CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Monitoring the Illegal Killing of Elephants (MIKE)
Sixth meeting of the Technical Advisory Group
Entebbe, 3–4 March 2008

SUMMARY MINUTES

In attendance:

- **Colin Craig, MIKE TAG member, Southern Africa**
- **Iain Douglas-Hamilton, MIKE TAG member, East Africa**
- **Martin Tchamba, MIKE TAG member, Central Africa**
- **Bob Burn, co-opted member MIKE Sub-TAG**
- **Tom Milliken, *ex officio* member MIKE Sub-TAG**
- **Tom De Meulenaer, *ex officio* member MIKE Sub-TAG (Chairman)**
- **Julian Blanc, MIKE Central Coordinating Unit**
- **Mahaman Sani Massalatchi, MIKE Sub-regional Support Unit, West Africa**
- **Martha Bechem, MIKE Sub-regional Support Unit, Central Africa**
- **Edison Nuwamanya, MIKE Sub-regional Support Unit, East Africa**
- **Kevin Sallee, Ecological Software Solutions, expert**
- **Louisa Sangalakula, TRAFFIC East/Southern Africa, expert**

Absent with apologies:

- **Liz Bennett, MIKE TAG member**
- **Kenneth Burnham, MIKE TAG member**
- **Holly Dublin, MIKE TAG member**
- **Anil Gore, MIKE TAG member**
- **Hugo Jachmann, MIKE TAG member**
- **Moses Kofi Sam, MIKE TAG member, West Africa**
- **Raman Sukumar, MIKE TAG member, South Asia**
- **Aster Li Zhang, MIKE TAG member, Southeast Asia**
- **Alexandre Serres, EU Commission, expert**

Administrative matters

1. Adoption of the agenda

   The draft agenda was adopted.

2. Adoption of the Working Programme

   The provisional working programme was adopted.

3. Minutes of the 5th meeting

   The Technical Advisory Group (TAG) took note of the minutes of the 5th meeting of the MIKE TAG (Nairobi, 2006). The action points mentioned under paragraphs 2.3 and 4.1 had been implemented. Those under paragraphs 3.3.1 (Measuring Effort and Alternative Carcass Detection Methods), 3.3.2 (Evolving Population Surveys), 3.3.5 (Standard Analytical and Reporting Framework), 4.2.1 (Survey Effort and Power), 4.2.4 (MIKE and ETIS sub-TAGs) and 4.2.9 (New Technology) had not been acted upon but were subject of working documents for the current TAG meeting under agenda items 11, 13, 6, 11, 5.2, and 15 to 18 respectively. Finally, it was explained that no action had been taken on the action point mentioned in paragraph 4.2.2 (measuring information network effort).

   It was agreed that for this and subsequent TAG meetings, summary minutes and technical advice emanating from the meetings would be produced. Meeting minutes are to be circulated to TAG members and participants for comments, and finalized within a reasonable timeframe, normally not exceeding 3 months after the meeting took place.

4. Institutional arrangements and funding for MIKE Phase II (2007-2011)

   The TAG took note of the institutional and financial arrangements for Phase II (2007-2011). It was clarified that the relational structure presented in Annex 1 of document TAG06 Doc. 4 was in full compliance with Resolution Conf. 10.10 (Rev. CoP14) (*Trade in elephant specimens*), i.e. technical oversight to both MIKE and ETIS is provided through an independent technical advisory group established by the Secretariat, while the Secretariat's MIKE Central Coordination Unit acts as secretary to this group.

   It was suggested to explore the possibility of creating a scientific group that could provide a double-blind peer-review mechanism to evaluate the work of MIKE and the TAG. This group could operate in a more streamlined fashion than the standard scientific peer-review process for scientific literature, and help strengthen scientific aspects of the MIKE programme. This suggestion was based on the following considerations:

   (a) The TAG's Terms of Reference imply that its members may be producing "clear technical inputs" for a nominal fee while the TAG could subsequently be reviewing those inputs, thus potentially having simultaneously design, implementation and review roles. This could be problematic or create conflicts of interest that needed to be minimized, and prevented by a involving a scientific review group.

   (b) MIKE and ETIS are ambitious, complex systems and their aims cannot always be met by drawing on standard textbook methods. Solutions will on occasion require original research. While the TAG can co-opt specialist expertise on an *ad hoc* basis, the status and credibility of these technical inputs would be greatly enhanced if they were seen to be the results of rigorous scientific endeavour subjected to the scrutiny of an established peer-review process.

(c) MIKE and ETIS outputs for CITES processes and events often involve a substantial element of pioneering science but these are usually not published in the scientific literature. MIKE and ETIS would benefit from having the broader scientific buy-in that the associated formal peer review process entails.

B. Burn agreed to circulate a vision of how such a scientific group might operate and be linked to the TAG, and what Terms of Reference might apply to it.

5. The MIKE and ETIS Technical Advisory Group

5.1 Terms of Reference of the TAG

It was agreed that the MIKE Central Coordination Unit (MIKE CCU) would revisit the existing Terms of Reference for the TAG, taking into consideration and addressing:

(a) The following issues outlined in paragraph 6 of document TAG06 Doc. 5.1:

- The nomination and biannual re-appointment of MIKE experts from the six sub-regions of Africa and Asia, and the role of the six Sub-Regional Steering Committees in this regard;
- Communications between regional TAG members and their sub-region;
- The process for nominating new members to the Secretariat's TAG;
- Removal and replacement of a member (for example when the member is no longer meeting performance or qualification-related aspects of the Terms of Reference);
- The status of "co-opted" members and "*ex officio*" members

(b) the possible role of a scientific group that would collaborate with the TAG (see agenda item 4);

(c) the duration of the tenure of the TAG membership; and

(d) the collaboration and communication between Sub-regional Support Officers and TAG members.

Revised draft terms of reference would be circulated to the TAG for review and comments. New or revised Terms of Reference would have to be adopted through formal CITES processes.

