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

Twelfth meeting of the Conference of the Parties
Santiago (Chile), 3-15 November 2002

Interpretation and implementation of the Convention

Species trade and conservation issues

Conservation of elephants and trade in elephant specimens

ILLEGAL HUNTING OF ELEPHANTS

Executive Summary

Introduction

Given a clear indication by the European Community (EC) of financial support for the Africa region, the Secretariat undertook a series of meetings during 2001 in order to get range States' agreement and support for the implementation of MIKE. On the basis of the agreements reached at these meetings, this report describes progress with regard to Africa and Asia, and the longer-term funding situation.

Progress in Africa

In terms of institutional arrangements, all four sub-regions are organised with a sub-regional steering committee for overseeing MIKE, coupled with the appointment of National and Site Officers in each range State. Technical support is provided by the MIKE Sub-regional Support Officers (SSOs) and the Technical Advisory Group (TAG).

The original methodology of site selection was aimed at providing a representative sample of sites based on a combination of various factors. With the benefit of hindsight, this process has revealed some weaknesses and a model-based approach is now thought to be the best way forward. To overcome these weaknesses, it will be particularly important to collect data (covariate information) that will enable the construction of spatial models. The current situation is that 55 sites in 29 range States have been identified, but this should not be regarded as the limit.

The Law Enforcement Monitoring (LEM) work is based on the existing patrol personnel in each site keeping a systematic record of where they go and what they find. In addition, all elephant carcasses, whether located on a site or outside of it, whether found on patrol or otherwise, are requested to be reported on, as these data provide information on why elephants are being killed. This work is based on the use of standard forms and field protocols, and is facilitated by the use of GPS.

Training on the use of the forms of GPS has been provided in all four sub-regions (February to May 2002), followed by the SSOs visiting each site. The current situation on LEM data flow is reflected by the fact that over 80 per cent of the sites are now producing data. However this does not mean that there are no constraints being faced in the delivery of these data. For some countries, the current MIKE provision of two GPSs per site is very limiting, particularly if no other GPSs are available.

Aerial counting methods have been used to estimate elephant populations for a considerable number of years. The approach to estimate forest populations has been based on ground surveys, using dung count methods. However work undertaken under the MIKE pilot project in central Africa and by Conservation International in Ghana (1999-2001) has lead to improvements in the methodology so that the results are now in line with the confidence levels, variance and standard errors of aerial surveys.

However it is worth stressing that whilst an aerial survey can be done in a matter of days or a week or two at most, forest surveys are likely to take at least four to five months. This has institutional and financial implications, which will need to be discussed with the range States over the next 12 months. In the meantime much needed support is being provided by USFWS, CEPF, WCS and WWF. It is therefore anticipated that a population survey will have been achieved in almost every site by the end of 2003.

It is very important to have a standardized data reporting system in place, since this will greatly affect what can and will be done with the analysis of the data. The data analysis inter-relationships that MIKE will be particularly addressing are, population trends, patterns of effort, patterns of illegal killing and patterns of influencing factors. The development of the database is being done, using the principles set out in the main report. The main report also highlights the importance of spatial data for the analysis of law enforcement data and population survey data.

A Microsoft Access database is therefore being developed which facilitates data entry, management and retrieval and whish will be linked to Arcview 8.1 to facilitate the analyses required. This will be available to the Site Officers in a computer system that is being provided at each site together with appropriate training. A similar arrangement will be available for the National Officers, Sub-regional Support Officers and the Central Coordinating Unit (CCU). An illustration of the output and analysis that this system will provide is provided in a table, as is a list of possible influencing factors.

In September 2002, the basic structure, tables and relationships of the site-level database had been developed in harmony with the data collection forms and planned analyses. The appropriate queries to generate the monthly and annual reports and the reports themselves are under development. Database outputs will include tabular summaries of protection effort and results of patrolling, and an illustration of a "catch/effort" analysis that provides indicators of illegal activities both in space and time. This process will be facilitated as a more comprehensive data set becomes available.

The current funding for Africa is provided under a project agreement between the CITES Secretariat and the European Commission. However a condition of this agreement is that the EC will only provide 66.85 per cent of the approved budget. There has been a need to obtain the remainder under a matching fund arrangement. This has been achieved thanks to contributions from the Governments of Belgium and of Japan, the Critical Ecosystem Partnership Fund, the US Fish and Wildlife Service (AfECF), the range States, the Environmental Systems Research Institute (ESRI), GTZ and UNESCO (World Heritage).

Progress in Asia

It was not until April 2002 that fund-raising for Southeast Asia could be focussed on. However the United States Fish and Wildlife Service has now approved funds and the Critical Ecosystem Partnership Fund is actively considering the provision of funds to get MIKE started in this sub-region. The Wildlife Conservation Society has also agreed to help collaborate with implementing MIKE, especially with regard to assisting training, facilitating field work and developing practical monitoring techniques adapted to Southeast Asia needs.

During the latter part of 2002 and early 2003, the MIKE Director will undertake travel to the south Asia range States to discuss the possible approach to and implementation of MIKE in that sub-region. This will help guide efforts that will be required to obtain funding.

Longer-term funding

It is the aim of the MIKE programme to endeavour to provide 10 years of support, so that at the end of the support period, each range State will have had the opportunity to develop a sustainable monitoring programme supported by its own recurrent budget.

For Africa, the current 18-months' EC support is due to end in April 2003. However recent discussions with the European Commission indicate its willingness to support MIKE in the longer term. It is therefore currently determining which funding instrument would be the most appropriate for submitting a project proposal.

However it is highly unlikely that the new funding could be approved in time for a smooth transition in May 2003. It is therefore realistic to acknowledge that a bridging period of probably 12 months will be required, if MIKE is to maintain continuity. Ii is projected that this bridging period will require a financial supplement of approximately USD 1 million.

For Asia, the longer-term funding will be sought during 2003.

Main report on the monitoring of the illegal hunting of elephants (MIKE)

1. Requirement for progress report to CoP12

Resolution Conf. 10.10 (Rev.) states that the system known as MIKE, established under the supervision of the Standing Committee, shall continue and be expanded with the following objectives:

i) measuring and recording levels and trends, and changes in levels and trends, of illegal hunting and trade in ivory in elephant range States, and in trade entrepots;
ii) assessing whether, and to what extent, observed trends are linked to changes in the listing of elephant populations in the CITES Appendices and/or the resumption of legal international trade in ivory;
iii) establishing an information base to support the making of decisions on appropriate management, protection and enforcement needs; and
iv) building capacity in range States.

