoga area of central Uganda is another recently initiated PPP (see Chapter 1 for a discussion of the spread in Uganda of sleeping sickness caused by *T. b. rhodesiense*). If the northwestward spread of *T. b. rhodesiense* continues, it will likely begin to overlap with *T. b. gambiense* (Welburn *et al.*, 2006), greatly complicating the task of diagnosing the disease and creating serious health risks for those infected because the two disease forms require different medication. As described in Box 5 on pages 38–39, the Stamp Out Sleeping Sickness programme was established to prevent this overlap from occurring. Such initiatives also do a great deal for rural development, because working with private entities can help galvanize both local communities and government departments.

The partnerships

A joint international effort, marked by high public awareness and the strong leadership of WHO, produced in May 2001 a commitment from the Sanofi-Aventis Pharmaceutical Company to donate US$25 million over five years, half to fund the purchase of three specific drugs for sleeping sickness treatment and the other half to strengthen national-level surveillance and control activities. In addition, Bayer AG agreed to continue production of the necessary drugs and to supply them free of charge. On 10 October 2006, Sanofi-Aventis renewed its partnership agreement with WHO for another five years and expanded it beyond sleeping sickness to include several other neglected tropical diseases. Bilateral donors (notably Belgium, France and Spain) and NGOs (notably Medecins Sans Frontieres) also contributed massively as national governments allocated new resources to sleeping sickness control.

Their impact

By 2006, these PPPs had led to:

- the harmonization of surveillance and control approaches;
- a 70 percent reduction in the number of new HAT cases;
- an increase in the number of people screened annually from one million to three million;
- the treatment between 1997 and 2006 of some 385 000 HAT patients, representing some 10 million disability-adjusted life years averted (mostly due to the prevention of premature death).

FIGURE 5

Public and private partners currently supporting T&TC programmes

BOX 5

Stamp Out Sleeping Sickness: a public-private partnership to control the spread of human African trypanosomosis in Uganda while benefiting livestock keepers

The partners

- WHO;
- CEVA Santé Animale, which donated the trypanocides and insecticides and provided support and expertise;
- IK Investment Partners, a pan-European private equity firm that provided funding (through IKARE Ltd) and management resources;
- the Ugandan Coordinating Office for the Control of Trypanosomiasis, which uniquely deals with both animal and human trypanosomosis;
- the Ugandan Ministry of Health;
- the Ugandan Ministry of Animal Industries and Fisheries;
- the Veterinary School at Uganda's Makerere University, which provided students and faculty to undertake the initial intervention;
- the University of Edinburgh Centre for Infectious Disease Control, which provided monitoring and evaluation for the operation;
- the livestock keepers.

The impact

Because this project is ongoing, its ultimate impact cannot yet be assessed. By the end of 2008, however, the following had been accomplished:

- During October and November of 2006, approximately 200 000 cattle in the districts of Amolatar, Apac, Dokolo, Kaberamaido and Lira were treated with trypanocides free of charge to reduce the zoonotic reservoir of the disease. On three subsequent occasions, the cattle were again treated with insecticides free of charge using the highly cost-effective restricted-application method (Bourn *et al.*, 2005). Their legs and bellies were sprayed against tsetse and their ears and tails against ticks.
- CEVA Santé Animale, the manufacturer of the synthetic pyrethroid Vectocid® (Deltamethrin 5% EC), began making the insecticide (used in restricted applications on cattle) available in small packs of 20 ml and 100 ml so that small-scale farmers could afford to purchase the product.
- The 3-V Veterinarian Initiative, employing five veterinary graduate students on a temporary basis, was established in the treatment area to continue, on a six-month trial basis, both the messaging and the provision of pre-emptive veterinary services. The initiative took its name from the three T&TC inputs being offered by the 3-V veterinarians: Vectocid, Veriben and Veridium.

- Livestock keepers now pay for the insecticide and either spray the animals themselves or hire private spray teams set up under the 3-V Vet Initiative to do the work for them. Some 48 spray teams have been set up (just over half of the targeted number), and demand for insecticide continues to be high.
- The proportion of cattle carrying *T. b. rhodesiense*, which causes the acute form of HAT found in eastern Africa, fell from 0.75 percent in October/November 2006 to 0.11 percent three months later.
- During the same three-month period, the incidence of HAT in the treated districts fell by 67 percent, thus reducing the likelihood that the *rhodesiense* form of the disease will continue its spread northwestward towards the area of Uganda in which the *gambiense* form of the disease is found.

Vertical and horizontal delivery issues

Traditionally, all T&TC programmes that screen for HAT have been vertically delivered – that is, they have been undertaken by dedicated units that specialize in this problem alone.

On the other hand, the prevention and routine treatment of trypanosomosis in livestock has tended to be fully integrated into the activities of local veterinary services. In the case of draught oxen, for example, their association with crops has meant that sometimes responsibility for their welfare has fallen to ministries of agriculture. To carry out this responsibility, the ministries has often turned to agricultural extension services, which in turn have liaised with veterinary services to provide trypanocide treatments and other interventions. This tendency is particularly marked in francophone West Africa – where large-scale rural development projects, often focusing on a particular cash crop, involved extension agents who recommended and supervised a complete care package for draught oxen.