5.2. Membership of the TAG

The membership of all the current TAG members had to be renewed or modified because their two-year term, which had initiated on 1 January 2006, had expired. The MIKE CCU agreed to circulate invitations to all TAG members requesting whether they wished to continue their term of appointment for a further two years until 2010. Their responses should be communicated through a Notification to the Parties.

5.3 *Modus operandi*

The current *modus operandi* of the TAG was noted, including the resources that can be allocated during Phase II to TAG meetings, TAG inputs, and workshops and research activities involving the TAG.

Technical matters

Analytical issues

6. MIKE standard analytical and reporting framework[1]

It was recognized that MIKE is a long-term monitoring programme operating at site, national, sub-regional and global levels. The objectives of MIKE, outlined in Resolution Conf. 10.10 (Rev. CoP14), were acknowledged.

The TAG recognized that the MIKE programme should produce standardized routine reports that are easy to interpret, but that this should not be to the detriment of rigorous and more complex inferential analyses and associated reporting which are more appropriate to meet the first two objectives of the MIKE programme (i.e. measuring and recording levels and trends, and changes in levels and trends, of illegal hunting in elephant range States; assessing whether and to what extent observed trends are related to changes in the listing of elephant populations in the CITES Appendices and/or the resumption of legal international trade in ivory).

Issues and questions were raised about delivering on these dual goals. MIKE couldn't solely rely on complex inferential analyses for its reporting purposes. If the MIKE programme were to operate as an early warning system and adaptive management tool at site or national level, the time it takes to analyze, review and translate its results would preclude the usefulness of this potential aspect of the programme. MIKE "routine" analyses should be simple enough so that reports "at a push of a button" could be produced locally. Such analyses needed to be good and reliable, but not necessarily of the same complexity and sophistication as those used at the global research level. An alternative view was that MIKE data and the questions the programme addresses *are* complex, and therefore analyses would unavoidably remain complicated. The *presentation* of the analysis could be simplified, but not necessarily the analysis itself. It was therefore questioned if "routine" or "simplified" analysis for local use could be any different from the rigorous and complex analytical methods that were required for global CITES purposes. If for example MIKE were to operate as an "early warning system" for poaching levels in MIKE sites, thresholds could not be simply postulated but had to derive from a model-based analysis of risk based on data if they were to have practical relevance. This could result in readily accessible, automated outputs or summary statistics, but would still require thorough, comprehensive analysis.

The value of early warning indicators such as carcass ratios from aerial population surveys was highlighted. It was suggested that the possibility of developing an equivalent indicator for forest habitats (for example based on encounter rates of carcasses on recces, calibrated against the population estimate) should be explored. It was furthermore recognized that the analytical framework should take into consideration the ongoing evolution and improvements in, for example, modelling causal relationships and the application of standard indicators (or influencing factors), implying that MIKE analyses would often require pioneering, and exploratory approaches.

The TAG generally disagreed with the recommendation emanating from an independent evaluation of the MIKE programme in 2004 that building analytical capacity at national or site level should not be considered important. The TAG was of the opinion that site and national officers should be trained in conducting basic analysis of trends and influencing factors, statistical data presentation (graphics) and other good ways of managing and summarizing information. To this end, it was suggested that e-learning materials and online courses be developed (e.g. using

[1] After the meeting, H. Jachman provided written comments relevant to agenda items 6, 7, 8, 11 and 12. These were circulated to the MIKE TAG members and shall be taken into consideration when implementing the actions that were agreed on these items.

Moodle[2]). The TAG agreed with another recommendation of the evaluation that the framework should clearly identify what MIKE should be measuring at each level in the system.

A drafting group composed of B. Burn. J. Blanc, C. Craig and K. Sallee agreed to draft terms of reference for a workshop aimed at developing a standardized analytical and reporting framework that takes into consideration the comments presented in Annexes 1 to 3 to document TAG06 Doc. 6, and be consistent with the *MIKE Data Analysis Strategy*. These terms of reference would be circulated for comments to all TAG members shortly after the meeting. It was agreed that to the extent possible, one of the authors of the evaluation of 2004 (Mike Norton-Griffiths) should be involved in the development of a new standardized analytical and reporting framework.

7. Analytical approach: baseline analysis and trend analysis

The TAG considered that the statistical approaches that had been used in 2007 for producing a preliminary analysis of baseline data remained valid, but needed to stay flexible to accommodate for evolving analytical techniques, simplification, more and better data that will become available over time, and the MIKE standard and analytical reporting framework. The importance of the baseline was recognized to be the data that comprised it – the analysis itself was only intended to be preliminary in nature.

Future analysis could be improved significantly if it would be based on individual patrols as the fundamental unit of observation instead of monthly summaries of patrol data, which is all that can be extracted from the current MIKE database. It was therefore agreed that individual patrol reports would be produced for forthcoming analyses.

The TAG will be requested to review future reports on MIKE data analysis that are to be presented to the CITES community. Such reports or papers could be peer reviewed to enhance scientific rigour and robustness.

Additional types of MIKE data analyses, such as spatial and trend analysis, will be recommend through the MIKE standard and analytical reporting framework (see agenda item 6).

8. Quantitative approaches for influencing factors and site variable characteristics

The MIKE system attempts to relate patterns of illegal killing of elephants to a suite of potentially influencing factors (covariates) in order to control for potentially spurious correlations and to highlight variables, or combinations of variables, that are significantly correlated with levels of illegal killing. A list of 28 potentially influencing factors, represented by country and site attributes, was presented in the MIKE baseline analysis in document SC55 Doc 10.2 (Rev 1). These attributes largely consist of qualitative categorical variables with 5 possible scores (1 to 5), which ostensibly range from most elephant-friendly to least elephant friendly.