The Resolution goes on to state in its Annex 2:

The CITES Secretariat will request/subcontract technical support from appropriate experts, with advice of the TAG, to:

a) select sites for monitoring as representative samples;
b) develop a standardized methodology for data collection analysis;
c) provide training to designated officials in countries with selected sites and to CITES Management Authorities of elephant range States;
d) collate and process all data and information from all sources identified; and
e) provide a report to the CITES Secretariat for transmission to the Standing Committee and Parties to CITES.

This report therefore complies with this last requirement. However it is worth emphasizing that this particular report will demonstrate progress with regard to objectives (iii) and (iv) and not so much with regard to objectives (i) and (ii). This does not mean that objectives (i) and (ii) are less important or have changed but objectives (iii) and (iv) provide the platform from which the first two objectives can be achieved.

2. Introduction

Given a clear indication by the European Commission to the Secretariat in December 2000 that financial support would be forthcoming, the Secretariat embarked on organizing implementation meetings with the three sub-regions that had not yet started on MIKE processes. These meetings were held as follows:

– West Africa – Ouagadougou, Burkina Faso – February 2001;
– East Africa – Dar-es-Salaam, United Republic of Tanzania – March 2001; and
– Central Africa – Libreville, Gabon – July 2001.

Essentially each of the meetings confirmed the following points:

– The range State support for MIKE with the recognition that MIKE was a range-State-owned programme;
– The institutional arrangement for the sub-regions as highlighted in section 3.1;
– The confirmation that the range States would appoint a Steering Committee representative, a National Officer and a Site Officer for each site;
– The agreement and selection of MIKE sites, with an indication of reserve sites that each range State would like to include, resources permitting;
– The need to harmonize the LEM forms and to maintain as systematic and standardized an approach as possible;
– The need to recruit the Sub-regional Support Officers as soon as possible; and

– The recognition that the MIKE programme was about developing national capacity so that the monitoring process would become part of each Wildlife Agency's sustainable routine.

Given that southern Africa had started MIKE in their sub-region in 2000/2001, no start-up meeting was required. However, in recognition that no sub-regional meeting had occurred since September 2000, a steering committee meeting was held in June 2002 at Mid Rand, South Africa. This meeting effectively confirmed this Party's agreement with the above points.

On the basis of these meetings, this report describes below progress with regard to:

- Africa
    - Institutional arrangements
    - Sites
    - Law Enforcement Monitoring
    - Population surveys
    - Data analysis
    - Funding situation
- Asia
    - Longer-term funding

3. Africa

Following the indication from the European Commission with regard to funding, a contract was signed in June 2001 and the funds became available in October 2001. The start-up for MIKE implementation was formally set in October 2001, when the Director was appointed and charged with overseeing the MIKE programme in Africa and Asia.

3.1 Institutional Arrangements

As mandated by the CoP at its 11th meeting, the implementation of MIKE is the responsibility of the Standing Committee, which has in turn set up a sub-committee, known as the MIKE Sub-Group, to carry out that responsibility. The day-to-day coordination and facilitation of MIKE is the responsibility of the MIKE Director, who reports to the Deputy Secretary-General of the CITES Secretariat and to the MIKE Sub-Group. The Director and his Central Coordinating Unit are located in Nairobi, Kenya.

The Africa and Asia regions are divided into four (west, central, southern and East) and two (Southeast and south) sub-regions respectively. As decided at the implementation meetings, each of the African sub-regions have their MIKE implementation supervised by a Steering Committee (usually consisting of the respective Wildlife Directors) and facilitated by a sub-regional Support Officer, who report to the Director. Each range State has a National Officer and Site Officers as the core staff for implementing MIKE.

In addition, there is a MIKE Technical Advisory Group (TAG). This group comprises one expert from each sub-region and, to date, four nominated specialists. The principal role of the TAG is to guide the technical quality of MIKE processes and techniques. The TAG also acts as a peer-review group and any challenge on any outcomes of analysis may be referred to it.

An illustration of this structure is provided in Annex 1. The following can therefore be reported as achieved:

– The Central Coordinating Unit (CCU) is up and running and is located in Nairobi;
– The Technical Advisory Group (TAG) is functioning and has met twice (November 2001 and May 2002);
– The sub-regional Steering Committees are in place and met in a full regional meeting in September 2002;
– National and Site officers are positioned in all range States and sites; and

– All four sub-regional Support Units are positioned and active
  – West Africa - Ouagadougou
  – Central Africa - Yaounde
  – Southern Africa - Windhoek
  – East Africa – Nairobi.

3.2 Sites

After consultation with the range States, some 55 sites in 29 range States have been identified so far in Africa. The methodology of site selection was aimed at providing a representative sample of sites based on a combination of various factors:

– forest vs. savannah;
– relative size of elephant populations;
– protection status of site;
– historical incidence of illegal killing;
– ivory trade situation;
– incidence of civil-military conflict;
– level of law enforcement effort; and
– CITES context regarding Harare decisions.

With the benefit of hindsight, this process has revealed some weaknesses and a model-based approach is now thought to be the best way forward. To overcome these weaknesses, it will be particularly important to collect data (covariate information) that will enable the construction of spatial models. Nor should we accept that this is the maximum number of MIKE sites. Indeed, resources permitting, many range States will be and are striving to extend MIKE processes to other significant sites, particularly as national and sub-regional trends and patterns will also be important MIKE objectives. It is therefore important to understand that MIKE is there to assist analysis at site, national, sub-regional and continental levels. The analysis of trends and patterns at the national level, though, may not be easily accommodated until more sites are included. The list of sites is provided in Annex 2.

3.3 Law Enforcement Monitoring (LEM)

Monitoring law enforcement is important for two reasons:

– Law enforcement is a deterrent to poaching and has an important impact on illegal killing and so needs to be taken into account when comparing rates of killing across Africa and over time; and
– LEM provides information that site managers can use to determine optimum allocation of resources and so help improve protection and management of elephants.