With regard to HAT control, many different approaches to surveillance have been tried (see, for example, WHO, 1998). However, in situations that require the screening of large populations for the chronic *gambiense* form of the disease, most experts agree that dedicated mobile teams provide the most effective response. Although expensive on a per-person basis, they are by far the most effective in reaching, screening and treating a high proportion of a population in a short amount of time (WHO, 1998). The highly successful response to the upsurge of HAT at the end of the 1990s relied, for the most part, on mobile teams. In some situations, though, HAT detection does take place passively at local health centres, where care is delivered horizontally. For example, in *rhodesiense*-endemic areas, because of the acute nature of this form of the disease, patients often present rapidly with symptoms before specialized teams can be mobilized. In other areas or where the chronic *gambiense* form of the disease predominates, the lack of active surveillance also leaves patients with few options beyond the local health centre.

As discussed above, the trend in public health delivery has been towards horizontal delivery and the integration of all disease-control initiatives in the primary health care structure. This poses particular problems for a disease such as HAT, which is difficult to diagnose and which often requires specialized inputs and prolonged and dangerous treatment with a high rate of complications. HAT control can perhaps be successfully integrated into the primary health care structure through carefully planned activities such as the training of local staff in diagnosis and treatment of the disease, but such integration will probably not eliminate entirely the need for nations to maintain small but viable vertical structures capable of responding quickly to localized epidemics.

During the 1960s and 1970s, many African countries maintained dedicated tsetse control units or services, which undertook the mapping of fly distributions and the maintenance of control posts where vehicles and animals were checked and sprayed as well as other control activities. By the late 1990s, however, most of these units had been either subsumed into general pest control units or reabsorbed into ministries of agriculture or livestock production. Some capacity continues to exist within these ministries but not enough to meet the needs of more ambitious tsetse-control activities, which require the support of trained staff and dedicated units. This is especially true for large-scale programmes, which require technical expertise and planning tailored to the specifics of the tsetse distribution and the control methodology. Such programmes will necessarily be predominantly vertical in their delivery. However, small- and medium-scale suppression projects, especially those that employ techniques such as insecticide-treated cattle and traps/targets/screens, do lend themselves to integration within a horizontal delivery system made up of extension services, veterinary services, NGOs and CBOs. In this context, alongside the purely technical issues, the extent to which tsetse control is perceived as a private or a public good is an important consideration.

Public and private good issues

When is T&TC a public good and when is it a private good? There has been much discussion of this issue, which is key to determining how local populations view various programmes, what type of support they feel able to give them and to what extent they are likely to invest their time and other resources in T&TC work. Box 6 summarizes the most commonly held views.

The usual generalization about public and private goods is that people consider HAT control (along with most programmes to improve human health) a public good and therefore deserving of public funding; they consider vector control also as a public good that should be publicly funded; but they see livestock treatment using trypanocides as a private good that should be privately funded.

Such a characterization is overly simplistic. In the field of HAT control, measures designed primarily to clear the disease from human or livestock reservoirs (and thus prevent transmission) are clearly seen as public goods. (This was especially evident in the colonial times, when large-scale enforced screening programmes were often perceived as just another aspect of colonial domination.) Yet, for the individual whose

BOX 6

Public good or private good? Beneficiaries' perceptions of T&TC activities

Mostly seen as a public good

Dealing with the disease

- Large-scale screenings of populations for HAT
- Block treatment of livestock in order to prevent transmission of zoonotic HAT to people in *rhodesiense*-endemic areas

Dealing with the vector

- Use of traps or screens on a large scale in areas where only a section of the community is affected by AAT or where HAT is not (or is no longer) perceived as a current threat
- Large-scale programmes treating cattle with insecticides under which the selection of cattle by project authorities is seen as singling those animals out for special benefit
- Large-scale programmes involving ground or aerial spraying or the sterile insect technique

Mostly seen as a private good

Dealing with the disease

- Treatment of individuals found to be infected with HAT
- Treatment at the livestock keeper's request of individual livestock thought to have trypanosomosis
- Prophylaxis at the livestock keeper's request of selected livestock

Dealing with the vector

- Use of traps or screens to control HAT while the disease continues to be perceived as an active threat to the community's health
- Use of traps or screens to control AAT in predominantly livestock-keeping communities
- Pour-on treatments administered to selected animals (usually cows and draught oxen) by livestock keepers or as part of an insecticide-treatment programme to deal with tsetse and reduce tick burdens
- Use of protected zero-grazing units or fences, especially for high-value animals that are already zero grazed

illness is correctly diagnosed and treated, there is a great private benefit. Similarly, in *rhodesiense*-endemic areas where block treatment of cattle to deal with outbreaks of the disease is now recommended (Welburn *et al.*, 2006), the treatment is seen as a public good, but it also confers a private benefit to the owners of infected cattle.

Even in the field of vector control, which is intrinsically a public good, a public good/private good issue has arisen in the context of schemes to involve local communities through the active contribution of labour and other resources (Barrett and Okali, 1998; PAAT 2003a; Dransfield and Brightwell, 2004). An exception to the general rule that communities are reluctant to contribute resources seems to have developed in the case of insecticide-treated cattle (Swallow and Woudyalew, 1994; Swallow, Woudyalew and Leak, 1995; Kamuanga *et al.*, 2001). One reason is that, in addition to suppressing tsetse, the

insecticide also reduces the tick burden on livestock, which is an important private good. Another reason is that the best T&TC results are obtained by treating large animals such as cows and draught oxen, which are the very animals that livestock keepers want most to protect. Although animals are treated individually (and are thus seen as being individually protected), their actual role is to attract and kill tsetse over a wide area. Treating as few as four animals per square kilometre can suppress the savannah species of tsetse or even eliminate an isolated tsetse population. Thus, livestock keepers are usually quite willing to assume a share of the cost of treating cattle with insecticides.