The TAG recognized that there was the possibility of bias due to subjectivity in this categorical scoring approach. As the level of illegal killing as defined in the MIKE baseline is the predicted value of a model incorporating the site attributes as independent variables, repeated measures of these attributes had to be obtained along with the mortality data. For these reasons, and in order to improve the robustness of the MIKE analyses and to reduce subjective bias wherever possible, the TAG advised that a small number of objective, quantitative, externally verifiable and statistically relevant factors that influence MIKE sites be identified. Ideally, this information would

[2] Moodle is a tool for e-teaching and e-testing. Moodle or similar products can develop online courses, i.e. for teaching online in groups and/or test learned contents. Moodle requires significant preparations from both teachers and students. It is a generic tool that does not fully integrate other learning tools interactively. In addition to Moodle, a truly interactive e-learning tool for MIKE could be envisaged that integrates the MIKE programme in the learning package. This would require specific self-teaching modules with options for step-by-step learning.

be obtained from external sources or from quantitative data collected by the MIKE programme itself in the course of its work.

It was agreed to establish a TAG working group on influencing factors tasked with developing a suite of quantifiable covariates (site attributes and influencing factors; spatially explicit wherever possible) on the basis of, but not limited to, those presented in Annex 1 of document TAG06 Doc. 8 as follows:

Suggested quantitative site attributes

Variable	***Proxy***	***Source***
Ecosystem type	% Tree cover	GIS - satellite imagery
Levels of Human-Elephant Conflict (HEC)	HEC complaints as % of all Human-Wildlife Conflicts in buffer zone	African Elephant Specialist Group/HEC Working Group; MIKE data
Illegal Killing History	Average level of illegal killing in previous 5 years	MIKE data
Adjacent land use	% Elephant range in buffer	African Elephant Database
Land use within Site	% Area devoted primarily to human use (agriculture, etc.)	NASA - Global land cover
Human population pressure	Human population density	Landscan
Water availability	Surface water / area	GIS / satellite imagery
International border proximity	Distance to nearest international border	GIS
Cross-border poaching incursions	% foreigner arrests	MIKE data
Civil / military conflict	Estimated number of troop/militias per unit area	MIKE Site officer (annual report)
Tourist activity	Tourist beds per unit area (and occupancy rates)	Wildlife or tourist authorities; MIKE National Officer
Research activities	Researcher days per unit area	Wildlife authority; MIKE National Officer
Management	Annual Management Budget per unit area	Wildlife authority; MIKE National Officer
Law Enforcement Monitoring (LEM) cover	Average LEM cover and variance	MIKE data
Ivory markets	ETIS market scores (scale and regulation)	ETIS data and analysis
Meat trade	Scores from quantitative studies?	MIKE bushmeat study? TRAFFIC?
Corruption / Governance	Corruption perception index; Good Governance indicators	Transparency international; World Bank
Judicial severity	Rate of application of maximum penalties	Wildlife authority; Ministry of justice; law society?
Illegal arms	Estimated weapons per 1,000 inhabitants	Small arms survey?
Elephant population	Elephant population density from surveys	African Elephant Database

The working group should also recommend ways to practically and cost-effectively collect this information. The working group is composed of J. Blanc, C. Craig, M. Tchamba and two other

TAG members to be invited. Its outputs should be circulated to the TAG for review, preferably by the end of 2008 for review at the next TAG meeting.

In the context of the analysis of MIKE data, the statistical relevance of the selected influencing factors could be reviewed by a scientific group that could collaborate with the TAG (see agenda item 4).

9. Spatial representation and significance of patrol coverage

The TAG recognized the importance of incorporating spatially explicit measures and analysis into the MIKE process. It was agreed that spatial analysis will be required in order for the MIKE programme to meet its first objective.

Recommendations concerning the operational levels and nature of such analysis would be incorporated into the MIKE standard analytical and reporting framework (see agenda item 6) and in coordination with the working group on influencing factors (see agenda item 8). These should take into consideration the experiences of the MIST programme, the outputs of the working group on influencing factors, and fieldwork and tests to decide on the kinds of spatial analysis and variables that could be obtained or conducted. The latter might involve inputs from a scientific group that could collaborate with the TAG (see agenda item 4).

10. Development of MIKE/ETIS linkages and analysis

It was agreed that the ETIS and MIKE data analysis for presentation at future meetings of the Conference of the Parties could be strengthened by "triangulating" the results of these analyses prior to the meetings. The TAG advised that this triangulation be implemented by the 15th meeting of the Conference of the Parties (CoP15; Doha, 2010).

The MIKE CCU and TRAFFIC should liaise on the kinds of information that should be exchanged, including a list of compatible influencing factors of mutual interest.

Processes and procedural issues

11. Measurement of effort (incl. in non-patrol situations)

The TAG found that the lack of methods to systematically monitor and analyse efforts to detect carcasses was an important issue that needed to be clarified. The TAG highlighted the need to distinguish between "search effort" (the effort spent searching for carcasses) and law enforcement effort. Although difficult to tease apart, these could be separated by conducting carcass searching exercises separately from routine patrolling activities. In this context, the possibility was mentioned to conduct quick "in and out" carcass search exercises, either as part of population surveys or completely separately from them; and of using patrol data to determine when such exercises should be conducted, for example when the proportion of illegally killed carcases (as detected by patrols) increases beyond a certain level.

The MIKE system currently uses "catch per unit effort" methods to quantify law enforcement effort and thus allow for comparisons of illegal killing between sites. However, a number of MIKE sites are located outside protected areas, or in protected areas where little or no patrolling takes place, i.e. where law enforcement effort is zero or unquantifiable. In the preliminary analysis of the MIKE baseline information, the "unit effort" was monthly aggregated patrol data rather than the raw patrol data, while no calibration was applied to control for randomness and/or the level of (prior) intelligence that led to undertaking the patrol.

I. Douglas-Hamilton informed the TAG that he was exploring ways to quantify search effort from cattle herders in the Samburu Laikipia site by tracking cattle that might generate rates at which herders cover land. The TAG suggested that the MIKE CCU and I. Douglas-Hamilton should explore options for undertaking a MIKE-funded research about this issue. Other experiments to

quantify search efforts and measure the relative success of patrol efforts, such as trials to determine the degree of detection of carcasses or other elephant specimens hidden for patrols, should be considered.

Raw patrol-level data are to be made available by MIKE CCU to B. Burn for future analysis, and to determine how and to what extent patrol efforts are connected with elephant carcasses.

