

# **WORKSHOP ON ENVIRONMENT STATISTICS**

YAOUNDE, CAMEROON  
5-9 DECEMBER 2011

**Final Report**

**United Nations Statistics Division**

## **Background and objectives of the workshop**

1. The United Nations Statistics Division (UNSD), in collaboration with the United Nations Economic Commission for Africa, organized a Workshop on Environment Statistics that was held in Yaoundé, Cameroon from 5 to 9 December 2011. The objectives of the Workshop were to:

- a. adopt a list of environmental statistics and indicators for the Central African region for national and regional reporting based on the African regional list of environmental statistics and indicators which were discussed and agreed upon at several other UN organized workshops on Environment Statistics for African countries;
- b. review methodologies for ECOWAS regional core set of environmental indicators, with a view to assessing their usefulness for this region;
- c. develop a way forward for a draft regional programme on environment statistics;
- d. train participants from national statistical offices and environmental ministries/agencies on basic concepts, methods and best practices in environment statistics;
- e. provide a forum for exchange of information on the status of national environment statistics; and
- f. enhance the capacity of statisticians in a selection of developing countries to develop and improve their capabilities in environment statistics.

2. The Workshop was attended by participants from NSOs and Ministries of Environment of the Central African region (Cameroon, Chad, Congo, Equatorial Guinea, Gabon and São Tomé and Príncipe). The National Institute of Statistics of Cameroon and the Ministry of Environment and Nature Protection were well represented at the workshop. Also in attendance were the following regional/international organizations: the Central African Forests Commission (COMIFAC), the Food and Agriculture Organization of the United Nations (FAO), the Sub-regional Institute on Statistics and Applied Economics (ISSEA), the International Union for the Conservation of Nature and Natural Resources (IUCN), and the United Nations Environment Programme (UNEP).

3. The list of participants is attached as Annex 1.

## **Opening session**

4. In her welcome address, Ms. Reena Shah of UNSD thanked the Economic Commission for Africa (Addis Ababa and Yaoundé offices), the Institute for Statistics and Applied Economics (ISSEA) and the National Statistical Institute of Cameroon for their overall support and cooperation in assisting UNSD with the organization and hosting of this Workshop. She noted that sound policy and decision making as well as the monitoring of progress are impossible without accessible, timely and reliable information on the environment.

5. She highlighted the fact that although environment statistics is still considered to be a relatively new field of statistics compared to national accounts, trade statistics, etc, efforts should still be made to collect data on the environment even though the concepts, methods and classifications are not fully established. She also encouraged countries to establish robust and coherent national strategies for their data needs on environment statistics and noted that these

strategies should be based on the countries' environmental concerns and the requirements of international and regional commitments.

6. In addition to national strategies, she also encouraged the development of regional strategies. She provided the example of the significant amount of work in environment statistics that has taken place in the ECOWAS region, stimulated by the UNSD capacity building project with the ECOWAS Commission. This project has since been sustained by the ECOWAS Commission and further promoted by the adoption of a regional Framework for Strengthening Capacity in the Development and Institutionalization of Environment Statistics in the ECOWAS Region. A key output of this activity is the agreed set of environmental indicators and accompanying methodology sheets.

7. Ms. Shah also highlighted the fact that this current Workshop in Yaoundé would provide the opportunity to assess whether the ECOWAS set of environmental indicators and methodology sheets were applicable to this group of Central African countries, as the eventual objective was to adopt and implement an African set of environmental indicators. Finally, Ms. Shah concluded by saying that she believed that the strengthening of environment statistics will make a significant impact on preparations for the Rio+20 Conference that will take place in Brazil in June 2012, as well as for regional and national policy planning and decision making in the environmental and sustainable development fields.

8. In his opening statement, Mr. Emile Ahohe, Director of the Economic Commission for Africa/Sub-regional Office for Cameroon (ECA/SRO-CA) expressed his appreciation to UNSD for organizing this Workshop and for their contribution to improving statistical capacity in Africa, particularly in the area of environment statistics. He noted that a groundbreaking consensus was achieved at the United Nations Conference on Environment and Development (Rio de Janeiro, 1992) where countries agreed then, that strategies of sustainable development should integrate environmental issues, supported by environmental and socioeconomic data, into development plans and policies. He noted that the world was now getting prepared for the United Nations Conference on Sustainable Development (Rio+20) which will take place in 2012 in Rio de Janeiro. He indicated that in the Central African region, most of the Member States are faced with increasing environmental challenges including the loss of biodiversity, the impacts of natural disasters, waste management and the impacts of climate change. He noted that the overall objective of this Workshop was, therefore, aimed at improving the quality of environment statistics in Africa through the training of participants on basic concepts, methods and best practices in environment statistics.

9. Mr. Ahohe pointed out that the Workshop would also discuss a set of environmental indicators and methodology sheets that have been adopted by the ECOWAS region and expressed his hope that the Central African countries would be able to benefit from this experience. He drew particular attention to the session dedicated to the development of a regional programme on environment statistics during which the Member States would draw up a work plan for the implementation of environment statistics in the region. Finally, Mr. Ahohe concluded by noting the presence of participants from both the National Statistical Offices and the Ministries of Environment and indicated that this partnership should be sustainable and enhance collaboration and coordination of stakeholders in national statistical systems.

10. In his welcome address, Mr. Joseph Tedou, Director-General of the National Institute of Statistics of Cameroon, welcomed the participants on behalf of the Government of Cameroon

and expressed his appreciation for this first training workshop of its kind to be organized in the sub-region of Central Africa. He indicated that the presence of the participants at the Workshop was proof of the importance that their countries, international organizations, as well as regional and sub-regional organizations, attach to achieving the Millennium Development Goal 7 of ensuring environmental sustainability. He noted that it thus reflects the common desire to address the many problems facing their countries in the region, namely drought, desertification, deforestation, bush fires, degradation of the rainforest, the destruction of marine and coastal ecosystems, increased multifaceted pollution in urban areas and around industrial facilities, and the impacts of climate change.

11. Mr. Tedou indicated that environment statistics, as a tool to support decision making, is an important lever for monitoring sustainable development. Since the Conference in Rio de Janeiro in 1992, environmental issues have become more important both in industrialized and developing countries. He stressed that on the one hand it was urgent to strengthen the capacity of national statistical systems in the production of data and statistical indicators related to the environment and climate change, for informing the political and strategic choices to be made, and on the other it was important to evaluate and measure progress towards achieving MDG 7. Finally, Mr. Tedou emphasized the fact that it was the participants' responsibility to take advantage of the experience of the resource persons to help in better understanding the various sources of data and that they should take ownership of the data mining and data collection methods, as well as understand the methods of calculation and interpretation.

#### **Election of the bureau and adoption of the agenda**

12. The meeting elected the following bureau:

Chair: Ms. Marie Antoinette Teulawo Fomo (Cameroon)

Rapporteurs: Mr. Eugene Tati Poaty (CONGO) and Mr. Antoine Moutsouka Mamona (CONGO), with Mr. Estime Mensah-Magni deputizing in their absence.

13. The following agenda items were adopted:

- a. The need for environmental statistics and indicators
- b. Environment statistics and indicators: concepts and methods, and data sources
- c. Statistics on Freshwater, Coastal and marine resources, Environmental health, and Natural disasters
- d. Statistics on Land use and agriculture, Forests and biodiversity
- e. Statistics on Air, Energy and Waste
- f. Institutional aspects of environment statistics
- g. Towards a regional programme of environment statistics
- h. Closing session: adoption of conclusions and recommendations.

14. The discussions were organised in both plenary and working group sessions. The work schedule is attached as Annex 2.

## OUTCOME OF DELIBERATIONS

### Session 1: The need for environment statistics and indicators

15. In this session, three presentations were made [on National needs (National Institute of Statistics of Cameroon); International needs (UNSD); and Environment statistics and indicators for keeping Africa's environment under review (UNEP)].