The use of protected zero-grazing units provides a perfect example of tsetse control as a private good. (For their application under the Farming in Tsetse Controlled Areas [FITCA] project, see Box 7 on page 44 and Agrisystems, 2005.) The first successful test of this approach took place in Kenya, where there are substantial zero-grazed dairy cattle populations (Bauer *et al.*, 2006). The approach was subsequently applied in Uganda and Tanzania. More recently, insecticide-treated mosquito fences have been used to protect pigs in the eastern region of Ghana (Holzgrefe *et al.*, 2008). Such initiatives, although primarily private goods, also generate important additional benefits for the local communities. Strategically applied, they are considered to be at least as effective as a large-scale strategy applied in Zimbabwe for which it was postulated that four insecticide-treated targets per square kilometre were sufficient to control and possibly eliminate savannah tsetse. Hence, a maximum of four protected cattle pens would achieve the same effect and, arguably, in a more sustainable manner.

In the case of traps, targets and screens, deployment and maintenance is usually considered a public good. But there are also individual groups within communities (primarily livestock keepers) who see these devices as particularly beneficial and thus are willing to contribute their own resources towards maintenance and/or the prevention of damage and theft. Where HAT is a problem, successful programmes involving communities in this type of tsetse control have also been undertaken (Laveissière *et al.*, 1994; Lancien, 1991). However, as the disease comes under control, these operations become more difficult to maintain.

The other tsetse control methods (aerial spraying, large-scale trapping, the sterile insect technique and, until recently, ground-spraying) are all suited to large operations requiring considerable organizational and technical expertise, and thus all deliver a clear public good. A particular challenge to new, large-scale T&TC initiatives will be combining these methods with the use of traps/targets/screens and/or insecticide-treated cattle to create barriers to reinvasion in areas from which tsetse have been cleared and where ongoing operations are envisaged.

Chapter 5
Securing the benefits

The livestock subsector remains weak in many African countries, particularly in SSA, despite the potential it has for poverty reduction and enhancing the economy of many countries. In fact, appropriate strategies for livestock and agricultural development still lag behind (Leonard, 1993; Leonard, 2000; PPLPI, 2005). At the individual and community levels, the major constraints are:

- supply-driven planning with little consultation;
- a lack of awareness that many important decisions are taken by non-livestock actors (e.g. the ministry of finance, the ministry of trade, the private sector);
- poor data collection and little or no analysis;
- the use of production per animal as the only productivity measure (even when production is the main focus);
- little or no understanding of the interactions (upstream, downstream and horizontal links) among livestock and other sectors;
- poor understanding of markets and demand, which are thus rarely taken into account.

For T&TC technologies to be successful in such circumstances, institutions need to be innovative, and appropriate policies need to be devised and implemented.

An end-of-project evaluation of FITCA suggested that its approach could provide not only a template for effective T&TC but also new opportunities for rural dwellers to improve their livelihoods. However, because the project ended only recently, its sustainability remains to be demonstrated. For example, villagers participating in target deployment and supervision were given incentives in kind (seed, fertilizer, etc.), which likely affected their performance. In addition, it became evident during the project's implementation that the factors constraining success were sociocultural, institutional and economic as well as technical. For livestock keepers to have shared fully in the responsibility for control activities and thus to have achieved a sense of ownership, an institutional structure needed to be established on which they could rely. Although some improvements were observed, the rural development objective was not fully achieved. It seems that more work could have been done, especially at the start, to reinforce the organizational structure and make it more multidisciplinary and cross-sectoral.

At the time of this evaluation, the data available and the time elapsed were insufficient to support more definite conclusions (Agrisystems, 2005). However, more recent reports from the FITCA area do indicate that the work has been expanded. For instance, private veterinarians whom FITCA helped establish in the project area have since set up thriving practices and open agroveterinary shops. Measures such as encouraging villagers to construct cattle crush pens have also been very successful. These crush pens have acted as an entry point for a wide variety of animal health care and extension messages and have provided a focal centre for commercial activities,

BOX 7

A multicountry rural development project: Farming in Tsetse Controlled Areas (FITCA), 1996–2004

Basic data

- The project comprised national programmes in Ethiopia, Kenya and Uganda and an overarching regional programme that also covered Rwanda and Tanzania.
- Funding was provided by the European Development Fund.

Concept

- T&TC would be used as an entry point for rural development and the enhancement of income-generating activities in areas where T&T had already been controlled.
- Control measures would combine farmer-managed T&TC technologies with a rural development approach aimed at improving animal health, animal and crop productivity and household income. These activities would take place in the context of a PPP involving the local communities.
- The communities would participate on a cost-sharing basis, and thus T&TC would cease to be considered exclusively as a public good.
- Livestock keepers would share the responsibility for control measures and thereby acquire a sense of ownership with regard to the implemented activities (Agrisystems, 2005).

Key components and achievements

In Kenya and Uganda, animal and crop husbandry and animal health interventions were promoted. These included:

- the introduction of animal traction and training in its use, leading to the clearing of significant areas of land for the cultivation of crops;
- the promotion of virus-resistant cassava;
- the development of extension materials;
- the support and training of women in poultry husbandry and the introduction of poultry vaccines;
- the mobilization of villages for the construction of cattle crush pens;
- general support for deworming of calves and the control of ticks.

In Uganda, mass treatment of cattle was undertaken to halt the spread of *rhodesiense* HAT, for which the cattle acted as a reservoir.