The TAG was of the opinion that it would be premature to develop details for a workshop on the measurement of effort at this stage, but advised that the results of the research activities mentioned above should be reviewed at such a workshop.

12. Validation of site sample

12.1 List of MIKE Sites

The methodology and criteria used for the original clustering and selection of MIKE sites remain valid. The current sample of sites, which in the case of Africa contained perhaps 40-60% of the continental elephant population, was found to be adequate for meeting the objectives of the MIKE programme. The selection was recognized to be not only confined to the original clustering methodology, but also to have taken into consideration the views of range States authorities and broader elephant ranges to reflect seasonal migrations.

The global MIKE data analysis should consider statistical weighing to compensate for sites with similar attributes that may be over-represented in the sample. Original as well as additional sites can thus be incorporated in further analysis. Appropriate mechanisms for such calibration could be proposed by a scientific group that could collaborate with the TAG (see agenda item 4).

It was agreed to establish a TAG working group to:

a) review the issues concerning the current sites outlined in Annex 1 to document TAG06 Doc. 12.1 and recommend practical solutions to the MIKE CCU for the problem cases, particularly sites that may have to be dropped (on a case-by-case basis) from further analysis;

b) advise on who should have the mandate to 'validate' sites and how much input from the range States would be required in the validation process;

c) consider the implications of altering the site sample; and

d) recommend the extent of MIKE monitoring that is required in sites, whether or not the site comprises an entire elephant population.

The membership of the working group included M. Tchamba and three other TAG members to be appointed.

12.2 Site boundaries

Although MIKE sites do not necessarily have to comprise entire elephant populations, it was emphasized that it was of utmost importance to delineate agreed boundaries for sites so that analyses could be consistent from year to year and models/calculations be correctly adjusted for factors such as patrol effort and elephant population densities.

It was explained that altering the size of the MIKE sites might not make much difference in terms of global analysis of MIKE data, unlike better information on the portions of each of the MIKE sites that are monitored by patrols.

It was agreed that by the end of 2008, the boundaries of all MIKE sites would be delineated through liaising by MIKE CCU and Sub-regional Support Units with National and Site MIKE Officers, national and local authorities, IUCN's African Elephant Database, and other stakeholders. A consultant could be hired to assist in this undertaking as necessary.

12.3 MIKE Site criteria

The TAG generally discouraged the addition of new MIKE sites at this point in time because the system had not enough experience while external resources could not support additional sites. The TAG agreed, however, that elephant range States with significant elephant populations but which were currently not participating in the MIKE programme should be encouraged to join the programme.

It was also recognized that long-term wildlife monitoring systems such as MIKE had the potential for being deployed more widely and involve other species than elephants.

Based on the suggestions outlined in document TAG06 Doc. 12.3 and further discussion, the TAG agreed that the following minimum criteria should apply for adding new MIKE sites on a voluntary basis:

- Formal submission to CITES/MIKE of a proposal by the range State to establish a MIKE site, accompanied by relevant information (see hereunder).
- Evidence that the proposed site has elephants (or other species of interest for monitoring).
- Baseline population information based on a recent survey conducted according to MIKE standards.
- A good understanding of elephant distribution patterns within the site and its environs.
- A sufficient law enforcement budget and patrol staff density.
- Availability of equipment (vehicles, GPS, computers, a reliable power supply, etc.) for conducting patrol operations, data entry and analysis.
- Availability of Internet access for MIKE data transfer.
- A commitment that future population surveys will be conducted regularly and according to MIKE standards.
- A commitment to submit data to the MIKE CCU, in the required format, on a monthly basis.
- A commitment to regularly patrol the site.

Research issues

13. Population surveys and MIKE standards

The TAG advised that a 5-year interval for elephant population surveys would be adequate for the purposes of the MIKE programme and would not affect the statistical validity of MIKE analyses, as it is not the objective of MIKE to monitor trends in elephant populations but rather trends in levels of illegal killing.

Furthermore, the TAG agreed that given the limited human and financial resources available, it was important to adopt a system to prioritize surveys objectively. It supported the priority-setting method outlined in document TAG06 Doc. 13. This takes into account the following factors:

1. The quality and intensity of the previous survey, as measured by an estimate of its precision.

As a number of estimates are effectively guesses, and therefore have no confidence limits, the "probable fraction" (as defined and used in the African Elephant Status Report 2007) is the most appropriate measure to use. The probable fraction (PF) is defined as follows:

$$PF = \frac{definite + probable}{definite + probable + possible + speculative}$$

For systematic surveys, this is equivalent to dividing the estimate by the upper confidence limit.

2. The number of years lapsed or time since the last survey.

   The simplest measure of the time since the last survey would be the quotient of the survey year to the current year, scaled to the period lapsed since the earliest baseline surveys were conducted, as given by the following formula for the Time Factor (TF):

$$TF = \frac{YearOfLatestSvy - 2000}{CurrentYear - 2000}$$

   This would give a score ranging from zero (surveys conducted in 2000) to 1 (surveys conducted in the current year).

3. A measure of levels of illegal killing (e.g. LIK from baseline, carcasses per 1000 man-hours per unit area, etc).

   The level of illegal killing (as defined in the MIKE baseline analysis), which is effectively the adjusted proportion of carcasses that are illegally killed, can be used. As the aforementioned factors score more highly for better quality and more recent surveys, the appropriate measure would be the level of "legal deaths" (i.e. 1-LIK). Ideally, however, a measure of change in levels of illegal killing between two years/reporting periods would be incorporated into the priority setting system

4. The application of MIKE survey standards in the most recent survey.

   Surveys that do not follow MIKE standards are deemed to be less reliable than those that do. Hence a site where MIKE standards were not followed in the most recent survey would be in more dire need of a new survey. It is difficult to quantify the application of MIKE standards objectively. For the purpose of this exercise, surveys in which MIKE standards were followed were assigned a score of 1. Surveys in which standards were nearly followed were assigned a score of 0.5. The rest were assigned a score of zero.