#### National needs

16. A presentation was made on the beginnings of environment statistics by Ms. Marie Antoinette Teulawo Fomo, Unit Head of Cartography and Environmental Statistics of the National Institute of Statistics. She noted that Cameroon has been quick to perceive the challenges posed by environmental problems, to its development and to the future of the entire planet and has demonstrated genuine readiness to find appropriate solutions to these problems. Accordingly, it has signed and ratified almost all international conventions on environmental protection and adapted its institutional framework to meet these aims. To this end, a ministry in charge of the Environment and Forestry was set up in 1992 and subsequently split in 2004 into two ministries namely, the Ministry of the Environment and Nature Protection and the Ministry of Forestry and Wildlife. Aware of the insufficiency of reliable environmental data/information as the major limiting factor to the making of decisions that ensure rational management of the environment and protection of natural resources and, anxious to assess the various programs and strategies implemented by these ministries as well as achieve the Millennium Development Goals, the Government of Cameroon decided in 2009 to create, within the National Institute of Statistics, a Mapping and Environment Statistics Unit.

17. Since the creation of the Mapping and Environment Statistics Unit, several activities are under implementation and should permit the development of indicators for the monitoring and evaluation of environmental issues. Such activities include:

- The collection of data on water and waste in the ten regions of the country;
- The study on surface and ground water pollution in Yaoundé and the attendant impact of such pollution on the health of the surrounding population;
- The development of a data collection mechanism in order to establish an environmental and climate change database.

18. Implementation of these activities requires human resources (involvement of all stakeholders) and financial resources (partners and other stakeholders). The need for funding to finance the above-mentioned surveys and studies that should provide the data to populate the environment database still exists and is still unmet.

#### International needs

19. The presentation on international needs was made by Ms. Karen Cassamajor who started by outlining the different levels of requirements for environmental statistics - global, international, regional and national/sub-national. She highlighted some advantages of identifying the international requirements such as: helping to identify those topics, themes, indicators and statistics that are relevant to the field; helping countries to see where their data gaps are and presenting key tools in this area of statistics – the standards, concepts, definitions and classifications. She noted the applicability of the international requirements in promoting the functions of assessment, monitoring and planning that are critical to environment statistics.

These include follow up on global conferences, reporting to international conventions, supporting thematic and topical international data collections and contributing to comprehensive international environmental data collections. Most importantly, they can serve as a model for country collections for environment statistics.

20. Ms. Cassamajor laid out the four collections that have been undertaken by the UNSD environment statistics programme in recent times. She described the questionnaires that are disseminated, the tables that are generated from the data that are received and their compatibility with other conceptual areas such as the SEEA water accounts and the means of dissemination of those data. The dissemination modalities described in her presentation were - the UNSD Environmental Indicators webpage, the Country files (accessible to participating countries by password), the Country Snapshots and the presentations on Environment Statistics that form part of UNdata. Finally, Ms. Cassamajor addressed the question of the responsibilities of the collecting organizations as well as the reciprocal responsibilities of responding countries.

### **Environment statistics and indicators for keeping Africa's environment under review**

21. This presentation by the UNEP representative, Chris Ambala, focused on the link between collecting and using credible data and using science to generate policy relevant information for decision making in Africa. This is in line with UNEP's mandate to keep under review the state of the global environment. The presentation provided some background to the focus areas of UNEP's Medium Term Strategy 2010-2013. The presentation also highlighted the challenges in data collection and issues surrounding the quality of data collected by national and regional institutions. Mr. Ambala also emphasized the collaboration with UNSD, UNECA and other agencies to develop a core set of set of environmental indicators for environmental assessment, monitoring and reporting. Mr. Ambala gave examples of how UNEP and its partners at national, sub-regional and regional levels have applied these environmental indicators to generate policy relevant information. Such products include the Africa Atlas of Our Changing Environment, Africa Water Atlas and at the national levels, Kenya Atlas of Our Changing Environment, Uganda Atlas of Our Changing Environment and most recently the Kenya State of the Environment and Outlook report, 2010.

22. The presentation further provided an update on the preparation of the 3rd Africa Environment Outlook (AEO-3) and the 5th Global Environment Outlook (GEO-5) emphasizing that the focus of the AEO-3 is on the inter-linkages between Health and Environment, how these are likely to affect achievement of the MDGs and other agreed environment related goals and targets. Additionally it will assess challenges and opportunities of key cross-cutting issues, particularly as they relate to the contribution of the environment to sustainable development goals and targets. The GEO-5 will focus on analysis of case studies of policy options. This analysis will incorporate environmental, economic, social and scientific data and information and their indicative costs as well as the benefits to identify promising policy options aimed at speeding up achievement of the internationally agreed goals such as those agreed at the Millennium Summit in 2000 and in Multilateral Environmental Agreements.

### **Discussion**

23. During the discussion, the participants emphasized the need to involve ECCAS and COMIFAC in the activities being undertaken in the region, as these organizations are significant stakeholders in this domain in the Central African sub-region. Concerns were also

raised with regard to the assessment of the quality of the data collected by UNSD/UNEP, and specifically whether countries have the financial and other resources necessary to ensure that data being submitted are of adequate quality. Additionally there is need for harmonization of data requests, as the response burden is significant for countries, given that the volume of requests is considerable. Furthermore, data may be dispersed over a number of agencies, requiring some coordination at national level. UNEP and UNSD acknowledged the longstanding nature of some of these concerns and the concomitant need for resources to ensure follow-up and monitoring and facilitate production of data of the required quality.

## **Session 2: Environment statistics and indicators: concepts and methods, and data sources**

24. In this session, four presentations were made [on Basic concepts of environment statistics (UNSD); Revised Framework for the Development of Environment Statistics and the core set of environment statistics (UNSD); The use of Geographic Information Systems (GIS) and remote sensing for environment statistics (ECA); and International data sources for environment statistics (UNSD)].

### **Basic concepts of environment statistics**

25. Ms. Reena Shah of UNSD delivered a presentation which provided an introduction to the basic concepts of environment statistics. The presentation included describing the following aspects: the definition, scope and objective of environment statistics; the domain of environment statistics, including the characteristics, and temporal and spatial considerations of environment statistics; the types of environment statistics, including basic environment statistics, environmental indicators and environmental accounts; the need, users and products of environment statistics; the main sources of environment statistics, including traditional and non-traditional sources; the relation of environment statistics to economic and social statistics; the institutional dimension of environment statistics, including the important stakeholders, the main challenges faced as well as the key elements; and a brief history of the developments of environment statistics, starting from 1972 to the present time.

### **The Revised Framework for the Development of Environment Statistics and the Core Set of Environment Statistics**

26. Ms. Reena Shah of UNSD delivered a presentation on the revision of the UN Framework for the Development of Environment Statistics (FDES) and the development of the core set of environment statistics. The presenter explained the concepts and the structure of the FDES published in 1984. She recounted that the FDES sets out the scope of environment statistics by relating the components of the environment to information categories that are based on the recognition that environmental problems are the result of human activities and natural events reflecting a sequence of action, impact, and reaction. She clarified that the contents of the FDES are "statistical topics"; they are those aspects of environmental concerns that can be subjected to statistical description and analysis. She noted that the FDES has been used by many national statistical offices for developing and organizing environmental and related socio-economic information. She presented the main conclusions of the Expert Group Meetings on the revision of the FDES and described the current efforts being undertaken towards the revision and the development of the core set of environment statistics. Ms. Shah also noted that both the revised UN FDES and the core set will be submitted to the 43rd session of the UN Statistical Commission in 2012 for adoption.

### **The use of GIS and remote sensing for environment statistics**

27. This presentation, made by Mr. Chukwudozie Ezigbalike of the United Nations Economic Commission for Africa in Addis Ababa pointed out the UNSD definition of environment statistics as statistics that describe the state and trends of the environment, covering the media of the natural environment (air/climate, water, and land/soil), the biota within the media, and human settlements. The presentation noted that environment statistics bring together data on human activities, natural events, impacts of the activities and events on the environment, social responses to the impacts, and quality and availability of natural resources. He observed that this interdisciplinary nature makes it difficult to adopt a systems modelling approach based on entities and bookkeeping, such as in the case of the System of National Accounts. Mr. Ezigbalike clarified for the Workshop that instead, a framework is used to relate components of the environment to information categories.