Protected zero-grazing units and other income-earning opportunities were introduced in Kenya, Uganda and Tanzania (Agrisystems, 2005; Bauer *et al.*, 2006).

serving as a sort of field school for farmers. The creation of a crush pen management committee and a revolving fund for animal health care interventions has enabled these facilities to continue to run smoothly.

Changing the agriculture and livestock sectors takes time, and the interventions need to be long term – far longer than the five-year time horizon on which many projects

are based. Equally important to emphasize is that the impact of such projects takes far longer to accrue than the one or two years that pass before the projects are evaluated. Undertaking evaluations so soon leads to results that tend to underestimate greatly a project's benefits. This is especially true in the livestock field, where improvements in animal health and productivity take time to develop and to affect rural incomes.

SUSTAINABLE HEALTH AND LIVELIHOODS FRAMEWORK

In order to improve the livelihoods of poor people, development approaches need to focus more directly on poor livestock keepers, traders, labourers and consumers (including those of health services). Assessing sustainable livelihoods is essential to understanding the effects of interventions on the poor.

Focusing on household livelihood assets, Figure 6 on the following page illustrates the basic sustainable livelihoods framework. Successful T&T control helps increase the livelihood capital assets of households by:

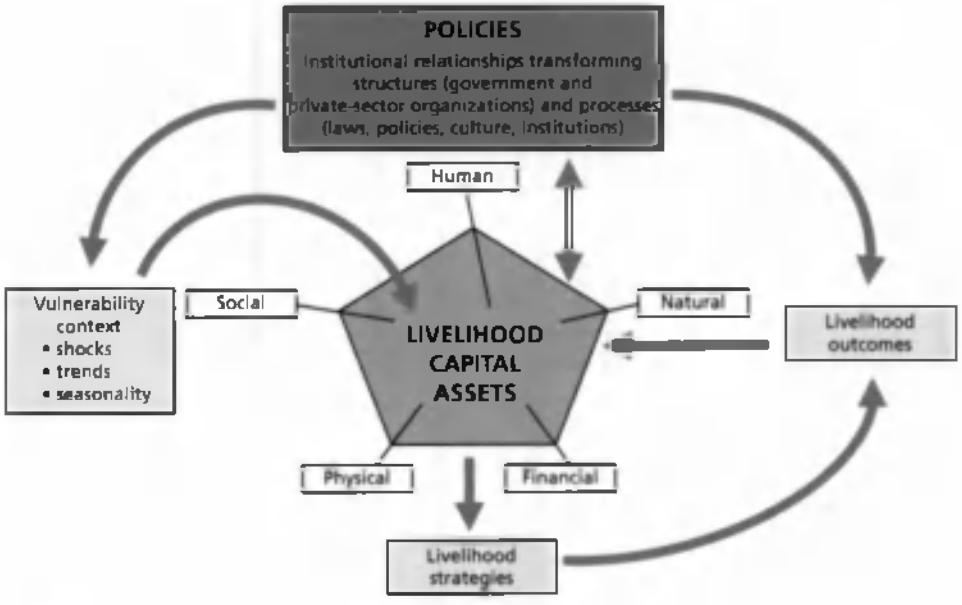
- improving human health and thus contributing to the primary household asset, its human capital;
- improving the health of livestock, which can be seen as natural or physical capital that is sold or retained as a store of financial wealth (livestock are also widely used as gifts, loans, dowries and food and at ceremonies and celebrations to cement social relationships and enhance social capital);
- reducing the vulnerability to disease, because sickness and death are usually the greatest shocks a household can receive;
- further reducing disease vulnerability by securing livestock health and reducing livestock mortality, which can also shock a household;
- strengthening the ability of households to cope with these shocks, especially because the sale of livestock is one of the key ways in which households manage financial emergencies.

Thus, associating T&TC with the sustainable livelihoods framework is particularly useful because the framework provides a checklist of important issues, highlights key elements and processes and emphasizes the interactions among factors and interventions that truly impact the livelihoods of poor people (Carney, 1998).

In applying the sustainable livelihoods framework to livestock, Heffernan and Misturelli (2000) analysed the intervention point for a variety of projects and programmes. Some of these acted directly on livelihood strategies and outcomes. Others tackled the broader social, political, environmental and institutional context – which can be either disabling, neutral, enabling or sometimes flourishing in its impact on capital asset acquisition. T&TC interventions fall into the former category – that is, they act directly on livelihood strategies and outcomes.

At first sight, the sustainable livelihoods approach seems similar to the integrated rural development approach that underpinned agricultural policies from the 1970s onwards. Table 6 on page 47 shows the similarities and differences between the two approaches, with particular attention paid to the institutional context and the involvement of stakeholders. It also shows how these approaches have evolved over the past two decades.

FIGURE 6
The sustainable livelihoods framework



Source: adapted from Carney, 1998

Although the sustainable livelihoods framework posits the multidimensional scope of poverty as its basic hypothesis, it does not follow that interventions to reduce poverty should be attempted on all fronts. Rather, it supports actions focused on key issues that can transform processes and structures that have been identified from assets and from the diagnosis of the vulnerability context. In this way, the sustainable livelihoods approach concentrates on institutional factors and macroeconomic forces that have been identified as major constraints.

Focus on policy and institutions

In developing countries, livestock-sector policy rarely favours the poor. According to North (1990), the related institutions are not "created to be socially efficient.... Rather they ... are created to serve the interests of those with the bargaining power to devise new rules."