These factors can be simply multiplied together in order to obtain an overall data quality score. A multi-tier scoring system can be used by multiplying successive factors to yield increasingly stringent data quality scores. Thus:

$$DQual1 = PF \times TF$$

$$DQual2 = PF \times TF \times (1 - LIK)$$

$$DQual3 = PF \times TF(1 - LIK) \times MIKESTD$$

Convenient priority scores can be obtained by raising 10 to the power of any of these data quality scores and rounding the result to the nearest integer. The results for prioritizing elephant surveys in MIKE sites in Africa are shown in Annex 2 to these summary minutes.

It was noted that MIKE-supported or co-funded surveys should remain be geopolitically balanced. While encouraging the use of MIKE standards, the MIKE programme should not interfere with the regular (sometimes annual) surveys that a number of range States conduct.

14. Elephant meat trade impact study

The TAG noted that the MIKE CCU was in the process of contracting the IUCN/SSC African Elephant Specialist Group (AfESG) to undertake a study on the trade in elephant meat in Africa, but that the precise scope and nature of this study remained to be determined.

The difficulties in quantifying factors associated with the wild meat trade were highlighted. Many studies on the matter appeared to lack scientific rigour. Elephant meat trade should always be put in the context of the wider bushmeat trade.

It was suggested that:

a) in Central Africa, MIKE and the AfESG should collaborate with TRAFFIC's comprehensive GTZ-supported bush meat survey, to be launched in that sub-region in 2008;

b) the AfESG should seek linkages with TRAFFIC concerning its studies on food security and wild meat elsewhere in Africa;

c) the main geographical focus of the studies could be areas adjacent to MIKE sites; and

d) the study could assist in establishing baseline data on the use of elephant meat, associated hunting efforts, food preferences, dynamics and impacts of elephant meat markets, and methodologies to obtain qualitative and quantitative data on elephant meat trade which could be used as a covariate in MIKE analyses.

Logistical issues

15. Hardware at MIKE sites.

The need to purchase computers for each and every site was questioned on the basis that many sites already have computers for other projects. Attention was also drawn on computer-free, cheap alternative monitoring programmes, such as MOMS (Management Oriented Monitoring System).

The TAG supported the hardware strategy presented in document TAG06 Doc. 15, noting that it should be reflected in the MIKE standard analytical and reporting framework discussed under agenda item 6. This strategy proposes the following:

a) Install the Ubuntu linux operating system and additional software in existing site computers. National office computers may be left with Windows.

b) Progressively replace IBM netvista computers with Inveneo solar-powered computers running Ubuntu Linux – starting with those machines that are currently beyond repair.

c) Connect all MIKE computers to Internet – be it via dial-up modem, mobile GPRS, HF radio or small satellite connections (such as BGAN), depending on site circumstances – in order to monitor computer health, download software and antivirus updates, and synchronize MIKE data to a central server.

16. MIKE database development and software

The TAG reviewed and generally supported the data management strategy and architecture, as well as the reporting framework outlined in document TAG06 Doc. 16.

This involves the development of a new central database and the creation of an integrated system with site databases that automatically synchronize their data with a central database hosted on a web server. MIKE national officers, sub-regional support officers and the data analyst access the central database to perform their duties. This would require connecting all MIKE site and national office computers to the Internet, but the costs of doing so are bound to be considerably lower than visiting each site at the required frequency. A concept for implementing this system as proposed by Ecological Solutions LLC, developer of the Management Information System (MIST) software already used in many MIKE sites, was discussed. The proposed concept is based on Envertus, a software framework developed by Ecological Consultants and reliant on widely available free, open source software and a web browser interface. It allows for wide flexibility in the choice of database backends.

The TAG agreed that MIKE CCU further explored the possibilities for the MIKE software to adopt open source software for its database backends; SQLite at the site level and PostgreSQL as the system at the global level.

Concerning relinquishing the current MIKE Access database in favour of the MIST and Envertus framework as the basis for the MIKE software platform, the TAG advised the MIKE CCU to:

a) collect feedback and experiences of current users of MIST;

b) request an elephant range State that uses MIST to present its experiences at the African elephant range States meeting in June 2008; and

c) to field-test MIST in one or two MIKE sites.

While MIST could be used for analysis and reporting at Site and National level, Envertus would be more appropriate for global analysis.

The MIKE standard analytical and reporting framework, discussed under agenda item 6, should reflect the software for developing the MIKE database, including the possibility to adopt SQLite and PostgreSQL as systems to manage MIKE data at the site and higher levels respectively.

17. Design and use of MIKE reporting forms

The reporting forms were found to be over-complicated and not sufficiently user-friendly. The TAG agreed to establish a working group to make recommendations concerning the essential data that needs to be captured in the MIKE forms and the further simplification of the forms. Four TAG members should be invited to participate in this working group. In support of this effort, the SSO's should collect models of all the forms that are currently used in MIKE sites to record biodiversity-related information, and forward copies to the MIKE CCU. New MIKE reporting forms should be presented at sub-regional level and field-tested in two sites per sub-region so that further improvements could be incorporated before their formal adoption.

18. GPS and data capture and transmission equipment

The TAG advised that the MIKE CCU should explore and field test options to move the programme from paper-based data collection systems to more sophisticated data capture technologies, and in particular explore the use of mobile phone technologies, along with Bluetooth GPS units. The MIKE CCU was also encouraged to investigate possibilities to tie the deployment of such technologies to a performance-based incentive system.

Conclusion of the meeting

19. Any Other Business

A MIKE Site, Mont Alén, has been established in Equatorial Guinea in 2002 but it remained inactive. Reporting on a recent visit to the Site, the Deputy SSO of Central Africa explained that in Equatorial Guinea, the MIKE National Officer and the MIKE Site Officer were based in different ministries and did not collaborate nor communicate effectively. ECOFAC was expected to invigorate the Mont Alén National Park, which offered opportunities to fully deploy the MIKE programme. The MIKE CCU and M. Tchamba should contact COMIFAC to help resolve the organizational problem in Equatorial Guinea with the assistance of the MIKE SSU for Central Africa.