The LEM work is based on the existing patrol personnel keeping a systematic record of where they go and what they find. In addition, all elephant carcasses, whether located on a site or outside of it, whether found on patrol or otherwise, are requested to be reported on, as this data provides information on why elephants are being killed. This work is based on the use of standard forms and field protocols, and is facilitated by the use of GPSs.

These forms can be summarized as follows:

– Ground patrol forms (provide information on patrol effort and observations made);
– Carcass forms (provide information on elephant deaths and possible causes (not restricted to patrols or sites);
– Monthly reports (summarize the information collected during the month); and
– Annual reports (summarize the monthly information and details other factors that may have contributed to illegal killing).

The forms have been reviewed by the TAG and will continue to be monitored by it, in an effort to make them as easy to use as possible. Where range States have been using similar forms prior to starting MIKE, then the policy is to encourage an integration of the forms, so that MIKE data are collected without insisting on a MIKE form format.

An important measurement of law enforcement effort is patrol coverage and patrol frequency. The best way to standardize measurement of patrol effort is to map patrol routes with the help of a GPS. GPS is also important for locating carcasses and other signs of illegal activities. Ideally each patrol should use a GPS to record its movements and observations.

Training on the use of the forms and the use of GPS has been provided in all four sub-regions (February to May 2002), followed by the SSOs visiting each site to further training. The current situation on LEM data flow is reflected in Tables 1(a)-(d). However this does not mean that there are no constraints being faced in the delivery of these data. For some countries with reasonably good manpower resources, the current MIKE provision of two GPSs per site is very limiting, particularly if no other GPSs are available.

However there is a more fundamental concern being raised by some of the range States. The first goal of MIKE in terms of law enforcement monitoring (LEM) is to have the system up and running based on existing resources. However many range States are anxious to move their LEM to a more optimal level. This is strongly felt where sites are large and current capacity covers a fraction of the site, or where the wildlife agency is simply not well supported by its Government in terms of staff and budget. In this context, the range States appreciate that the MIKE staff are there to facilitate this programme and recognize that the MIKE Secretariat can therefore not be regarded as a donor. An obvious solution is for range States' funding partners to assist in moving LEM from a sub-optimal to optimal level on a bilateral basis. However it is important that any such assistance is provided on the full understanding and agreement that the range State can and will absorb and sustain the incremental costs. Secondly it is important that such efforts are consistent with the systematic processes to which the range States have agreed under the MIKE programme.

Table 1(a): LEM – West Africa: Progress Report per Site

		Patrol data started	Carcass data started	Monthly reports started	Annual reports started
Benin	Parc W	April 02	April 02	April 02	Dec. 02
	Pendjari	April 02	April 02	April 02	Dec. 02
Burkina Faso	Parc W	Aug. 02	Aug. 02	Aug. 02	Dec. 02
	Ranch de Nazinga	June 02	June 02	June 02	Dec. 02
Côte d'Ivoire	Comoe	March 02	March 02	March 02	Dec. 02
	Marahoue	March 02	March 02	March 02	Dec. 02
	Tai	March 02	March 02	March 02	Dec. 02
Ghana	Kakum	April 02	April 02	April 02	Dec. 02
	Mole	April 02	April 02	April 02	Dec. 02
Guinea	Ziama	June 02	April 02	April 02	Dec. 02
Liberia	Sapo	Oct. Oct. 02	Oct. Oct. 02	Oct. Oct. 02	Dec. 03
Mali	Gourma	April 02	April 02	April 02	Dec. 02
Niger	Babah Rafi	June 02	June 02	June 02	Dec. 02
	Parc W	April 02	April 02	April 02	Dec. 02
Nigeria	Sambissa	(Nov. 02)	(Nov. 02)	(Nov. 02)	Dec. 03
	Yankarri	(Nov. 02)	(Nov. 02)	(Nov. 02)	Dec. 03
Senegal	Niokolo-Koba	Sept. 02	Sept. 02	Sept. 02	Dec. 02

		Patrol data started	Carcass data started	Monthly reports started	Annual reports started
Togo	Fosse aux Lions	April 02	April 02	April 02	Dec. 02
	Keran	April 02	April 02	April 02	Dec. 02

Table 1(b): LEM – central Africa: progress report per site

		Patrol data started	Carcass data started	Monthly reports started	Annual reports started
Cameroon	Bomba Bek	July 02	July 02	July 02	Dec. 02
	Waza	July 02	July 02	July 02	Dec. 02
CAR	Dzangha-Sangha	July 02	July 02	July 02	Dec. 02
	Bangassou	Not Yet	Not Yet	Not yet	Not yet
Congo	Noubale-Ndoki	July 02	July 02	July 02	Dec. 02
	Odzala	June 02	Not yet	June 02	Dec. 02
Dem .Rep. of the Congo	Garamba	July 02	Not yet	July 02	Dec. 02
	Ituri/Okapi	July 02	Not yet	July 02	Dec. 02
	Kahuzi-Biega	July 02	July 02	July 02	Dec. 02
	Salonga	July 02	Not yet	Not yet	Not yet
	Virunga	July 02	Not yet	July 02	Dec. 02
Equat. Guinea	Mont Alen	May 02	May 02	May 02	Dec. 02
Gabon	Lope	July 02	July 02	July 02	Dec. 02
	Minkebe	July 02	July 02	July 02	Dec. 02
Tchad	Zakouma	June 02	June 02	June 02	Dec. 02

Table 1(c): LEM – southern Africa: progress report per site

		Patrol data started	Carcass data started	Monthly reports started	Annual reports started
Botswana	Chobe	Jul 00	Jul 00	Jul 00	Dec. 00
Mozambique	Caborra Bassa	Jan. 01	Apr 01	Oct. 02	Dec. 02
	Niassa	Sep 02	Sep 02	Jan. 03	Dec. 03
Namibia	Etosha	Feb. 00	Feb. 00	Feb. 00	Dec. 00
South Africa	Kruger	Jan. 01	Jan. 01	Jan. 01	Dec. 01
Zambia	S. Luangwa	Oct. 00	Oct. 00	Oct. 00	Dec. 00
Zimbabwe	Chewore	Jan. 00	Jan. 00	Jan. 00	Dec. 00
	Nyami Nyami	Jan. 00	Jan. 00	Jan. 00	Dec. 00