The history of agricultural development shows that in the presence of an enabling policy and institutional environment, farmers will adopt new technologies. In the cases of Europe and North America, a major component of this enabling environment was public funding – for example, for the elimination of key livestock diseases, especially zoonotic diseases such as tuberculosis and brucellosis. Such an environment allowed farmers to access new technologies and reap the benefits of their adoption. Of course, the creation of an enabling environment is influenced by economic and institutional factors beyond the immediate control of individual farmers. That is why, in order to

TABLE 6
Integrated rural development versus sustainable livelihoods framework actions

	Integrated rural development	Sustainable livelihoods
Period	1970s onwards	Late 1990s onwards
Starting points	Structures Areas Tsetse-infested areas Area-wide pest management units	People and their existing strengths and constraints
Conceptions of poverty	Holistic Multidimensional (recommendation domains suggest uniformity, an operational simplification to bring intervention)	Multidimensional Complex Local (embracing the concepts of risk and variability)
Problem analysis	Undertaken by a planning unit over a short period of time Viewed as conclusive T&T impact driven	Inclusive process Iterative Incomplete
Sectoral scope	Multisectoral Single plan Sector involvement established at outset	Multisectoral Many plans Small number of entry points Sectoral involvement evolves with project
Level of operation	Local Area-based	Both policy and field level, with clear links between the two Vulnerability context
Partner organizations	National and local governments	Local and national governments NGOs CSOs Private-sector groups All stakeholders and institutions
Project management structure	Dedicated project management unit, external to government Supply of public services approach	Project within partner organization Adapted and appropriate services supplied by various actors depending on the transforming structures and processes
Coordination (among sectors)	Driven by donors Integrated execution	Driven by shared objectives Requirements identified by those involved
Sustainability	A growing concern, not always explicitly addressed	A core concern with multiple dimensions

Source: adapted from Carney, 1998

reverse the negative trends of livestock development in SSA, major institutional and policy reforms need to be made at the national, regional and pan-African levels (PPLPI, 2005). Currently in Africa, the farmer, for the most part, has to go it alone.

Over the last decade, the evolution of the institutional context has led to a drive for the privatization of veterinary services in order to diminish drastically the role of the state in this activity. Behind this shift was the view that animal health care is primarily a private good and veterinary services are its delivery system. With privatization, however, such public goods as surveillance; early warning; laboratory diagnostic services; planning, regulation and management of disease-control programmes; quality assurance and safety of animal products have all become secondary considerations. As a result, there is now a growing consensus that, in the wake of structural adjustment programmes for sector reform, the private sector and civil society are failing to provide adequately essential services and markets once provided by the state. The reasons for this are complex, but the result is simple: The great majority of the rural poor do not yet enjoy access to the range and quality of services and markets that they need to support a robust livestock-related livelihood (Holden, 1999; FAO, 2002).

Thus, as shown in Figure 6 and detailed in Table 6, the sustainable livelihoods approach focuses on the ways in which institutions (meaning the web of relationships that govern economic and social interactions, not specific organizations) enable and facilitate economic and social change. This focus on transforming the institutional environment in which development takes place lies at the heart of such poverty-alleviation policies as improving governance, fighting corruption, reducing trade barriers, ensuring that PRSPs address the underlying causes of poverty and empowering poor people (especially women in societies where they are disadvantaged) through better education and health.

On the livestock side, focusing on policy and the creation of an enabling environment means reforming market networks, laws relating to livestock movements, taxes and veterinary controls so that they become more supportive of livestock keeping. In particular, the organizations that interact with livestock keepers need to maintain an open dialogue with them and consult them on planned interventions.

A number of imaginative projects have recently linked the tourism and wildlife conservation sectors. These projects have encouraged communities both to take ownership of their wildlife resources and to see those resources as potential tourism assets. (In some areas, wildlife has even been used to attract paying game hunters). Changing a community's attitude towards its wildlife resources also discourages poaching, because poaching interferes with rational culling and conservation and delivers a much lower financial return to the community. Once local stakeholders realize that such reforms provide public benefits that are greater overall than the private benefits reaped by individual poachers, meaningful conservation and management of game (including tsetse control) can be undertaken. Initiatives of this sort have been undertaken in Zambia's South Luangwa National Park and in Zimbabwe under the CAMPFIRE programme (Communal Areas Management Programme for Indigenous Resources).

Concerning human health, the health care issues that need to be addressed and the context within which primary health care operates are always changing. The challenges faced by primary health care are economic and institutional as well as social. For these challenges to be overcome, national primary health care frameworks must be developed and strengthened, reflecting the commitment of governments and other exogenous institutions. Overall, concerted efforts must be made to ensure the timely and efficient implementation of a sustainable health delivery system.

Reduction of mesoeconomic filters

When economic development is debated, emphasis is often placed on the importance of transaction costs and the role that institutions play in policy design and implementation. Sometimes, the interface between government and the private sector is also discussed, and the urgent need to develop institutional forces at the mesoeconomic level is recognized. What is most needed, however, is a synthesis of macroeconomic, mesoeconomic and microeconomic perspectives that focuses on the structural and institutional factors mediating the effects of policy reforms (especially in the livestock sector) on rural households and poor livestock keepers. Table 7 on the following page shows how these three levels of filters intervene at various links in the policy chain, permitting a better understanding of the household decision-making process whereby the poor make choices based on their own livelihood assets and strategies (Zezza and Llambi, 2001).