28. Mr. Ezigbalike explained that despite the organization of the information into categories, for presentation purposes, it is necessary to integrate them with a common feature. The feature that all the categories have in common is their location. Therefore the appropriate tool for presenting integrated information categories of environment statistics is through the use of GIS. This also provides for spatial interpolation of values from sample points, such as rain gauge stations.

29. He provided further information that another method of collecting data about surface characteristics from every point is remote sensing. Remote sensing is based on the principle that different features and surfaces reflect and emit electromagnetic radiation in different frequencies that define their signatures, enabling sensors to generate false colour images for features and surfaces.

30. In conclusion, he summarized that remote sensing allows the collection of detailed data about bio-physical characteristics that cannot be collected by questionnaires; and GIS provides for the interpolation of other data from spatial sample points, as well as tools for integrating all the data, including data from “standard” statistical processes and presenting them visually showing the locations where various features or combinations exist.

### **International data sources for national environment statistics**

31. Ms. Reena Shah of UNSD made a presentation on data that she had compiled for Cameroon, as an example, for several environmental statistics and indicators from various international organizations, international non-governmental organizations, external governmental organizations and academia to illustrate the multiplicity and variety of data sources residing outside the country. She selected particular statistics and indicators among the various environmental themes and described the process of obtaining the data through the internet, which participants found to be very useful as they were not familiar with several of the data sources. She also presented a compilation of the data for the MDG Goal 7 indicators for the seven countries invited to the Workshop.

### **Discussion**

32. Concerns raised in this session included the expressed need for countries to convene forums at national level to discuss environmental statistics and indicator requirements. These forums should serve to develop a network of stakeholders who would be able to make decisions about the data to be collected. The network would promote environment statistics



and help to determine how these data are to be aligned with more general development data to support the national development and planning processes of the concerned countries. In this regard, forest management and water management data were identified as special engines for fostering economic growth that should be developed within the environmental statistics and indicators programmes for the Central African region. It was recommended that regional institutions such as ECCAS and CEMAC (which were not present at the Workshop) should be integrally involved in this work.

33. It was also recognized that sometimes countries lack complete information on what data are available for their country and where key data collections needed to compile environment statistics reside.

### **Session 3: Statistics on Freshwater, coastal and marine resources, Environmental health, and Natural disasters**

34. In this session, five presentations were made [on Indicators of coastal and marine resources (UNSD); Statistics on aquatic biological resources (FAO); Natural disasters statistics and indicators (UNSD); Freshwater statistics and indicators; UNSD/UNEP Questionnaire 'Water' tables (UNSD); and Environmental health indicators].

#### **Indicators of coastal and marine resources**

35. This presentation made by Mr. Belmont Djomo of IUCN provided an overview of marine and coastal resources and some indicators that can be used for their monitoring and evaluation. It began by highlighting the characteristics of marine and coastal areas, their importance and the threats they face. Based on the proposition that environmental statistics and indicators are needed to sustainably manage coastal and marine resources, it emphasized the importance of developing reliable indicators for monitoring the resources of these areas.

#### **Statistics on aquatic biological resources**

36. Ms. Tsuji of FAO presented procedures utilized in management of the fishery and aquaculture sector. Behaviour of natural fishery resources was described with a balance between growth in biomass, recruitment, natural reduction and extraction by fishing activities. The presenter pointed out that when resource increase (by growth and recruitment) is matched with resource reduction (through natural reduction and catch reduction), the stock is considered to be in sustainable condition and the corresponding catch is referred to as "sustainable yield". She continued that since rates of growth, recruitment, and natural reduction are considered to decline according to stock density, sustainable yield has a dome-shaped relationship with stock, zero at zero stock point and maximum equilibrium points, and maximum yield at about middle. She revealed that conventional stock management measures are intended to maintain stock at the level corresponding to maximum sustainable yield. This has encountered challenges and difficulties specifically because of high level of recruitment variability and uncertainties in measuring absolute stock size.

37. Ms. Tsuji also pointed out that the recent management of the fishery and aquaculture sector has been shifting toward the ecosystem management approach with use of an adaptive management measures that intend to maintain social, economic and environmental conditions relevant to fishery and aquaculture sector in addition to behaviour of exploited resources. Adaptive management requires a set of indicators to monitor behaviours of targets (e.g. economic benefits, environmental health, stock conditions etc), management actions (e.g. number of days of fishing operations, fishing boats, etc) and response of target to management

actions, which would be quite extensive and play a key role in the overall management scheme. Management goals and corresponding monitoring indicators should be selected with participation of all stakeholders. The ecosystem approach is designed to be flexible and powerful and can even respond to events that cannot be controlled directly and/or which have not been assessed, such as climate change impacts.

38. At the end of the presentation, the presenter listed recent developments and provided information that could be relevant to environmental monitoring. She noted that the Coordinating Working Party of Fishery Statistics (CWP), the global coordinating mechanism for reviewing and setting standards, concepts, classifications and methodologies for fishery and aquaculture statistics, is currently revising its Handbook, with special emphasis on enhancing components on aquaculture data collection, socio-economic statistics, and monitoring of ecosystems. FAO has worked in collaboration with UNSD to ensure that the concepts in the fish resource chapter of the SEEA are consistent with those in UNCLOS and Code of Conduct of Responsible Fisheries (CCRF). FAO has disseminated an overview of the statutes of global marine resources every 2 years, as a chapter of SOFIA and every 5 years in more detail, as a Technical Circular. Other information available through the FAO web-site includes capture and aquaculture production by species, by countries; trade and food balance sheets of fish and fishery products; the status of marine resources assessed by Regional Fishery Bodies; the CWP Handbook including classifications, fact sheets of aquatic species, fishing gears, and vessels, country profiles of capture, aquaculture and legislation, and market information of selected species.

#### **Natural disasters statistics and indicators**

39. Ms. Reena Shah delivered a presentation on natural disasters statistics and indicators where she described the main concepts, classifications, types, definitions and variables of natural disaster statistics, focusing primarily on those used by the Centre for Research on the Epidemiology of Disasters (CRED). She noted that although CRED is the main international data source, it includes data from several United Nations agencies, United States government agencies, insurance companies and the press. Ms. Shah described the criteria for inclusion of a disaster in CRED's EM-DAT database. Finally, she explained the two indicators related to natural disasters contained in the Commission of Sustainable Development (CSD) list of Indicators, and noted that the same two indicators were also included in the Agreed Set of ECOWAS Regional Indicators as core indicators.

#### **Freshwater statistics and indicators**

40. This presentation, made by Ms. Karen Cassamajor, described the UNSD/UNEP questionnaire on Freshwater statistics and indicators. It started off by setting out the different parts of the questionnaire and pointing out the kinds of Guidance and Definitions which were provided for the use of the respondent. The presentation mentioned each of the seven tables that are included in the questionnaire. These are:

1. Renewable Freshwater Resources – Table 1
2. Freshwater Abstraction – Table 2
3. Freshwater Available for Use – Table 3
4. Total Water Use – Table 4
5. Water Supply Industry (ISIC 36) – Table 5
6. Wastewater Treatment Facilities – Table 6
7. Population Connected to Wastewater Treatment – Table 7

41. In presenting each table, the different line items were identified and the linkages between them as well as between the tables were identified and some elementary validation functions were pointed out. A caution was issued about ensuring that the units of measurement were appropriate and consistent with the guidelines.

42. The presentation concluded by providing a brief general description and explanation of the purpose for each of the Freshwater indicators, under consideration in the Agreed Set of ECOWAS Regional Indicators, along with the major concepts and definitions of each of those indicators.