Table 1(d): LEM – East Africa: progress report per site

		Patrol data started	Carcass data started	Monthly reports started	Annual reports started

		Patrol data started	Carcass data started	Monthly reports started	Annual reports started
Eritrea	Gash-Setit	Jul 02	Jun 02	Jul 02	Dec. 02
Kenya	Elgon	Jul 02	Jul 02	Jul 02	Dec. 02
	Meru/Kora	Jul 02	May 02	Jul 02	Dec. 02
	Tsavo	May 02	Apr 02	Jul 02	Dec. 02
	Samburu/Laikipia	Jul 02	Jan. 02	Jul 02	Dec. 02
Rwanda	Akagera	Aug. 02	Aug. 02	Aug. 02	Dec. 02
United. Rep. of Tanzania	Katavi/Rukwa	Aug. 02	Aug. 02	Aug. 02	Dec. 02
	Ruaha/Rungwa	Jul 02	Jul 02	Jul 02	Dec. 02
	Selous/Mikumi	Jul 02	Jul 02	Jul 02	Dec. 02
	Tarangire/Manyara	Jul 02	May 02	Jul 02	Dec. 02
Uganda	Elgon	Jun 02	Jun 02	Jul 02	Dec. 02
	Murchison Falls	Jun 02	Jun 02	Jul 02	Dec. 02
	Queen Elizabeth	Jun 02	Jun 02	Jul 02	Dec. 02

3.4 Population surveys

The difference between forest and savannah ecosystems is significant for population surveys. Aerial counting methods have been used to estimate elephant populations for a considerable number of years. This technique is not suitable for forest situations. The approach to estimate forest populations has been based on ground surveys, using dung count methods. Historically such an approach has not matched the results delivered by aerial surveys in terms of precision.

However work undertaken under the MIKE pilot project in central Africa and by Conservation International in Ghana (1999-2001) has lead to improvements in the methodology so that the results are now in line with the confidence levels, variance and standard errors of aerial surveys. Accordingly, it has been possible to undertake or plan for a population estimate to be achieved for all current MIKE sites by the end of 2003. This will then set the systematic basis for such estimates to be repeated every two to three years, as recommended in the MIKE design. However it is worth stressing that whilst an aerial survey can be done in a matter of days or at most a week or two, forest surveys are likely to take at least four to five months.

This has institutional implications, which will need to be discussed with the range States that have forest sites over the next year, as one can not expect site staff to suddenly drop other duties and responsibilities to undertake a four-months' survey. Secondly there are financial implications. Such surveys require funding to a similar order as aerial surveys, which has largely been underestimated in the current MIKE budget. However thanks are due to the United States Fish and Wildlife Service, to WWF International and to WCS for providing the necessary funds to support the central Africa forest population programme over the next 18 months and also to Critical Ecosystem Partnership Fund for assisting in West Africa.

The current situation with population surveys is provided in Table 2 (a)-(d).

Table 2(a): population surveys – west Africa: progress report

		Survey available 2000-2002	Survey planned
Benin	Parc W	[2002]	Feb. 03

		Survey available 2000-2002	Survey planned
	Pendjari	[2000,2001*, 2002]	Feb. 03
Burkina Faso	Parc W	[2002]	Feb. 03
	Ranch de Nazinga	[2000]	Feb. 03
Côte d'Ivoire	Comoe		Feb. 03
	Marahoue		2002
	Tai		2002
Ghana	Kakum	2001/2	2004
	Mole	2002	2004
Guinea	Ziama		2003
Liberia	Sapo		2002/3
Mali	Gourma	2002	2004
Niger	Babah Rafi		(2004)
	Parc W	2002	Feb. 03
Nigeria	Sambissa		Feb. 04
	Yankarri	2001	Feb. 04
Senegal	Niokolo-Koba	[2001, 2002]	Not yet decided
Togo	Fosse aux Lions		Feb. 03
	Keran		Feb. 03
Notes: [] indicates quality of survey suspect : * only year published			

Table 2(b): population surveys – central Africa: progress report

		Survey available 2000-2002	Survey planned
Cameroon	Bomba Bek		2003
	Waza	2002	2004
CAR	Dzangha-Sangha		2003
	Bangassou		2003
Congo	Noubale-Ndoki		2003
	Odzala	2001	2004
Dem. Rep. of the Congo	Garamba	2002	2004
	Ituri/Okapi	2001	2004
	Kahuzi-Biega		?*
	Salonga		2003
	Virunga		2002
Equat. Guinea	Mont Alen		2003
Gabon	Lope	2001	2004

		Survey available 2000-2002	Survey planned
	Minkebe		2003
Tchad	Zakouma	2000 &2002[1]	2003
Notes: *Kahuzi-Biega difficult to plan owing to security issues [1] Concern expressed over quality of 2002 survey			

Table 2(c): population surveys – East Africa: progress report

		Survey available 2000-2002	Survey planned
Eritrea	Gash-Setit	2001	Not yet decided
Kenya	Elgon		2003
	Meru/Kora	2002	2005
	Tsavo*	2002	2005
	Samburu/Laikipia	2002	2005
Rwanda	Akagera	2002	2005
United Rep. of Tanzania	Katavi/Rukwa	2001	2003
	Ruaha/Rungwa	(1999)	2003
	Selous/Mikumi	(1998)	2002
	Tarangire/Manyara	2001	2003
Uganda	Elgon		2003
	Murchison Falls	2002	2005
	Queen Elizabeth	2002	2005
Notes: * Included Mkomazi (United Republic of Tanzania)			