As an economic concept, the mesoeconomic level incorporates the two primary channels through which policy decisions in general (and macroeconomic policy in particular) are made. These channels are market mechanisms and administrative procedures, and they provide a link between the macroeconomic level of aggregated variables and policy decisions and the microeconomic level of disaggregated production, consumption and investment decisions. Analysing policy reforms from a mesoeconomic perspective helps one understand how such macroeconomic reforms impact people on the microeconomic level and how they modify the production, consumption and investment decisions of microeconomic agents.

It is supposed that incentives created by new livestock policies (or other exogenous changes) will impact the decision-making of microeconomic agents, such as livestock keepers in tsetse-affected areas. Certainly, poorly designed policies can alter microeconomic decision-making – especially given the informational biases created when new policies are implemented through private market mechanisms and programmes. Often, public administrative procedures further complicate the problem. When added to market failures, such biases can substantially weaken or obviate the responses of microeconomic agents, leading either to unsatisfactory production levels and reduced welfare outcomes or to an undesired distribution and allocation of livelihoods.

In a world of frictionless markets and perfect governments, there would be no need for a distinct mesoeconomic analysis. But in the real world, such an analysis, focusing on the rise of transaction costs in response to market failures, can illuminate the ways in which institutional arrangements emerge to minimize these costs, particularly in the rural sectors of less-developed countries (see North, 1990; Leonard, 1993). In this

TABLE 7
Filters in the policy chain

Filters	Nature	Level
Macroeconomic	Lack of coherence among policies	Macroeconomics
	Neglect of certain structural characteristics of the economy	Policy delivery
	Lack of understanding of certain economic relationships caused by deficiencies in economic analysis and information	
	Lack of state and institutional implementation capacity	
	Influence on domestic policy outcomes of exogenous factors (e.g. global and regional trade rules, international environment agreements, volatility in international financial flows and commodity prices)	
Mesoeconomic	Lack of transparency and information on particular changes in the relative price structure induced by policy measures	Mesoeconomics
	Lack of access to publicly provided goods and services as a result of bureaucracy and corruption	Market and administrative channels
	Market-based and administrative transaction costs and failures	
	Transaction costs and informational problems affecting infrastructure, transportation and communications, human capital, marketing information, market regulation, a sound legal framework for market transactions, etc.	
Microeconomic	Lack of assets	Microeconomics
	Lack of access to assets and to markets	Transmission/ incentives to the household/farm
	Lack of access to publicly provided infrastructure and services	
	Household heterogeneity	
	Household transaction costs	

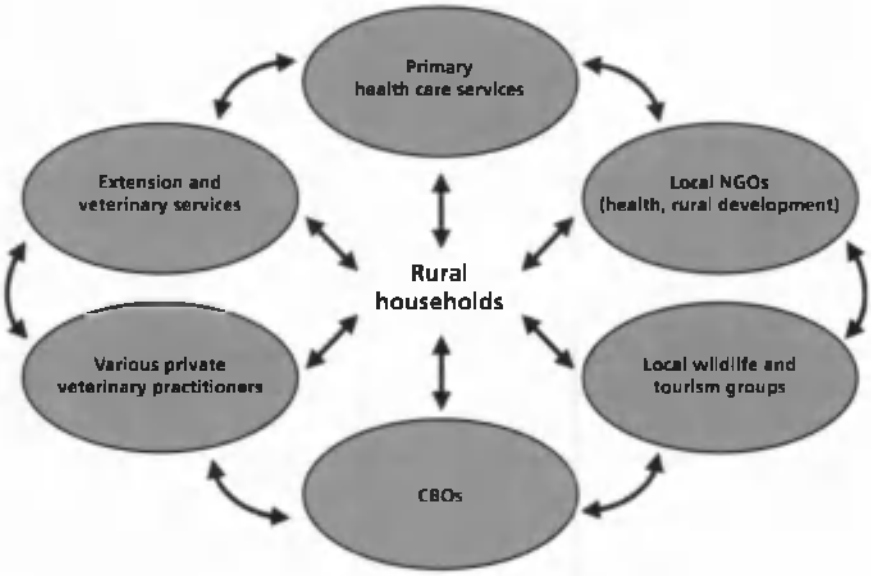
regard, the literature of the New Institutional Economics provides especially useful insights into market analysis and policy failures.

Similarly, in the field of human health, there have been two main obstacles to improving the public health services: One is the dispersal of rural populations, and the other is the difficulty health workers have in reaching remote villages. Currently, these unserved people lack basic sanitation, diarrhoea control, family planning, prevention and treatment of parasitic diseases, health and nutrition information, immunizations, child delivery and prevention and control of tuberculosis. If they are to receive such services in the future, the primary health care systems in their countries must be expanded and improved.

IDENTIFYING NECESSARY ACCOMPANYING MEASURES

Once the broad strategies of a T&TC project have been established, the next step is to work out the details of ensuring that the project achieves its objectives and that its gains are sustained. To realize fully the benefits of a T&TC intervention, planners need to identify and put in place accompanying measures that will support the expected development activities. In addition, because the majority of tsetse populations are not truly isolated, very clear plans for maintaining barriers to reinvasion need to be made. Because such barriers cannot be maintained indefinitely, they can be justified only in the company of coordinated, long-term national/

FIGURE 7
Making local partnerships work



regional programmes for progressive tsetse elimination. An important prerequisite for programmes of this sort would be funding sufficient to involve communities and ensure their long-term commitment. Furthermore, the programmes would have to be elaborated carefully in conjunction with the various groups involved – especially at the local level, where it is vital that government services (medical veterinary, agricultural extension, tourism and wildlife) work together with NGOs and CBOs, as outlined in Figure 7.