### **Environmental health indicators**

43. Ms. Reena Shah of UNSD made a presentation on environmental health indicators. Reference was made to the World Health Organisation's (WHO's) definition of environmental health and the application of the Driving force-Pressure-State-Impact-Response (DPSIR) framework to environmental health. The presentation focused on the relationship between environmental health and access to safe water and sanitation, and environmentally-related diseases which are categorised into: water-related diseases, diseases related to air quality, diseases relating to climate, and epidemic diseases. Finally, the five core environmental health indicators included in the Agreed Set of ECOWAS Regional Indicators were describe, the first three of which are also CSD and MDG Goal 7 indicators.

### **Discussion**

44. During the discussion on Session 3 a suggestion was made to create a road map for the development of environmental statistics and indicators that could be presented to the relevant council of ministers. Other speakers suggested that it would be more appropriate to first finalize the ECOWAS methodology sheets that were under consideration, and test them for applicability. This exercise would then be able to inform a regional strategy. Regional institutions such as CEMAC and COMIFAC could then adopt them at a higher level.

45. It was observed that the procedures for data collection were not as clear as they could be. Greater elaboration of the collection methodologies would therefore be useful to data collectors. In this regard, a specific issue was raised about data on evapotranspiration. The definition was unclear and different institutions had to be approached in an attempt to collect the appropriate data. Also, data collectors reported that they have encountered resistance from respondents (especially in the case of quantity of water discharged), as the respondents are suspicious that the data collection activities are really intended to be used for extracting taxes/more taxes from them. There is a problem of trust when collecting some of these data, and as a result the data which are submitted to UNSD are sometimes submitted with reservations. It was agreed that it was important to document any such reservations.

## **Session 4: Statistics on Land use and agriculture, Forests and Biodiversity**

46. In this session, four presentations were made [on Agri-Environmental statistics and indicators within FAOSTAT (UNSD on behalf of FAO); Environmental issues on desertification in Cameroon, based on the report of the UNCCD (Ministry of Environment and Nature Protection, Cameroon); Indicators on Biodiversity (IUCN); and Indicators and statistics on the Congo Basin Forest (COMIFAC)].

### **Agri-Environmental statistics and indicators within FAOSTAT**

47. Ms. Reena Shah of UNSD delivered a presentation on behalf of the FAO Statistics Division on agri-environmental statistics and indicators in the FAOSTAT database. The focus of the presentation was on agri-environmental data, indicators and policies, fertilizer and pesticide data and environmental issues, and land use data. With regard to agri-environmental data, the main points were that these data confronted problems of scale, that there were a variety of data collection methods and that there were many different data types. A definition and the policy relevance of agri-environmental indicators, as well as a description of international activities in this area over the past 10 years, were presented. Concerning fertilizers, pesticides and land use, a description of the main issues related to fertilizer use, pesticide use and land use, the related data contained in FAOSTAT, as well as selected key indicators through charts and graphs, were presented.

#### **Environmental issues on desertification in Cameroon, based on the report to the UNCCD**

48. A presentation was made by Mr. Youssaou of Cameroon on the environmental issues regarding desertification in Cameroon. Mr. Youssaou opined that Cameroon is an "Africa in miniature" because of its geographical and cultural variety. Despite its rich potential, the phenomenon of desertification and land degradation tends to be generalized, affecting all ecosystems, even wetter ones. He noted that there are five major agro-ecological zones: the Sudano-Sahelian zone of the High Guinean savannah, the highland area in the West and North West and the coastal forest zone. The Sudano-Sahelian region, the highlands and savannas are the altitudes and areas most affected by desertification in Cameroon.

49. He observed that in practice, land degradation in general and desertification in the driest areas had a direct impact on food security and more generally on the livelihoods of rural populations. To address the various impacts, the government has implemented policies and operational strategies. At the concrete operational level, there was the revival of "Operation Green Sahel" in 2008 in the region of the Far North and the North; the project of Urban Watershed Benue has taken effect since 2010 and the National Coordination Committee (NCC) has been created in lieu of the National Coordinating Body (NCB), under the authority of the Ministry of Environment and Nature Protection (MINEP). Despite all the efforts to establish normative and institutional frameworks for fighting against desertification, in practice one is often confronted by the inadequacies of such texts.

#### **Indicators on biodiversity**

50. This presentation made by Mr. Belmond Djomo of IUCN provided an overview of what biological diversity is and described some indicators that can be used for its monitoring and evaluation. It began by defining biodiversity, its usefulness and the threats it faces. Based on an argument that demonstrated the need for sustainable management of biodiversity, it emphasized the importance of developing reliable indicators for monitoring and evaluation of this important concept.

#### **Indicators and statistics on the Congo Basin Forest**

51. Mr. Jérôme Guefack of the Central African Forests Commission (COMIFAC) delivered a presentation on indicators and statistics on the Congo Basin Forest. He described the mandate of COMIFAC, which is to provide political and technical guidance and to coordinate, harmonize and carry out decision-making with regard to the conservation and sustainable management of forest ecosystems in Central Africa. He explained COMIFAC's Convergence Plan which serves as a common platform of priority actions to be carried out at sub-regional and national levels to achieve the convergent objectives of conservation and sustainable management of forest ecosystems. He noted that it was during the Second Summit of Heads of

State in February 2005 in Brazzaville that this sub-regional Convergence Plan was adopted by the Heads of State. It is based on ten strategic divisions which in turn are divided into sub-components.

52. Mr. Guefack described the role of the Observatory of Central African Forests (OFAC), an initiative of several members of the Congo Basin Forest Partnership (PFBC), which aims to pool the knowledge and data available for forest monitoring in the economic, ecological and social dimensions. He also informed the Workshop that a publication on the State of Central African Forests has been produced every two years since 2006. In conclusion, Mr. Guefack provided a list of regional indicators of forest management under the responsibility of OFAC and mentioned that the data were being collected for several national indicators.

### **Discussions**

53. One participant was interested in knowing the exact area of the territory covered under the initiative to combat desertification in Cameroon, “Operation Green Sahel” and whether this initiative addressed the problem of degraded pasture lands.

54. Participants wanted to know whether IUCN had data more recent than the 2003 figures of FAO origin which were disseminated and whether an endangered list species had been compiled for the Central African region. The IUCN representative explained that the list of species is a global list and that IUCN works with partners and experts in the field to populate the list. He pointed out that the list, along with other data generated by IUCN can be accessed at [www.iucn.org](http://www.iucn.org). Participants suggested that every two years, when IUCN issues the lists, they should specify whether there are any new proposals and identify which species are new additions to the list.

55. With respect to the presentation by COMIFAC, a question was asked about where Chad is located among the different ecosystems. It was explained that COMIFAC adopts an ecosystem approach and that it is all of the twelve countries together that decide how the Congo Basin is to be managed. In fact they have identified 72 ecological landscapes and Chad has not been excluded from these. Data for the Congo Basin are however collected at national level.

### **Session 5: Statistics on Air, Energy and Waste**

#### **Climate change: Environmental and policy issues; International/regional data sources for the indicators; and Data collection and compilation at national level**

56. In this session, four presentations were made [on Climate change: Environmental and policy issues; International/regional data sources for the indicators; and Data collection and compilation at national level (UNSD on behalf of UNFCCC); National communication to the UNFCCC (Ministry of Environment and Nature Protection, Cameroon); Energy statistics and indicators (UNSD); and Waste statistics and indicators; the UNSD/UNEP Questionnaire ‘Waste’ tables (UNSD)].

57. Ms. Reena Shah of UNSD delivered a presentation on behalf of the United Nations Framework Convention on Climate Change (UNFCCC). The first part of the presentation covered the environmental and policy issues related to climate change and included a description of the UNFCCC, the guidelines for national communications, and the preparation and financing of national communications. The second part of the presentation focused on the

various international and regional data sources for the indicators, where she highlighted, inter alia, the Inter-governmental Panel on Climate Change (IPCC) methodologies and the emission factor database. The third part of the presentation described the data collection and compilation at the national level, and highlighted in particular, the crucial need for activity data and the important role of national statistical offices in this regard. Throughout the presentation several references including documentation, resource materials and websites, were provided.