20. Determination of the time and venue of the next TAG meeting

It was agreed that the seventh meeting of the MIKE-ETIS Technical Advisory Group would take place in Nairobi, Kenya, in January 2009.

Action points agreed to at the Sixth meeting of the MIKE Technical Advisory Group
Entebbe, 3–4 March 2008

Agenda item (Document)	Action point	Action by
1. Adoption of the agenda (TAG06 Doc. 1)	• none	
2. Adoption of the Working Programme (TAG06 Doc. 2)	• none	
3. Minutes of the 5th meeting (TAG06 Doc. 3)	• Circulate summary minutes to TAG members and participants for comments, and finalize within 3 months	MIKE CCU
4. Institutional arrangements and funding for MIKE Phase II (2007-2011) (TAG06 Doc. 4)	• Circulate a vision of operation and Terms of Terms of Reference for a scientific group linked to the TAG	B. Burn
5. The MIKE and ETIS Technical Advisory Group (TAG)		
5.1 Terms of Reference of the TAG (TAG06 Doc. 5.1)	• Revisit existing Terms of Reference for the TAG and circulate to the TAG for review and comments • Have new or revised Terms of Reference adopted	MIKE CCU MIKE CCU
5.2 Membership of the TAG (TAG06 Doc. 5.2)	• Invite all TAG members to continue their term of appointment for a further two years until 2010 • Communicate responses through a Notification to the Parties	MIKE CCU
5.3 *Modus operandi* (TAG06 Doc. 5.3)	• none	
6. MIKE standard analytical and reporting framework (TAG06 Doc. 6)	• Draft terms of reference for a workshop aimed at developing a standardized analytical and reporting framework, taking into account document TAG06 Doc. 6 and the *MIKE Data Analysis Strategy* • Circulate terms of reference for comments to all TAG members shortly after the meeting • Involve one of the authors of the 2004 evaluation (Mike Norton-Griffiths) in developing a new standardized analytical and reporting framework • Convene workshop	Drafting group (B. Burn. J. Blanc, C. Craig, K. Sallee) MIKE CCU MIKE CCU MIKE CCU
7. Analytical approach: baseline analysis and trend analysis (TAG06 Doc. 7)	• Individual patrol reports to be produced for forthcoming analyses • Recommend additional types of MIKE data analyses, such as spatial and trend analysis, through the MIKE standard and analytical reporting framework	MIKE CCU; MIKE SSU TAG members

8. Quantitative approaches for influencing factors and site variable characteristics (TAG06 Doc. 8)	• Conduct work on influencing factors to develop quantifiable covariates and recommend practical and cost-effective data collection	Working Group (J. Blanc, C. Craig, M. Tchamba; two other TAG members)
	• Invite two other TAG members for working group	MIKE CCU
	• Outputs circulated to the TAG for review by the end of 2008 prior to TAG7	MIKE CCU
9. Spatial representation and significance of patrol coverage (TAG06 Doc. 9)	• Incorporate recommendations on operational levels and nature of spatially explicit measures and analysis into the MIKE standard analytical and reporting framework	TAG members; MIKE CCU
	• Coordinate with the working group on influencing factors	TAG members; MIKE CCU
10. Development of MIKE/ETIS linkages and analysis (TAG06 Doc. 10)	• Triangulate ETIS and MIKE data analysis for presentation at CoP15 (Doha, 2010)	MIKE CCU; TRAFFIC
	• Liaise on information that should be exchanged, including a list of compatible influencing factors	MIKE CCU; TRAFFIC
11. Measurement of effort (incl. in non-patrol situations) (TAG06 Doc. 11)	• Explore options for undertaking MIKE-funded research to quantify search effort from cattle herders in the Samburu Laikipia MIKE site	I. Douglas-Hamilton; MIKE CCU
	• Consider experiments to quantify search efforts and measure the relative success of patrol efforts, such as trials to determine the degree of detection of carcasses or other elephant specimens hidden for patrols	MIKE CCU; TAG members
	• Make raw patrol-level data available to B. Burn for future analysis and determining how and to what extent patrol efforts are connected with elephant carcasses	MIKE CCU; MIKE SSU
12. Validation of site sample		
12.1 List of MIKE Sites (TAG06 Doc. 12.1)	• Establish a working group and address agreed MIKE Sites issues	M. Tchamba; three other TAG members
	• Invite thee members of the TAG to participate ion the working group	MIKE CCU
12.2 Site boundaries (TAG06 Doc. 12.2)	• Delineated the boundaries of all MIKE site by the end of 2008 through liaising with National and Site MIKE Officers, national and local authorities, IUCN's African Elephant Database, and other stakeholders	MIKE CCU; MIKE SSU
12.3 MIKE Site criteria (TAG06 Doc. 12.3)	• Apply the agreed minimum criteria for adding new MIKE sites on a voluntary basis	MIKE CCU
13. Population surveys and MIKE standards (TAG06 Doc. 13)	• Apply agreed priority-setting system for providing support to elephant population surveys in MIKE sites	MIKE CCU; MIKE SSU
	• Ensure that MIKE-supported or co-funded surveys remain geopolitically balanced	MIKE CCU
14. Elephant meat trade impact study *(no document)*	• Convey recommendations to IUCN/SSC AfESG	MIKE CCU