The main areas in need of attention are outlined below. However, because this is a major topic, it can be covered only in very general terms. The following discussion is, therefore, by no means exhaustive.

Health support

- The first and most vital component of T&TC is the active identification and treatment of individuals infected with HAT. This needs to be followed by ongoing surveillance for HAT, especially in those areas into which infected individuals may be immigrating. It also needs to be supported by testing facilities and referrals to appropriate treatment centres.
- Awareness of the causes, symptoms and treatment of the disease needs to be promoted among health centre personnel and community health workers as well as in the community at large.

- In the long run, T&TC should be integrated with other key health issues. Its programmes should encourage joint public awareness activities and, in some situations, the use of surveillance activities to test for other diseases and to conduct other interventions. In this way, the necessarily vertical structure of a national surveillance and treatment programme can have a horizontal impact as well. Such an outcome is most likely to become feasible once an outbreak of HAT has been treated and a surveillance phase has been initiated.

Veterinary support

- It is essential to treat livestock with trypanocides before and during tsetse control in order to clear the disease from the livestock population. This allows livestock keepers to harvest the health gains as rapidly as possible.
- Additional veterinary inputs may be required as animal health improves. First, in most of Africa's tsetse-infested areas, tick-borne diseases (TBDs) rank with trypanosomosis as ubiquitous threats to animal health that chronically undermine productivity. Thus, actions to control ticks and TBDs should be envisaged. This is particularly feasible in areas where insecticide-treated cattle are already being used to control tsetse, because the insecticides being used also control ticks. Second, in areas where T&TC makes the raising of more livestock or different types of livestock possible, these new breeds may require more or simply different animal health inputs. Third, because T&TC is a first step towards better overall animal health, the opportunity to engage with livestock keepers on animal health issues should not be missed, and a variety of prevention and treatment options should be offered. Many poor villagers – especially those who cannot afford to own sheep, goats or cattle – keep poultry. Following this logic, a useful entry point might be vaccinating poultry against the potentially devastating Newcastle disease, which was undertaken as part of the FITCA project.

Extension advice

- In addition to veterinary support, livestock keepers need extension advice. As the health of their animals improves and other productivity improvements become possible, livestock keepers can often benefit from best-practices advice about inputs such as supplementary feeding. Similarly, when farmers begin making greater use of draught animals or raising improved breeds, astute husbandry advice becomes particularly important.
- Other rural development activities can be encouraged as part of T&TC programmes, as with the FITCA project (see Box 7 on page 44).
- Extension activities can take many different forms and thus should not be seen as merely the traditional top-down dispensing of management rules and dictums. Interactive approaches and shared learning experiences can be very successful in this context (see Minjauw, Muriuki and Romney, 2002, for an adaptation of this strategy to dairy farming). Approaches of this sort have been promulgated by the Farmer Field Schools and extensively supported by FAO.

Market reinforcement and regulation

- In many areas where T&TC is required, there also exists a need to investigate the marketing structures for livestock and for livestock products. In some areas, livestock keepers have limited access to markets and are therefore forced to rely on itinerant traders who offer them below-market prices. Elsewhere, trading circuits are extremely well organized.
- Regulation of markets can lead to the avoidance of taxes and veterinary controls through the creation of parallel, unofficial trading circuits. Nevertheless, such regulation can be vital for effective T&TC as well as for general disease control, particularly in those parts of eastern and central Africa where cattle are the main reservoir of the *rhodesiense* form of HAT. Treating cattle from endemic areas with trypanocides is an essential measure for preventing the spread of the disease to new areas (see Welburn *et al.*, 2004).

Support for the maintenance of barriers

Last, recalling that very few tsetse populations are truly isolated, those who attempt tsetse control must decide whether they want to suppress tsetse populations or create tsetse-free zones. If the latter, they will need to create effective barriers to prevent recolonization. Such barriers can be created, for example, by the application of tsetse control techniques at high intensity on the borders across which reinvasion might occur. Depending on the technique chosen, the barrier may require a high level of local involvement and support. Before making such a decision, however, project planners should consult technical experts and review the successes and failures of barriers used in similar contexts. The temporary nature of barriers also needs to be taken into account. In relation to sustainability, it may be helpful to consider the following:

- Using insecticide-treated cattle to create a barrier is an approach that livestock keepers tend to find attractive because the insecticide is also effective against ticks. This technique, of course, requires the active participation of local cattle keepers, who need to bring in their animals for treatment with insecticide.
- The deployment of traps, targets and screens needs to be recognized by the local population as beneficial. Otherwise, theft and damage will occur.
- For all types of barriers, important considerations include the cost per year and the number of years that a barrier will need to be maintained. From these numbers, a realistic total cost can be projected, an appropriate funder identified and a responsible party found. When local people are expected to be that responsible party – contributing their labour through bringing in cattle, overseeing traps and targets, and so on – project planners need to make sure that the people understand clearly how the maintenance of such barriers will provide long-term benefits to the community.

Chapter 6
Conclusion

With the drafting of the MDGs at the turn of the twenty-first century, the world's governments took a momentous decision to work together to reduce poverty. Meanwhile, in the field of development theory, an important shift was taking place, reflecting the experience of development efforts during the late twentieth century. The first component of this shift was the realization that top-down approaches had produced only mixed success when used to implement projects with long-term impact on the poorer groups within societies. This realization led to the development of a suite of approaches based on interaction and involvement. These have since become known as the participatory paradigm. The second component of the theoretical shift was the acknowledgement that, in order to benefit the poor, programmes must target the poor directly. That is, development efforts need to target problems that directly concern the poor; they need to target regions where there is a high level of poverty; and they need to include poor people in participatory activities. The third component of the shift was a growing awareness that pro-poor development efforts often failed to take place because of institutional deficiencies – *institutional* referring to the web of relationships, customs, policies and laws that govern everyday social and economic interactions. As has been stated earlier, for development policies and programmes to result in sustainable livelihoods, these must take place within an enabling policy and institutional environment. The upshot of the recent theoretical shift has thus been a stronger focus on institutional issues.