### **National communication to the UNFCCC**

58. A presentation was made by Mr. Youssaou, Head of Service of Environmental Planning in the Ministry of Environment, Nature Conservation and Sustainable Development of the Ministry of Environment and Nature Protection of Cameroon regarding their national communication with the UNFCCC. Mr. Youssaou pointed out that Cameroon is a triangular shaped country of 475 442 km<sup>2</sup> located in the Gulf of Guinea with a population estimated at 19,406,000 inhabitants on 1 January 2010. Its terrain consists of highland regions unevenly distributed across the country, encircled by narrow plains. There are three main climatic zones: the humid equatorial zone, the Sudanese zone and the Sudano-Sahelian zone. As for precipitation, it varies widely from region to region and ranges between 380-600 mm/year in the semi-arid regions to 1500 mm in the Adamawa Plateau, between 2500-4000 mm on the coast and up to 10,000 mm of rain along the western flank of Mount Cameroon, where the rain falls heavily most of the year. For average temperatures, the lowest is 21 ° C on the plateau, with the highest as 32 ° C in the North and in the South and along the coast, ranges from 22 ° C and 29 ° C.

59. The gases covered by the Greenhouse Gas Inventory Data are: for direct GHGs - carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and for indirect gas and ozone precursors - carbon monoxide (CO), nitrous oxides (NO<sub>x</sub>), non-methane volatile organic compounds (NMVOCs) and sulphur dioxide (SO<sub>2</sub>). Areas considered as areas of vulnerability vis-à-vis climate change are coastal areas (for mangroves and industrial infrastructure) and Sahel (for agriculture and livestock). To address the problem of climate change, Cameroon has developed four strategic thrusts. The efforts by the Cameroonian government to fight against the triggers of climate change are however tempered by the limited financial capacity of the country whose economy is just recovering from a severe recession.

### **Energy statistics and indicators**

60. A presentation was made on energy statistics and indicators by Ms. Karen Cassamajor on behalf of the Energy Statistics Section of the UNSD. Ms. Cassamajor presented the three pillars that constitute the work of the energy statistics programme at UNSD - methodological work, data collection and technical cooperation. She introduced participants to the new methodological publications of the programme, the International Recommendation for Energy Statistics (IRES) and the upcoming Energy Statistics Compilers Manual (ESCM). She also dilated on the work of the Joint Organisations Data Initiative (JODI) as well as on the data collections for the Monthly Bulletin of Statistics, the Energy Statistics Yearbook and the Energy Balances and Electricity Profiles. With regard to data dissemination, she introduced participants to the JODI World database and the UNSD website containing Monthly Bulletin of Statistics (MBS) and UNdata holdings.

61. In the second part of her presentation, Ms. Cassamajor presented the Agreed Set of ECOWAS Core Energy Indicators – five energy indicators:

- Primary energy production total, per capita and by source;
- Electricity production total, per capita and by source;
- Energy consumption total, per capita and per unit of GDP;
- Traditional fuel use as a proportion of total energy consumption; and
- Proportion of households with access to electricity.

62. For each of these indicators she outlined the key definitions and concepts and the analytical purpose which the indicator serves.

63. Ms. Cassamajor concluded her presentation by alluding to the types of technical cooperation activities undertaken by the UNSD in the area of energy statistics, an important aspect of which are the training workshops.

### **Waste statistics and indicators; the UNSD/UNEP Questionnaire ‘Waste’ tables**

64. Ms. Karen Cassamajor presented on this topic on behalf of UNSD, observing that the concept of waste management was relevant as a key concern of the environment and particularly of the sustainable management of natural resources. The presentation focused on the UNSD/UNEP questionnaire on Waste. The first part of the presentation focused on the five tables

65. The tables which constitute the questionnaire are the following:

- Generation of Waste (Table R1)
- Management of Hazardous Waste (Table R2)
- Management of Municipal Waste (Table R3)
- Composition of Municipal Waste (Table R4) and
- Management of Municipal Waste – City data (Table R5)

Each table was treated in turn. The line items and interrelationships among the line items were explained in each case. Where relevant, relationships among tables were also pointed out, as were elementary validation points and distinctions between concepts (such as between household and municipal waste), as these could impact the veracity of the data provided in the questionnaire.

66. The four agreed ECOWAS Core Waste Indicators were also briefly presented – their purpose and the basic concepts and definitions used in elaborating their methodology sheets. In each case their relationship to the tables in the Waste questionnaire were pointed out.

### **Discussion**

67. Participants expressed the interest in knowing whether there were earlier versions of the International Recommendations for Energy Statistics and what the exact definition for secondary products was. Participants were promised specific references for these items. They follow.

68. The listing of “secondary energy products” can be found at the Energy Statistics Website of UNSD at <http://unstats.un.org/unsd/statcom/doc11/BG-IRES.pdf>, where the draft IRES and where the listing of secondary energy products provided in Annex A pages 172-174.

69. Concerning the International Recommendations on Energy Statistics, although there has been in the past, some methodological guidance from UNSD regarding energy statistics, this is the first set of international recommendations to provide data compilers with a complete set of recommendations covering all aspects of the statistical production process framework, from basic concepts, definitions and classifications to data sources, data compilation strategies, energy balances, data quality and statistical dissemination. The IRES has been widely agreed by the relevant international and national agencies worldwide and has been adopted by the Statistical Commission.

70. One participant noted that as Cameroon was referred to as “Africa in miniature”, and given that Cameroon was on the verge of preparing their country’s first national communication with UNFCCC, could they comment on whether there were any zones that were particularly vulnerable or in which there had been material damage, as this could provide indications for other countries. A response was provided that there were two such zones in Cameroon, the Coastal and the Sudano-Sahelian. In the Sudano-Sahelian zone, rain is rare and finding of firewood is now so difficult that people are forced to cut down trees. This is a difficulty that has to be dealt with. By contrast, the third zone, the Sudanese Zone, was described as having much capacity for mitigating the impacts of climate change.

71. Another country indicated that they were looking for funds for the implementation of their strategy, as it was UNDP that had launched their national strategy.

## **Session 6: Institutional aspects of environment statistics**

### **ECOWAS Programme on Environment Statistics**

72. Ms. Reena Shah of UNSD delivered a presentation on behalf of the ECOWAS Commission, where she focused on the ECOWAS regional programme of environment statistics. She noted the main challenges and environmental issues in the region and described the environmental policies of the ECOWAS Commission. She presented the results of the assessment of environment statistics carried out for the ECOWAS region. Ms. Shah recalled the priority areas identified in the programme of environment statistics in the ECOWAS region, which include land degradation, drought and desertification, wetland conservation, coastal and marine resources, transboundary conservation of natural resources, and climate change. She described the Framework for Strengthening Capacity in the Development and Institutionalization of Environment Statistics in the ECOWAS Region which was developed by the ECOWAS Commission in collaboration with UNSD. She highlighted the twelve objectives of the Framework, which included, inter alia, strengthening national capacities, mobilizing support and institutionalizing environment statistics in the mainstream statistical activities of the region. Also presented in the presentation were the actions to be undertaken both at the regional and the national level.

73. Ms. Shah concluded her presentation by highlighting the most important recent and current activities being undertaken by the ECOWAS Commission, which included conduct of three regional workshops through which an Agreed Set of ECOWAS Indicators was adopted, and with the assistance of UNSD, methodology sheets have been developed for the indicators. She also explained that the ECOWAS Commission is currently testing these indicators through a first data collection exercise and plans to produce a first regional compendium on environment statistics. In addition to the regional workshops, Ms. Shah noted that the ECOWAS Commission, with the technical support of UNSD, had conducted two national workshops in the region.



### **Sub-regional Institute on Statistics and Applied Economics (ISSEA)**

74. The ISSEA is an organization responsible for sub-regional training in statistics and applied economics and planning. As part of capacity building strategies for national and sub-regional organizations in charge of environmental issues, ISSEA is planning to include in its curriculum a module "Statistics and Environmental Economics". The goal is to develop a continuing education program for executives and a specialization for future statisticians being trained by ISSEA. In this regard, countries in the region can count on support from ISSEA and look forward to its partnership with national governments and regional and international organizations.