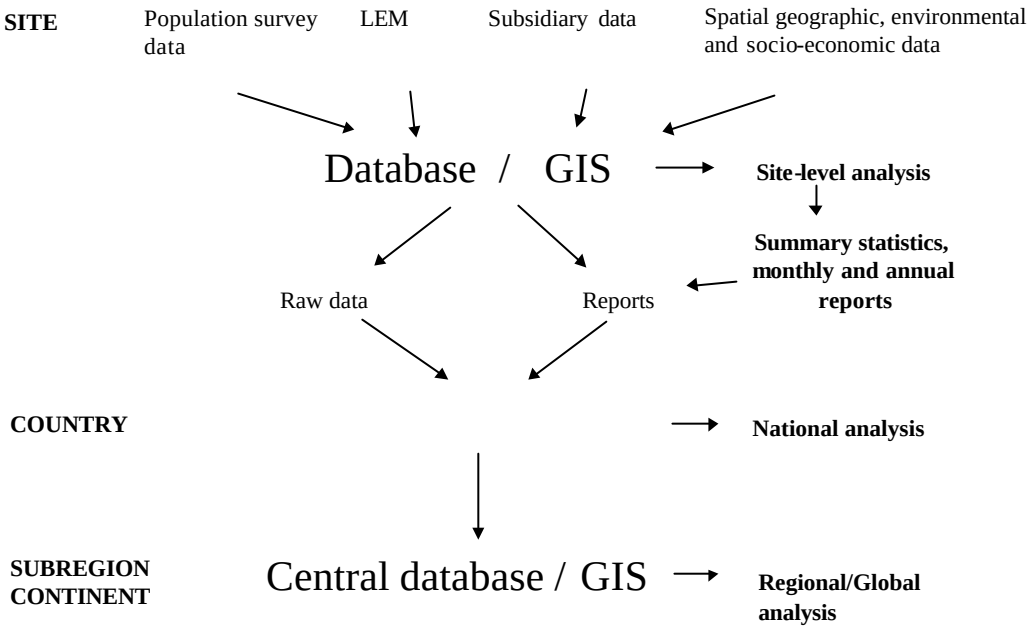
Table 2(d): population surveys – southern Africa: progress report

		Survey available 2000-2002	Survey planned
Botswana	Chobe	2001	2002[1]
Mozambique	Caborra Bassa[2]	2000	2003
	Niassa	2000	2002
Namibia	Etosha	2000	2002
South Africa	Kruger	2001	2002
Zambia	S. Luangwa	2000	2002
Zimbabwe	Chewore	2001	2003/4
	Nyami Nyami	2001	2003
Notes: [1] Included in wider Caprivi (Namibia), Zambia & Hwange (Zimbabwe) survey [2] Included in wider Lower Zambezi survey			

3.5 Data analysis

The data required per site, the data activities and the expected outputs are illustrated in Annex 3. This information is then placed in a computer-based data management system that will facilitate the analysis of the data provided from the outputs highlighted in Annex 3. Of particular importance will be the capability to commence the analysis at site level and then to develop the analysis further at national, sub-regional and continental levels, whilst maintaining a standardized approach as illustrated in figure 1.

Figure 1: Data management and data flow



It is very important to have a standardized data reporting system in place, since this will greatly affect what can and will be done with the analysis of the data. The data analysis inter-relationships that MIKE will be particularly addressing are:

– population trends;
– patterns of effort;
– patterns of illegal killing and; and
– patterns of influencing factors.

This approach will be facilitated by providing a data analysis programme using Microsoft Access in conjunction with ESRI Arcview 8.1 and appropriate statistical software such as S-PLUS and SAS.

The following principles have been followed in developing the database:

– The database has an identical structure (tables and relationships) at the site level and at higher levels;
– The database stores both law enforcement monitoring and elephant population survey data;
– The database has a user-friendly interface for data input mimicking field data forms;
– The database generates summary reports, summary statistics and specific analysis of LEM data at the site level. It provides information and analytical output that is useful to site managers. It informs them about illegal activities in different sectors in their area and trends in these activities over time. This

should enable them to support management decisions and make optimum allocation of effort to protect and manage elephants and other wildlife species. Site level analysis and direct feedback is important to keep staff motivated, to collect good data and maintain the quality of data management and reporting;

– Both raw data and summary reports move up from the site to higher levels. Feedback mechanisms ensure that results of analysis and data input performed at higher levels also flows back to sites; and

A proper data transfer and backup system will be developed.

Spatial data are important both for the analysis of law enforcement data and population survey data. Location of patrol routes as a measure of patrol effort and distribution of illegal activities are important in the analysis of law enforcement monitoring data. Elephant distribution and densities are usually related to spatial variables such as habitat, human access and human activities. These covariates are important in the analysis and spatial modelling of elephant survey data. Spatial modelling has the potential to improve precision of population estimates and can predict densities in areas between sampling locations. Maps are essential for the design and stratification of population surveys.

Spatial data will be managed in the ArcGIS 8.x Geographic Information System (GIS). ArcGIS allows the development of a geodatabase, which is a spatial implementation of a relational database. This facilitates the integration of the database currently developed in MS Access. Custom analytical tools should be programmed in ArcGIS. The organization of the collection and management of spatial variables relating to elephants also needs to be further developed. At the site level the MS Access database engine is used as the data server in a personal geodatabase. At the continental level, a more powerful data server may be necessary (e.g. SQL server, DB2) which will then act as a server for ArcGIS through the ArcSDE interface.

A Microsoft Access database is therefore being developed which facilitates data entry, management and retrieval and which will be linked to Arcview 8.1 to facilitate the analyses required. This will be available to the Site Officers in a computer system that is being provided at each site together with appropriate training. A similar arrangement will be available for the National Officers, Sub-regional Support Officers and the CCU. An illustration of the output and analysis that this system will provide is provided in Table 3 below:

Table 3: proposed data input and analytical reports for site, national and (sub-)regional levels for MIKE

LEVEL	DATA INPUT	ANALYSIS AND REPORTING	NOTES
SITE	Law enforcement monitoring data: law enforcement effort and results (indicators of illegal killing) - *patrol forms* - *carcass forms*	Monthly and annual reports with summary tables and statistics on patrol effort and indicators of illegal killing of elephants. Trends and spatial distribution of catch/effort indicators. Trends in causes of elephant mortality.	This type of catch/effort analysis is not as well developed as was first thought and assumes that the relative catch/effort indicators reflect trends in absolute abundance of illegal activities. A few years of data may shed more light on the exact nature of this relationship.
	Subsidiary variables on law enforcement capacity at the site - monthly and annual site information on law enforcement capacity (budget, staff, vehicles) *monthly and annual reports*		