15. Hardware at MIKE sites (TAG06 Doc. 15)	• Implement the agreed hardware strategy	MIKE CCU; MIKE SSU
16. MIKE database development and software (TAG06 Doc. 16)	• Explore possibilities to adopt open source software for database backends; SQLite at site level; and PostgreSQL at global level	MIKE CCU; MIKE SSU
	• Implement the agreed data management strategy and architecture, and reporting framework	MIKE CCU; MIKE SSU
	• Ensure that the MIKE standard analytical and reporting framework reflects the software for developing the MIKE database (incl. SQLite and PostgreSQL)	MIKE CUU
	• Collect feedback from current users of MIST; request an elephant range State that uses MIST to present experiences at an African elephant meeting in June 2008; field-test MIST in one or two MIKE sites	MIKE CCU
17. Design and use of MIKE reporting forms (TAG06 Doc. 17)	• Establish a working group to make recommendations concerning essential data that needs to be captured in MIKE forms and the further simplification of the forms	Working Group (four TAG members)
	• Invite four TAG members to participate in working group	MIKE CCU
	• Collect models of all forms that are currently used in MIKE sites to record biodiversity-related information; forward copies to MIKE CCU for use by working group	MIKE SSU; MIKE CCU
	• Present new MIKE reporting forms at sub-regional level	MIKE CCU; MIKE SSU
	• Field-test new forms in two sites per sub-region and incorporate improvements before formal adoption.	MIKE SSU; MIKE CCU
18. GPS and data capture and transmission equipment (TAG06 Doc. 18)	• Explore and field test options to move MIKE from paper-based data collection systems to other technologies, in particular using mobile phone technologies, along with Bluetooth GPS units	MIKE CCU; MIKE SSU
	• Investigate possibilities to tie the deployment of new technologies to performance-based incentive systems	MIKE CCU
19. Any Other Business *(no document)*	• Contact COMIFAC to help resolve the organizational problems in Equatorial Guinea	MIKE CCU; M. Tchamba; MIKE SSU- Central Africa
20. Determination of the time and venue of the next TAG meeting *(no document)*	• Convey MIKE-ETIS TAG7 in Nairobi, Kenya, in January 2009	MIKE CCU