### **Discussion**

75. During the discussions on Session 6, participants suggested that Afristat and the African Development Bank are also stakeholders who should be sensitized to the issues and recommendations coming out of the Workshop, in addition to the regional stakeholders such as CEMAC, ECCAS and COMIFAC, who had been invited to the Workshop. They should be included in future workshops of this kind, as they are important stakeholders and can help to establish current knowledge and progress implementation strategies for this domain.

### **Session 7: Towards a regional programme of environment statistics (UNSD/regional institutions)**

76. In outlining the elements of a regional programme of environment statistics, the participants in the Workshop formulated a number of recommendations, each associated with specific stakeholders who can affect or be affected by the actions in question (see Paragraph 104)

### **Session 8: Closing session: adoption of conclusions and recommendations**

77. Based on the presentations described above and the ensuing discussions spanning the entirety of the Workshop, the participants adopted the recommendations contained in Paragraph 104 below and recommended that they be communicated to the parties mentioned as concerned stakeholders for each of the recommendations.

## **COUNTRY PRESENTATIONS**

78. Each country represented at the Workshop was asked to make a short presentation on the state of implementation of environmental statistics and indicators in their national statistical offices and ministries of environment (or equivalent institutions), including any specific issues that they may wish to raise regarding their country experiences. Following are summaries of the presentations. Cameroon was not represented in this session as they made their presentations under Sessions 1, 4 and 5.

### **Country presentation (São Tomé and Príncipe)**

79. A presentation was made by Ms. Aline Castro on behalf of São Tomé and Príncipe. São Tomé and Príncipe is made up of two main islands with a total surface area of 1001 km<sup>2</sup>; the country also has a marine surface area of 128,000 km<sup>2</sup>. Agriculture is the mainstay of the country's economy with cocoa being the main export crop. There is significant exploitation of

fishery resources as well as growing demand for forest resources that are used for construction and as fuelwood. São Tomé and Príncipe has a population of 150,000 inhabitants with a population density of 155 inhabitants per km<sup>2</sup>. It has a moist tropical climate with two seasons: the rainy, and the dry seasons that last nine months. The annual average temperature is 26 ° C.

80. Environment statistics describe the availability and quality of natural resources and their relevance to the environment. As a result of its geographical location and its history, São Tomé and Príncipe is home to fauna and flora whose richness lies not in its diversity, but in its specificity. The country's biodiversity is marked by the existence of endemic species of fauna and flora although the country is losing some forest habitats that support certain ecosystems critical to the development of the said endemic species. Strong atrophic pressure linked to food habits, commercial pressures and the strong incidence of poverty, especially in the rural areas, have led to growing loss of biodiversity, especially its specificity.

81. Generally, there are island populations with several endemic species and some endemic genera. 30 percent of the 26 bird species on the archipelago are endemic. There are numerous species of butterflies, island parakeets, parrots and especially the grey parrots on the Príncipe Island. There is significant marine wildlife, particularly off the coast of the Príncipe Island: four turtle species, barracudas, tunas, dauphins, marlins and whales reported at some periods. Overall, about 800 species of wildlife have been reported on the archipelago, 120 of which are endemic. The São Tomé Island has one genus and 87 species that are endemic, while Príncipe has one genus and 32 species that are endemic.

Environmental Problems include:

- Drought
- Erosion of coastal areas as result of extraction of sand for construction
- Destruction of turtle reproduction areas
- Destruction of important coral reserves, including certain endemic species of the gulf of Guinea;
- Use of nets with unapproved meshes in fishing;
- Use of grenades to capture fish;
- Washing of oil tankers in the high seas and transportation of waste to coastal areas
- Farmer usurpation of natural parks;
- Traumatic felling of endangered tree species;
- Wildfires;
- Destruction of commercial species;
- Destruction of plant canopy;
- Increased erosion of soils in the country;
- Loss of soil fertility;
- Uncontrolled hunting.

82. The participants of São Tomé and Príncipe opined that the preparation of the presentation for the Workshop afforded them the opportunity to update their statistical data. They expected to gain the type of knowledge from this workshop that would help to establish an environment statistics database in São Tomé and Príncipe.

### **Country presentation (Chad)**

83. A presentation was prepared by Mr. Mahamat Djimadingar of the Ministry of Environment and Water Resources of Chad and Mr. Ahmat Abderrahim Abbo / Statistician of INSEED Chad. The presentation was delivered by Mr. Abbo. He noted that the Central African state, is a vast territory with an area of 1,284,000 km<sup>2</sup> and a population of 11,175,915 inhabitants according to the last General Census of Population and Housing (RGPH2) 2009.

84. The climate is Saharan to the north and Sudano-Guinean in the south. The rainfall is tropical with two seasons. The average temperature is high with large temperature variations. The average relative humidity is low with high evaporation. The average rainfall is about 1200 mm and 20 mm in the south. It is possible for the far north of the country to see zero rainfall. The thermal regime varies from December to February (11 ° to 22 ° C) in March (35 ° -38 ° C) to the south, in April (40 ° -41 ° C) in the centre and from May to June (42 ° - 43 ° C) to the north.

85. Arable land accounts for 30% of national territory and renewable water resources are estimated at 19.2 billion m<sup>3</sup>/year. As for the reserve forest, they are estimated at 16.4% of the country and losses are estimated at 0.6% per year (FAO). Compared to international conventions and with the support of partners, Chad has developed strategies for their development work in compliance with the commitments of the Parties. Environmental statistics cover the areas of forest resources, protected areas, water resources, the potential production (land), wildlife, and reforestation. Environment statistics are important in the context of monitoring the MDGs and they encourage the implementation of measures to rectify harmful effects.

86. In conclusion it should be noted that the production of environment statistics in Chad is subject to many technical difficulties as well as material, human, financial and institutional instability.

### **Country presentation (Congo)**

87. A presentation was prepared by Mr. Eugene Tati Poaty and Mr. Antoine Moutsouka Mamona of the Congo. Mr. Tati Poaty informed the Workshop on his country's geographical characteristics and the state of his country's environment.

88. He described the Congo as a country with an equatorial climate with two main seasons – a rainy season from October to mid-May and a dry season from mid-May to September. The Congo is covered by two major types of vegetation – dense forest that covers some 65% of the area of the country and savannah that extends over the remaining 35%. Two important river systems, the Congo and the Kouilou Niari traverse the terrain.

89. Two thirds of the population of the Congo is now concentrated in the two major cities of Brazzaville and Pointe-Noire. This has resulted in a proliferation of slums on the outskirts of these towns and the attendant poverty that such living arrangements cause. The general management of the environment is under the Ministry of the Sustainable Development of Forest Economy and Environment.

90. The major environmental challenges for the country include the following:

- In the area of health and environment, an upsurge in cardiovascular diseases, allergies and water borne diarrhoeal diseases;

- In the priority area of land, soil erosion caused by building construction that does not take account of potential impacts on the environment is having a damaging effect;
- With regard to energy, extensive exploitation of oil through inefficient, highly polluting and obsolete technologies that contribute dangerously to atmospheric emissions of greenhouse gases pose a special threat;
- Concerning the coastal and marine resources, the Congo is experiencing increasing extraction of sea sand (for building purposes) and the resulting degradation of the fragile ecosystems such as mangroves as well as threats to the breeding cycles of certain fish species. Additionally, the use of prohibited fishing gear, explosives and hazardous chemicals have negative impacts on these resources;
- Bush fires have had a deleterious effect on air quality and the continuous importation of aged second-hand vehicles from Europe has had a very negative impact on air quality, increasing the concentration of suspended particulate matter; and finally
- In the area of biodiversity, there are significant threats to biodiversity through poaching.

91. In response, new management policies and strengthened legal and institutional protections are being considered to ensure the sustainable management of the environment. In this regard, an improved skills base, including the capacity to measure the relevant indicators and provide information for decision making is a requirement. Congolese participants hoped that the Workshop would contribute effectively in that respect.