LEVEL	DATA INPUT	ANALYSIS AND REPORTING	NOTES
	Aerial surveys of elephants and carcasses - aerial survey forms	Site estimates of elephant abundance and trend analysis in relation to factors influencing elephants abundance	A list of possible factors influencing elephant abundance and illegal killing at different levels is given in Table 4.
	Ground surveys of elephants - ground survey forms		
	Geographic, socio-economic and other ancillary data about the site	Site base maps	
NATIONAL	National law enforcement capacity (national budgets, staff, infrastructure, equipment...)	National patterns of illegal killing and of factors influencing illegal killing (including law enforcement effort).	National patterns of illegal killing will start to emerge with time. Where elephants occur in several places in a country, the chance to reveal real patterns at a national level improves when more sites are involved in the data collection. Patterns of illegal killing will be related to patterns of influencing factors (including site and national levels of law enforcement) and hypotheses about these relationships may be generated. The ability to reveal these trends and relationships increases significantly after several years of data.
	National background variables and other factors influencing elephants and illegal killing. This includes spatial geographic, environmental and socio-economic variables such as protection and law enforcement, human access and activities, habitat, water sources, etc.		
		Possibly national trends in elephant populations in relation to factors affecting elephants	National trends in elephant populations can be established through sampling the national population, or through modelling trends from representative sites within the country in relation to influencing factors. This will require the use of (spatial) models for which data on the appropriate (spatial) covariates will have to be collected. Analysing data from several sites together will improve confidence levels and the power to detect trends.

LEVEL	DATA INPUT	ANALYSIS AND REPORTING	NOTES
			Many background variables (e.g. GNI, GDP, Corruption Index, civil strife) are stored in the ETIS database and updated annually. We recommend that they be made available for MIKE analysis. See Table 4 for other factors.
	ETIS indicators of illegal ivory trade, sources and trafficking routes	Relationships between trends of illegal killing and ETIS variables.	Certain output variables of the ETIS analysis are among the factors that are likely to correlate with illegal killing. One such variable is the law enforcement – reporting ratio (the number of reported seizures of ivory in a country / the number of global seizures in which this country is implicated.
SUB-REGIONAL/ CONTINENTAL	Sub-regional and global factors influencing illegal killing (including CITES-related policies) ETIS information on ivory trade (ivory price, markets, global trafficking routes, etc.)	Sub-regional and continental patterns of illegal killing and of factors influencing illegal killing (including law enforcement effort and CITES-related policies).	Patterns of illegal killing at a sub-regional and continental level are likely to emerge with time. Standardized data collection at 55 sites (and maybe more in the future) across Africa greatly enhances the chance to detect these patterns. Patterns of illegal killing may be linked to patterns of influencing factors revealing differences between sites and countries.
		Sub-regional and continental trends in elephant abundance of the different sites combined in relation to factors affecting elephants, including illegal killing.	Analysing data from several sites together will improve confidence limits and the power to detect changes in the population. Sub-regional and continental trends in elephant abundance will be analysed in relation to patterns of illegal killing and to factors affecting elephants. This will require the development of (spatial) models for which appropriate covariate data should be collected.
		Comparison of trends in causes of illegal killing between countries.	

Table 4: Proposed list of factors having a possible influence on illegal killing and elephant abundance at the site and national/sub-regional levels.

Factors	Site	National and sub-regional
Ecosystem type/habitat	X	X
Elephant population levels		X
Elephant/human conflict levels	X	X
Adjacent land use	X	
Human access	X	X
Human population pressure	X	X
Availability of water	X	X
Land tenure systems	X	X
Development activities	X	X
Research activities	X	
Tourism activities	X	X
History of illegal killing	X	X
Proximity to international borders	X	
Cross-border incursions	X	X
Civil/military conflict	X	X
Law enforcement effort levels	X	X
Judicial severity		X
Corruption		X
Illegal drug/arms trafficking		X
Ivory trade patterns		X
CITES trade decisions	X	X

Since September 2002, the basic structure, tables and relationships of the site-level database have been developed in harmony with the data collection forms and planned analyses. Some modifications to the forms were made to achieve this harmonization. A first draft of the user menu and illustration of data entry forms has been developed. Data entry forms that mimic field forms have now been designed. The appropriate queries to generate the monthly and annual reports and the reports themselves are under development. Database outputs will include tabular summaries of protection effort and results of patrolling and an illustration of a "catch/effort" analysis that provides indicators of illegal activities both in space and time. This process will be facilitated as a more comprehensive data set becomes available.

The development of the database currently receives user-feedback from the Namibian MIKE team in its initial stages of development. It will be further evaluated by users from the other regions during the first year of its use, starting this year. This feedback will help improve the design and interaction with the user.

Ideas about the analytical framework will continue to be discussed, developed and tested, especially as more comprehensive data become available.

3.6 Funding situation

The current funding for Africa is provided under a project agreement between the CITES Secretariat and the European Commission. This agreement approved the expenditure of USD 3,014,030 over an 18-months' period, starting on 1 November 2001.

The allocation of this budget is reflected in figure 2 and the allocation of the range State component is reflected in figure 3.

Figure 2: MIKE EC budget allocation (2001-2003)