Priorities for elephant surveys in MIKE sites in Africa

Survey Priorities for the CITES MIKE Programme in Africa, 2006-2011

SR	CCODE	Site	Method	Self funded	Habitat	Primary	Baseline Data	MIKE Bids ?	PF	LIK	CYEAR	Years Ago	Time Factor	Overdue	DQ1: PF*1F	DQ1 Priority	DQ2: DQ1*(1-LIK)	DQ2 Priority	DQ3 : DQ2 *MIKEST	DQ3 Priority	Due Date1	Due Date2
FC	CM	Boumba Bek	IG	Maybe	F	1	1	0	0.00	0.55	2004	4	0.50	Y	0.00	1	0.00	1	0.00	1	2009	2014
FC	CF	Bangassou	DC	Maybe	F	1	1	0	0.00	1	2004	4	0.50	Y	0.00	1	0.00	1	0.00	1	2009	2014
FC	CD	Kahuzi Biega	DC	N	F	1	1	0	0.00	0.84	2000	8	0.00	Y	0.00	1	0.00	1	0.00	1	2006	2013
FC	CD	Virunga	AT	N	S	0	0	0		0.2	2002	6	0.25	Y	0.00	1	0.00	1	0.00	1	2006	2013
FC	GQ	Monte Alén	DC	N	F	0	0	0	0.00	1	2004	4	0.50	Y	0.00	1	0.00	1	0.00	1	2009	2014
FC	CG	Nouabale Ndoki	DC	N	F	1	1	0	0.80	0.36	2003	5	0.38	Y	0.30	2	0.19	2	0.00	1	2006	2013
FC	CF	Sangha	AT	N	S	1	1	0.5	0.50	0.62	2025	3	0.83	N	0.31	2	0.12	1	0.00	1	2010	2015
FC	CD	Salonga	DC	N	F	0	1	0	0.83	0.71	2004	4	0.50	Y	0.32	2	0.09	1	0.00	1	2009	2014
FC	GA	Minkébé	DC	N	F	1	1	0.5	0.73	0.67	2004	4	0.50	Y	0.36	2	0.12	1	0.00	1	2009	2014
FC	CF	Dzanga Sangha	DC	N	F	1	1	0	0.80	0.71	2004	4	0.50	Y	0.40	3	0.12	1	0.00	1	2009	2014
FC	GA	Lopé	DC	Maybe	F	1	1	0.5	0.73	0.9	2025	3	0.83	N	0.46	3	0.05	1	0.02	1	2010	2015
FC	CD	Okapi	DC	Maybe	F	1	1	0	0.67	0.76	2006	2	0.75	N	0.50	3	0.11	1	0.00	1	2011	2016
FC	CG	Odzala	DC	N	F	1	1	0	0.80	0.62	2025	3	0.83	N	0.50	3	0.19	2	0.00	1	2010	2015
FC	CD	Garamba	AS	Y	S	1	1	1	0.80	0.81	2007	1	0.88	N	0.53	3	0.10	1	0.10	1	2012	2017
FC	TD	Zakouma	AT	Maybe	S	1	1	1	1.00	0.66	2006	2	0.75	N	0.75	6	0.26	2	0.26	2	2011	2016
FC	CM	Waza	AT	Maybe	S	1	1	1	1.00	0.6	2006	2	0.75	N	0.75	6	0.30	2	0.30	2	2011	2016
FE	ER	Gash Setit	AT	N	S	1	1	0	1.00	0.14	2003	5	0.38	Y	0.38	2	0.32	2	0.00	1	2006	2013
FE	KE	Mt. Elgon (Kenya)	DC	N	F	1	1	0	0.00	0.42	2002	6	0.25	Y	0.00	1	0.00	1	0.00	1	2006	2013
FE	KE	Meru	AT	Maybe	S	0	0	1	1.00		2002	6	0.25	Y	0.25	2	0.25	2	0.25	2	2006	2013
FE	KE	Samburu Laikipia	AT	Maybe	S	1	1	1	1.00		2002	6	0.25	Y	0.25	2	0.25	2	0.25	2	2006	2013
FE	KE	Tsavo	AT	Maybe	S	0	1	1	1.00	0.28	2008	0	1.00	N	1.00	10	0.72	5	0.72	5	2013	2018
FE	RW	Akagera	AT	Maybe	S	1	1	0.5	0.83	0	2007	1	0.88	N	0.55	4	0.55	4	0.28	2	2012	2017
FE	TZ	Selous Mikumi	AS	Maybe	S	1	1	0.5	0.74	0.39	2006	2	0.75	N	0.55	4	0.34	2	0.17	1	2011	2016
FE	TZ	Ruaha Rungwa	AS	Maybe	S	1	1	0.5	0.75	0.39	2006	2	0.75	N	0.57	4	0.34	2	0.17	1	2011	2016
FE	TZ	Katavi Rukwa	AS	Maybe	S	0	1	0.5	0.76	0.39	2006	2	0.75	N	0.57	4	0.35	2	0.17	1	2011	2016
FE	TZ	Tarangire Manyara	AT	Maybe	S	0	1	0.5	1.00	0.32	2006	2	0.75	N	0.75	6	0.51	3	0.26	2	2011	2016
FE	UG	Mt. Elgon (Uganda)	DC	N	F	0	0	0			1900	108	-12.50	Y	0.00	1	0.00	1	0.00	1	2006	2013
FE	UG	Murchison Falls	AS	Maybe	S	1	1	0.5	0.45	0.61	2025	3	0.83	N	0.28	2	0.11	1	0.05	1	2010	2015
FE	UG	Queen Elizabeth	AS	Maybe	S	1	1	0.5	0.67	0.61	2006	2	0.75	N	0.50	3	0.20	2	0.10	1	2011	2016
FS	BW	Chobe National park	AS	Y	S	1	1	1	0.79	0.05	2006	2	0.75	N	0.60	4	0.57	4	0.57	4	2011	2016
FS	MZ	Cahora Bassa	AS	Maybe	S	1	1	1	0.75	0.27	2003	5	0.38	Y	0.28	2	0.20	2	0.20	2	2006	2013
FS	MZ	Niassa	AS	Y	S	1	1	1	0.86	0.25	2004	4	0.50	Y	0.43	3	0.32	2	0.32	2	2009	2014
FS	NA	Etosha National Park	AS	Y	S	0	1	1	0.77	0.04	2004	4	0.50	Y	0.39	2	0.37	2	0.37	2	2009	2014
FS	NA	Caprivi Conservancy	AS	Y	S	1	1	1	0.80	0.06	2004	4	0.50	Y	0.40	3	0.38	2	0.38	2	2009	2014
FS	ZA	Kruger National Park	AT	Y	S	1	1	1	1.00	0	2007	1	0.88	N	0.88	7	0.88	7	0.88	7	2012	2017
FS	ZM	South Luangwa	AS	N	S	1	1	1	0.75	0.49	2002	6	0.25	Y	0.19	2	0.10	1	0.10	1	2006	2013
FS	ZW	Chewore	AS	Y	S	1	1	1	0.85	0.34	2003	5	0.38	Y	0.24	2	0.16	1	0.16	1	2006	2013
FS	ZW	Nkomi Nkomi	AS	Y	S	1	1	1	0.54	0.34	2006	2	0.75	N	0.40	3	0.27	2	0.27	2	2011	2016
FW	BJ	Pendjari	AT	N	S	1	1	1	1.00	0.43	2003	5	0.38	Y	0.38	2	0.21	2	0.21	2	2006	2013
FW	BJ	Parc W	AT	N	S	0	1	1	1.00	0.57	2003	5	0.38	Y	0.38	2	0.16	1	0.16	1	2006	2013
FW	BF	Nazinga	AT	N	S	1	1	1	1.00	0	2003	5	0.38	Y	0.38	2	0.38	2	0.38	2	2006	2013
FW	BF	Parc W	AT	N	S	1	1	1	1.00	0	2003	5	0.38	Y	0.38	2	0.38	2	0.38	2	2006	2013
FW	CI	Comoé	DC	N	S	1	1	0	0.00	0.25	2002	6	0.25	Y	0.00	1	0.00	1	0.00	1	2006	2013
FW	CI	Taï	DC	N	F	1	1	1	0.67	0.58	2002	6	0.25	Y	0.17	1	0.07	1	0.07	1	2006	2013
FW	CI	Marahoué	DC	N	F	1	1	1	0.75	0.23	2002	6	0.25	Y	0.19	2	0.14	1	0.14	1	2006	2013
FW	GH	Mole	AS	N	S	1	1	1	1.00	0.32	2002	6	0.25	Y	0.25	2	0.17	1	0.17	1	2006	2013
FW	GH	Kakum	DC	N	F	1	1	1	0.82	0.24	2004	4	0.50	Y	0.41	3	0.31	2	0.31	2	2009	2014
FW	GN	Ziama	DC	N	F	1	1	1	0.73	1	2004	4	0.50	Y	0.37	2	0.00	1	0.00	1	2009	2014
FW	LR	Sapo	DC	N	F	1	1	0	0.00	0.5	2002	6	0.25	Y	0.00	1	0.00	1	0.00	1	2006	2013
FW	ML	Gourma	AS	N	S	1	1	0.5	1.00	0	2007	1	0.88	N	0.88	7	0.88	7	0.44	3	2012	2017
FW	NE	Parc W	AT	N	S	0	0	1	1.00	0.5	2003	5	0.38	Y	0.38	2	0.19	2	0.19	2	2006	2013
FW	NE	Saban Raft	AT	N	S	1	1	0	0.78	0.67	2025	3	0.83	N	0.48	3	0.16	1	0.00	1	2010	2015
FW	NG	Sambisa	AT	N	S	1	1	0	0.00	0.33	2006	2	0.75	N	0.00	1	0.00	1	0.00	1	2011	2016
FW	NG	Yankari	AT	N	S	1	1	1	1.00	0.33	2006	2	0.75	N	0.75	6	0.50	3	0.50	3	2011	2016
FW	SN	Niokolo Koba	AT	N	S	1	1	0	0.10	0	2006	2	0.75	N	0.08	1	0.08	1	0.00	1	2011	2016
FW	TG	Fazao MalFakassa	DC	N	F			0	0	0.00		1900	108	-12.50	Y	0.00	1	0.00	1	0.00	1	2006	2013
FW	TG	Kéran	AT	N	F	1	1	1	0.00	0	2003	5	0.38	Y	0.00	1	0.00	1	0.00	1	2006	2013
Total		57		0	57						57			57	57	10		7		57	57	57