### **Country presentation (Equatorial Guinea)**

92. A presentation was made by Mr. Antonio Micha Ondo Angue of Equatorial Guinea on his country's major environmental challenges and concerns. He pointed out that Equatorial Guinea's area is 28052.46 km<sup>2</sup>, which includes mainland Rio Muni (26,000 sq km) and small islands nearby (such as Corisco, Elobey). There are other islands: Bioko and Annobon, two volcanic islands of 2051 km<sup>2</sup>. Equatorial Guinea has an Exclusive Economic Zone (EEZ) of 314,000 km<sup>2</sup>. The land has boundaries with Cameroon to the north and with Gabon in the south and east. It has coastal and maritime boundaries with Gabon, Cameroon, São Tomé and Príncipe, Nigeria and Angola (Atlantic Ocean). The average temperature is 25°C, with average humidity of 98%. Annual rainfall is between 1400-1500 mm per year. Figures from the 2001 census estimate the population at 1,014,999 inhabitants with a breakdown of rural population of 61.2% and urban of 38.8%. Average density of the country is 36 inhabitants / km<sup>2</sup>. The two major cities are Malabo, with 64, 439 inhabitants and Bata, with 71,406 inhabitants. The birth rate is 4.8 per 1000 of population; average mortality rate: 2.3 per 1000 of population; growth rate: 2.5%. With regard to the distribution, more than 190,582 inhabitants live in coastal areas (i.e. equivalent to 58 inhabitants per km<sup>2</sup>) and 824,417 inhabitants reside in the interior of the country (this is equivalent to 14 inhabitants per km<sup>2</sup>). With regard to the economy, the GDP by sector is the following: Agriculture: 3%. Extraction - Oil: 95.7%. Services: 1.3%. So the indicators are similar to other developing countries (with over 60% of the population in poverty). Access to basic social services is still deficient, with only 37% of population having access to health services and 43% having access to drinking water. Some 53% of the population live in conditions of basic, acceptable sanitation.

93. In providing an assessment of biodiversity Mr. Ondo Angue revealed that there are more than 167 mammal species, with a rate of endemism that exceeds 28% of birds, with 300-600

endemic species. The figure is more than 22% higher for plant species with 4,000 to 5,000 endemic species, exceeding 42% of the species.

94. The major challenges to adopting measures for reducing pressure on the state of the environment are the undeveloped areas in the country. These challenges are:

- Normative framework:
  - (i) A mechanism for monitoring and control;
  - (ii) Some aspects of development; and
- Relating to infrastructure:
  - (i) Insufficient means;
  - (ii) Level of priorities among the political considerations;
- Relating to Coordination / Cooperation:
  - (i) Coordination of problems at domestic level (by sector); and
  - (ii) Cooperation with unplanned approaches (external).

### **Country presentation (Gabon)**

95. A presentation was made by Mr. Estimé Mensah Magni of Gabon on the state of his country's environment and the current pressures faced by the environment.

96. Mr. Mensah Magni started off by providing basic geographical and demographic information on Gabon, pointing out that the land area is some 267,772 km<sup>2</sup>, with a population of 1.2 million. He revealed that forests cover a large proportion of the land area, approximately 220,000 km<sup>2</sup> and that the population was largely urban (73%). The urbanization of the population has occurred as a response to the discovery of oil in the early 1970s.

97. The climate of Gabon is equatorial, with only slight variation over the year and two wet seasons that alternate with the May - September and December – January dry seasons. The terrain is characterized by three types of ecological landscapes – mountains, plateaus and coastal plains. These are crossed by an important river, the Ogooué, which runs for 1200 km throughout the country.

98. Key natural resources are oil, wood, manganese, uranium and other minerals such as iron, phosphate, niobium, gold, zinc diamonds and marble.

99. In terms of environmental issues, Mr. Mensah Magni cited logging as a major pressure on the environment, causing an average loss of 10% of forest canopy, with an estimate that as much as 50% of the canopy is damaged during the felling and transportation processes involved in the logging. Another pressure on the environment was identified as the illegal hunting of bush-meat. These two major pressures have impacted the environment with a loss of animals, soil erosion and also pollution, as chemicals used to treat the wood that is harvested actually pollute the water resources and fires originating with unused logs on the forest floor, increase air pollution by releasing large quantities of dust particles. Another pressure, the intensive exploration of oil, while contributing up to 37% of GDP, also adds to negative impacts on the environment because of the use of obsolete technologies. Bush fires and poaching also have detrimental environmental consequences.

100. Responses to these environmental challenges are under active consideration. Measures to strengthen the legal and institutional support necessary for addressing them and for promoting the sustainable management of the environment are being studied, with an awareness of the global context for any actions being considered. Mr. Mensah Magni expressed confidence that the Workshop would help to enhance the decision making capacities of Gabon as well as the other countries in the Central African region.

### **Discussion**

101. The discussions on the country presentations were wide-ranging and revealed many common challenges to the environment of the countries in the region and shared shortcomings in the capacity to face these challenges. It should be mentioned that the experiences of Cameroon were sometimes instructive in revealing possible practical approaches to dealing with some of these challenges. The consensus that emerged from all the discussions has been recorded in the “Recommendations” presented in Paragraph 104 below.

### **Working Groups**

102. A part of each of the Sessions 3, 4 and 5 was set aside for a group exercise. Each day, after the presentations had been delivered for one of those sessions, the Working Groups were constituted to examine the methodologies and data collection for selected indicators that were presented earlier in the session.

103. During the group exercise, the plenary was split into two groups. Each group was asked to review the Agreed Set of ECOWAS Regional Indicators, assessing the Priority areas and Indicators to see if there were any additional and/or alternative indicators that were relevant for the participant’s countries, which should be added to the Set. Additionally, participants were requested to review the definitions, units of measurement and other detail on the methodology sheets for each of those indicators, and to suggest changes in accordance with their knowledge of national practice. After each group exercise following the 3 sessions, the two groups presented their results back to the plenary session. UNSD and UNEP provided responses and clarifications as necessary to the presentations. Participants were in general agreement with the Priority Areas that had been identified in the Set and with the vast majority of the indicators. They did however recommend a small number of detailed changes. Those detailed changes are included in bold italicized font in Annex 3, under the related Priority Areas and Indicators, in the table “Core set of indicators incorporating suggested changes for the Central African region”.

### **Discussion points relevant to the entire meeting**

104. While a number of specific issues were raised in relation to material that was presented on the different topics, there were also a number of matters of a more general nature that emerged during the discussions of those topics as well as during the discussions on the papers presented by participating countries. In the country papers, many countries focused on their priority environmental problems and policies implemented as well as their strategies for implementation. Following are some of the common challenges that were revealed:

- the importance of harmonizing indicators and the need for the involvement of certain key sub-regional political or technical institutions such as ECCAS, COMIFAC and CEMAC in the harmonization process, as well as in the implementation of activities relating to environment statistics and indicators;

- the problem of insufficient financial, logistical and human resources in institutions responsible for producing environmental statistics and indicators and the ensuing issues relating to the reliability of data generated in such circumstances;
- the lack of coordination between the various institutions responsible for environmental issues at national and sub-regional levels;
- the difficulties involved in using the UNSD/UNEP questionnaire and the limited follow-up by UNSD/UNEP with the Member States of the Central African sub-region;
- the need to address discrepancies in the data produced by international, sub-regional and national institutions.

During discussions, participants suggested solutions to some of the concerns raised above. Following are some of the most cogent of the solutions suggested:

- Organizers of the workshop pointed out that in fact the organization of the Workshop constituted one appropriate response to the issue of harmonization of environmental statistics and indicators, as it provided a forum for the identification and discussion of environmental indicators for the Central African region.
- Participants expressed the wish that Governments would spare no effort to ensure smooth functioning of institutions responsible for environmental issues, especially through the allocation of adequate financial, human and logistical resources.
- Given the importance of the emerging domain of environmental statistics and indicators, participants stressed the need for the establishment of national and sub-regional coordination mechanisms to facilitate collaboration and cohesion between the various line institutions in charge of environmental issues.
- In furthering the interests of environment statistics as well as those of the broader field of sustainable development, governments should take advantage of advanced technologies such as remote sensing and satellite imaging (as has already been initiated in South Africa).