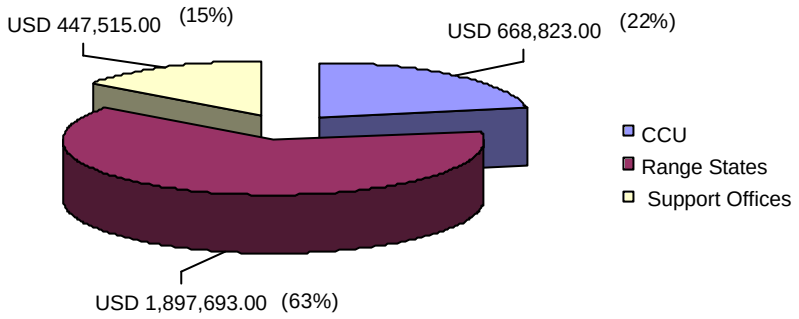
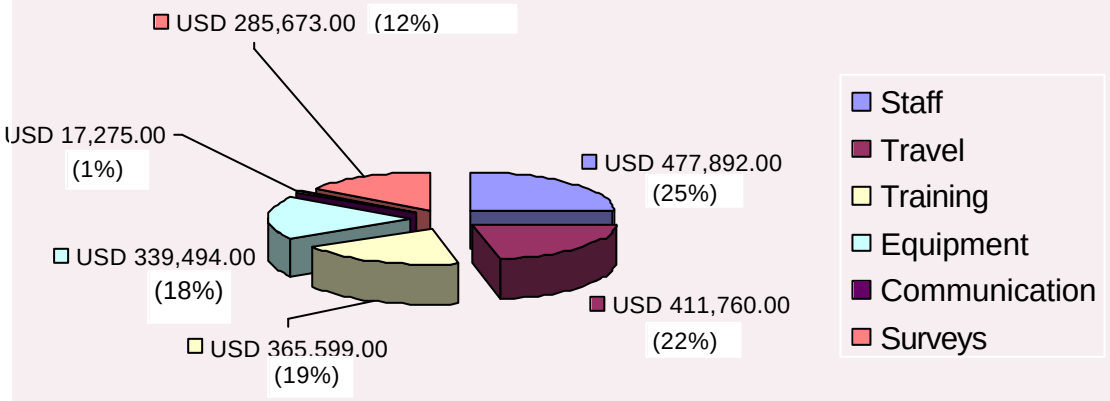


Figure 3: range States allocation breakdown



However a condition of this agreement is that the EC will only provide 66.85 per cent of the approved budget. There has been a need to obtain the remainder under a matching fund arrangement. This has been achieved thanks to contributions from the following donors:

– Government of Belgium
– Government of Japan
– Critical Ecosystem Partnership Fund
– US Fish and Wildlife Service (AfECF)
– The range States
– Environmental Systems Research Institute (ESRI)
– GTZ
– UNESCO (World Heritage)

In September 2002, the expenditures amounted to 45% of the allocation.

Funding beyond the 18-months' period is discussed under section 5.

4. Asia

In October 1999, a meeting was held in Bangkok, which was attended by five of the eight range States that comprise Southeast Asia. The purpose of the meeting was to discuss and get support for starting a MIKE pilot project in Southeast Asia. The agreement reached and support provided at the meeting became the basis for looking for funds to undertake the pilot project. Regrettably no such funds have been forthcoming.

When the MIKE Director was appointed in September 2001, it was agreed that it would be a priority to seek funds to start MIKE in Southeast Asia and to initiate discussions with the remaining sub-region, south Asia. However it was also agreed that the first priority had to be to get the African programme up and running in order to avoid the Director's attention being spread too thinly and thus risking failures on both fronts.

It was therefore not until April 2002 that fund-raising for Southeast Asia could be focussed on. However the United States Fish and Wildlife Service has now approved funds and the Critical Ecosystem Partnership Fund is actively considering the provision of funds to get MIKE started in this sub-region. The Wildlife Conservation Society have also agreed to help collaborate with implementing MIKE, especially with regard to assisting training, facilitating field work and developing practical monitoring techniques adapted to Southeast Asia needs. The next steps require full consultation with the eight range States in order to get their up-to-date understanding and support for implementing MIKE as a monitoring programme that has been mandated by the range States and is therefore owned by the range States. Included in those steps will be the process of creating a better understanding by and encouragement of NGO support for this range-State initiative.

During the latter part of 2002 and early 2003, the MIKE Director will undertake travel to the south Asia range States to discuss the possible approach to and implementation of MIKE in that sub-region. This will help guide efforts that will be required to obtain funding.

5. Longer-term funding

It is the aim of the MIKE programme to endeavour to provide 10 years of support, so that at the end of the support period, each range State will have had the opportunity to develop a sustainable monitoring programme supported by its own recurrent budget.

For Africa, the current 18-months' EC support is due to end in April 2003. However recent discussions with the European Commission indicate its willingness to support MIKE in the longer term. It is therefore currently determining which funding instrument would be the most appropriate for submitting a project proposal.

However it is highly unlikely that the new funding could be approved in time for a smooth transition in May 2003. It is therefore realistic to acknowledge that a bridging period of probably 12 months will be required,

if MIKE is to maintain continuity. It is projected that this bridging period will require a financial supplement of approximately USD 1 million.

For Asia, the longer-term funding will be sought during 2003.

Figure A: MIKE overall organization chart (for Africa)