Such is the context of development policy within which T&TC must now be undertaken. In this paper, we have examined how to ensure that sustainable T&TC feeds into and reinforces pro-poor rural development strategies and approaches. We have looked at each stage in the planning and implementation process, exploring the linkages among individuals and organizations that need to be established in order for the projects and programmes to be successful. We have also looked at the components of an enabling environment and the need to strengthen forces at the mesoeconomic level, which links the macroeconomic level at which governments operate to the microeconomic level of individual rural inhabitants. Finally, we have emphasized the need to lobby for the explicit inclusion of T&T in national PRSPs, as well as the need for a more detailed consideration of the livestock sector and its acknowledged potential as an important factor in poverty alleviation (Perry *et al.*, 2002).

For T&T interventions, specific activities need to be undertaken at each stage of the planning process. These involve, first, taking into account the wider picture in each locality where T&TC activities are envisaged. Thus, an inventory of the services, projects, development plans and other activities being undertaken by governments, NGOs and CBOs in all sectors affected by T&T – human and animal health, agriculture, livestock and rural development – is required. So is an investigation of the ways in which T&TC can be integrated into and either reinforce or enhance the work. It is recommended that

in tsetse-infested areas such NGOs and CBOs be provided with guidelines, information and access to relevant technical expertise so that their activities can proceed optimally. At the same time, the stakeholders in these sectors – ranging from individual farmers, livestock keepers and other rural inhabitants to civil servants, donors and researchers – need to be genuinely involved.

T&TC activities typically have both private- and public-good characteristics. In recent years, the most successful ones have tended to be those based on PPPs or those (such as FITCA) based on a truly integrated rural development ethos. Both offer very good models for sustainable T&TC because they situate T&TC within the wider context of rural development and primary health care. In order to secure the gains achieved by T&TC, there must be ongoing activity to safeguard those gains, such as surveillance for HAT and the creation of barriers to prevent the recolonization of tsetse-free zones. A key element is planning for the long term – that is, moving away from short cycles of project implementation and evaluation towards sustained interventions that recognize the slow pace of change in the field of rural development (and especially in the field of livestock production).

As outlined in the recent publication celebrating PAAT's first ten years (PAAT, 2008), T&TC potentially impacts all eight MDGs. The control of a disease that infects active adults while reducing livestock productivity has profound implications, not only for human health but also for agricultural incomes (and thus hunger and poverty). Effective T&TC benefits the education of children, for example, by improving child health and by increasing the value of livestock, the sale of which frequently pays for school fees. Similarly, livestock are often kept by women who retain the incomes those animals provide. The women are thereby empowered and become able to maintain their own health. Moreover, combating HAT reduces child mortality and improves maternal health.

People working in the field of T&T have long been aware of the need to protect the environment, especially the African wilderness. For nearly five decades, techniques for environmental monitoring have been rigorously applied and, in some cases, pioneered by T&TC programmes. Especially at an international level through the activities of PAAT, the T&T community represents a truly global partnership of stakeholders.

The careful design and implementation of interventions to deal with T&T at various levels and on various scales offer a real and possibly unique opportunity to alleviate poverty. The reason is that T&T cuts across three sectors – human health, livestock production and rural development. Yet therein lies also its greatest challenge: bringing together successfully the stakeholders from all of these fields.

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Annex 1

DIRECT PARTICIPATION PATHWAYS

1. Direct participation of the poor

- Representation forums and meetings to inform and motivate community and local leaders
- Self-evaluation by the community and local organizations of their needs and their pathways for action
- Coordination of activities through prevailing or new organizations in the community and at the local level
- Participation of community members and local constituencies in the implementation of programme activities
- Self-determination of what financial and/or in-kind contributions to offer to support the implementation of activities

2. The chain of participation

Type of participation	Representation and/or consultation of poor beneficiaries ("insiders") by those promoting various development initiatives ("outsiders")	Relationship between the pro-poor initiative and its beneficiaries ("the people")
Cooptation	Symbolic No power and no influence	Imposed on the people
Conformity	Assignments with incentives are given to insiders Timing chosen and processes directed by outsiders	For the people
Consultation	Opinions are asked of insiders Analyses and decisions are made by outsiders	For and with people
Cooperation	Insiders and outsiders work together to determine local priorities Responsibility and leadership is reserved for outsiders	With the people
Co-learning	Insiders and outsiders share information and understanding while working together to design activities and plans with external assistance	With and by the people
Collective action	Insiders decide their own agenda and mobilize to implement such without the involvement of conceptors/ facilitators from outside	By the people

3. The roles of outsiders: inversion in patterns and status

Pattern	Status	Results
Dominant outsiders	Collectors	Agenda choice
	Processors	Information control
	Producers	Organizational concepts
		Management framework
Dominated outsiders	Facilitators	Enquiry
	Learners	Catalysis
	Consultants	Assistance in methods use, choice, improvisation and learning processes

Note: see also Table 3 on pages 21–22 for a list of the main players in the field of T&TC