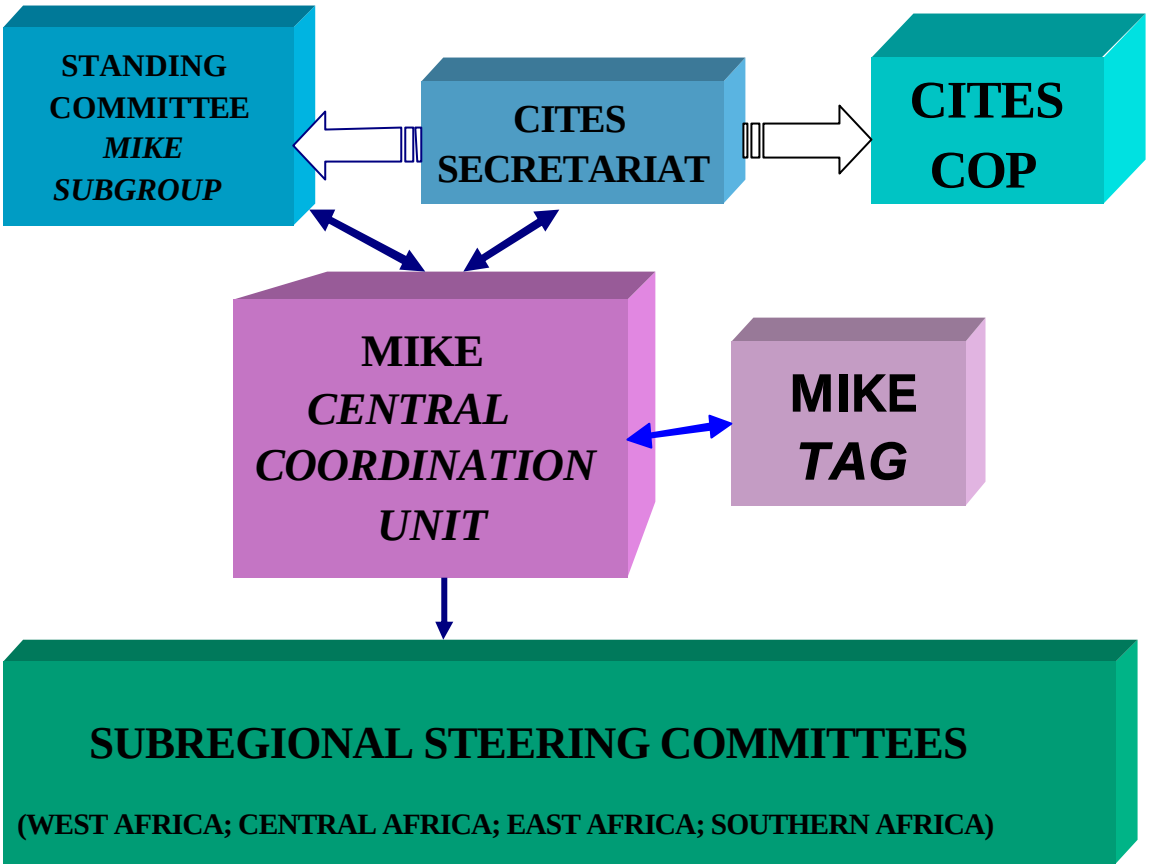
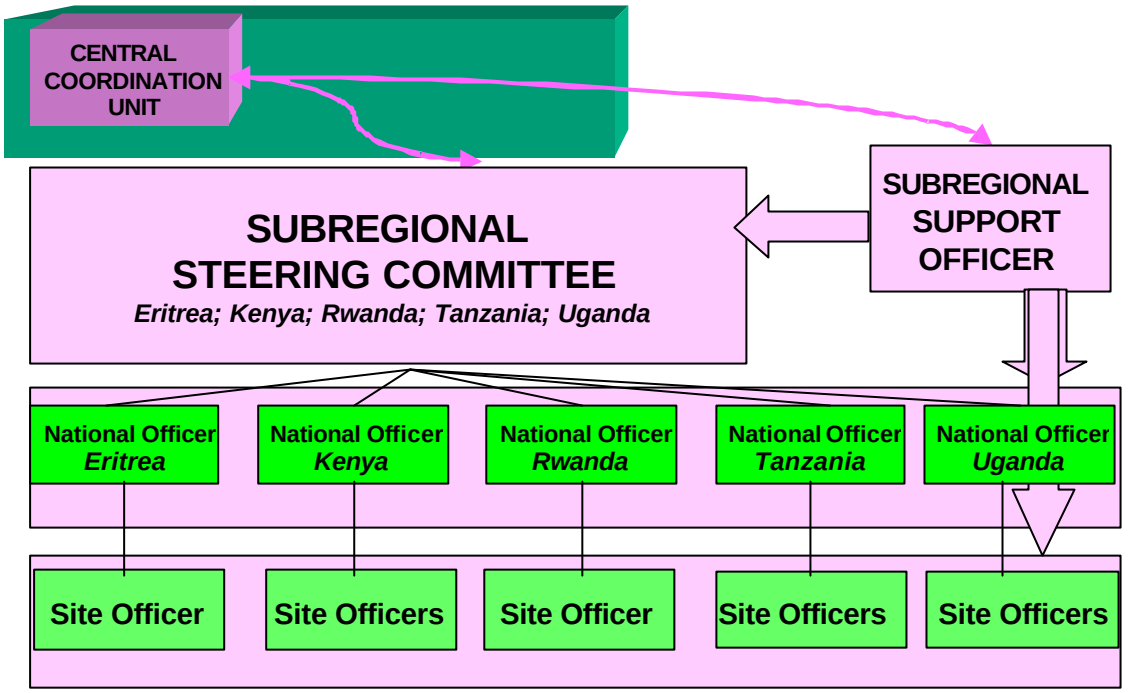


Figure B: MIKE sub-regional organization chart (exampe: East Africa)



MIKE sites in Africa

West Africa sub-region:	*Sites*:
Benin	**Pendjari (S/F), Park "W" (S)**
Burkina Faso	**Ranch de Nazinga (S/F), Park "W" (S)**
Côte d'Ivoire	**Tai (F), Marahoue (S/F), Comoe (S)**
Ghana	**Kakum (F), Mole (S)**
Guinea	**Ziama (F)**
Liberia	**Sapo (F)**
Mali	**Gourma (S)**
Niger	**Babah Rafi (S), Park "W" (S)**
Nigeria	**Sambissa (S), Yankarri (S)**
Senegal	**Niokolo-Koba (S)**
Togo	**Keran (S), Fosse aux Lions (S)**

Central Africa sub-region:	*Sites:*
Cameroon	**Bomba Bek (F), Waza (S),**
CAR	**Dzanga-Sangha (F), Bangassou (F)**
Congo	**Noubale-Ndoki (F), Odzala (S/F)**
Dem .Rep. of the Congo	**Ituri/Okapi (F), Salonga (F), Garamba (S/F), Kahuzi-Biega (F),**
	Virunga (S)
Equatorial Guinea	**Monte Alen (F)**
Gabon	**Lope (F), Minkebe (F)**
Tchad	**Zakouma (S)**

Southern Africa sub-region:	*Sites:*
Botswana	**Chobe (S)**
Mozambique	**Niassa (S), Cabora-Bassa (S)**
Namibia	**Etosha (S)**
South Africa	**Kruger (S)**
Zambia	**South Luangwa (S)**
Zimbabwe	**Chewore (S), Nyami Nyami (S)**

East Africa sub-region:	*Sites:*
Eritrea	**Gash-Setit (S)**
Kenya	**Tsavo/(Mkomazi) (S), Meru/Kora (S), Samburu/Laikipia (S)**
	Elgon (F)
Rwanda	**Akagera (S)**
Un. Rep. of Tanzania	**Selous/Mikumi (S), Ruaha/Rungwa (S), Katavi/Rukwa (S)**
	Tarangire/Manyara (S)
Uganda	**Queen Elizabeth (S), Elgon (F), Murchison Falls (S)**

S = Savannah

F = Forest

Data requirements