### Recommendations

105. Following is the list of recommendations that have evolved as the consensus of opinion on the key issues discussed during the Workshop:

<b>No.</b>	<b>Recommendation</b>	<b>Addressee</b>
1	The involvement of specialized sub-regional institutions and bodies to encourage the harmonization of policies, the making of decisions and the implementation of those decisions at national and sub-national level.	AFRISTAT, CEMAC, ECCAS, NSOs, ECA
2	Targeted efforts to improve the methodology for collecting data on the environmental indicators relevant for the sub-region and in particular those deemed to be of high priority. In this regard, the Workshop appreciated the work done by ECOWAS in collaboration with UNSD and UNEP to develop the list of environmental indicators and their related methodology sheets.	UNSD, UNEP
3	That specialized ECCAS institutions as well as other sub-regional entities such as CEMAC and ISSEA, participate in elaborating and promoting the harmonization of environmental statistics and indicators in Central Africa and that accordingly their capacities be strengthened to undertake the proposed activities. It expressed appreciation for the participation of COMIFAC in the Workshop.	COMIFAC, ECCAS, CEMAC, ISSEA, AFRISTAT
4	That national and sub-regional institutions include in their budgets and/or negotiate with their financial partners, appropriate budget lines to fund the activities identified.	African Development Bank
5	That African Development Bank and ECCAS/CEMAC provide the sub-region with financial resources to strengthen environment statistics activities. It also recommends that at national level, governments improve the budgets of their ministries in charge of the environment as well as those of National Statistics Offices by providing budget appropriations for environment statistics activities. Partnership with other UN agencies such as UNDP and other donors should be encouraged to support these activities.	African Development Bank, ECCAS, CEMAC, Governments, UNDP
6	That training workshops and activities to enhance environment statistics capacity be organized on a continual basis by UNSD, UNEP, ECA and ECCAS /COMIFAC as well as other relevant institutions in Central Africa. It welcomed the efforts that resulted in the current workshop.	National Statistical Offices, UNEP, UNDP, UNSD, ECA
7	That the priority and other relevant environmental statistics and indicators identified during the Workshop, be submitted to ECCAS / COMIFAC and other ECCAS specialized/technical institutions for consideration and validation in an effort to arrive at a core set of officially approved environmental indicators and statistics for Central Africa.	ECCAS, CEMAC, COMIFAC
8	That IUCN publish, on an acceptable and regular basis, the list of endangered species in the sub-region (sub-regional Red List of Threatened Species).	IUCN



9	That a sub-regional database for environment statistics and indicators be developed and maintained.	ECCAS, CEMAC, COMIFAC, NSOs
10	That a strategic environment statistics framework plan for the 2012-2015 period be prepared.	ECCAS, CEMAC, COMIFAC
11	That the work done by the National Statistical Institute in Cameroon in the area of environment statistics be highlighted to encourage other member countries to proceed in similar fashion.	The countries

## Annex 1

### List of Participants

<b>CAMEROON</b>	
Mr. Joseph TEDOU Director General National Institute of Statistics Ministry of Economic Planning and Regional Development BP 134, Yaoundé, Cameroon Tel: (237) 22 22 04 45 Fax: (237) 22 23 24 37 Email: <a href="mailto:josephthedou@yahoo.fr">josephthedou@yahoo.fr</a>	Mr. YOUSSAOU Head of the Department of Planning Ministry of Environment and Nature Protection (MINEP) Tél: (237) 74026960 Fax: (237) 22236051 Email: <a href="mailto:youssaoulara@yahoo.fr">youssaoulara@yahoo.fr</a>
Ms. Marie Antoinette TEULAWO FOMO Unit Head of Cartography and Environmental Statistics National Institute of Statistics Ministry of Economic Planning and Regional Development BP 134, Yaoundé, Cameroon Tel: (237) 77 63 45 80 Fax: (237) 22 23 24 37 Email: <a href="mailto:ma.fomo@yahoo.fr">ma.fomo@yahoo.fr</a>	Ms. Nadine TAGOU MAMINFO Ministry of Environment and Nature Protection (MINEP) Tel: (237) 75 71 65 72 Fax: (237) 22 23 60 51 Email: <a href="mailto:nadinetagou@yahoo.fr">nadinetagou@yahoo.fr</a>
Mr. Pierre SOHKADJIE SONGO Senior Research Fellow National Institute of Statistics Ministry of Economic Planning and Regional Development BP 134, Yaoundé, Cameroon Tel: (237) 75 45 35 65/ 99 26 89 28 Fax: (237) 22 23 24 37 Email: <a href="mailto:Pierre.sohkadjie@stat.cm">Pierre.sohkadjie@stat.cm</a>	Ms. Nadège KIBOUM KOH Staff Support Ministry of Environment and Nature Protection (MINEP) Tél: (237) 77577105/98674215 Fax: (237) 22236051 Email: <a href="mailto:kkohnadan@yahoo.fr">kkohnadan@yahoo.fr</a>
Mr. Damien BOUNKEU TCHOUPOU National Institute of Statistics Ministry of Economic Planning and Regional Development BP 134, Yaoundé, Cameroon Tel: (237) 70 35 23 89 Fax: (237) 22 23 24 37 Email: <a href="mailto:bounkeu@yahoo.fr">bounkeu@yahoo.fr</a>	Mr. Alain Pascal YANKAP NOUTANEWO Department of Development and Environmental Policies Ministry of Environment and Nature Protection Ministerial Building No. 2 20th May Boulevard Yaoundé, Cameroon Tel: (237) 99707342 Fax: (237) 22 23 60 51 Email: <a href="mailto:pascalain004@yahoo.fr">pascalain004@yahoo.fr</a>

<p>Ms. Fernande Irène EVINA MBO Assistant Research Fellow Cartography and Environmental Statistics Unit National Institute of Statistics Ministry of Economic Planning and Regional Development Tel: (237) 99 96 39 80 Email: <a href="mailto:fernandeevina@yahoo.fr">fernandeevina@yahoo.fr</a></p>	<p>Ms. Nicole Liliane MAFFO MAFFO Staff Support Ministry of Environment and Nature Protection (MINEP) Tél : (237) 96467130/ 75623388 Email: <a href="mailto:nicolemaffo@yahoo.fr">nicolemaffo@yahoo.fr</a></p>
<p>Mr. Dieudonné KAMGUEM Ministry of Environment and Protection of Nature Tel: (237) 237 79 54 02 88/94 28 96 33 Email: <a href="mailto:dkamguem@yahoo.fr">dkamguem@yahoo.fr</a></p>	
<b>TCHAD</b>	
<p>Mr. Mahamat DJIMADINGAR Deputy Director of Research, Planning and Monitoring Department of Environment and Fishery Resources BP 447, N'Djamena, Chad Tel: (235) 66257905/95094748 Email: <a href="mailto:djimadingar07@yahoo.fr">djimadingar07@yahoo.fr</a></p>	<p>Mr. Ahmat ABDERAHIM ABBO National Institute of Statistics, Demographic and Economic Studies Ministry of Planning and Cooperation (INSEED) Tchad B.P. 453 N'Djamena, Chad Tel: (235) 66 07 53 58/ 99 58 44 90 Email: <a href="mailto:ahmatabdarrahim@yahoo.fr">ahmatabdarrahim@yahoo.fr</a></p>
<b>CONGO</b>	
<p>Mr. Eugene TATI POATY National Centre for Statistics and Economic Reserarch (CNSEE) B. P. 2031 Brazzaville, Congo Tel: (242) 05 557 14 99 Email: <a href="mailto:eugenetati@yahoo.fr">eugenetati@yahoo.fr</a></p>	<p>Mr. Antoine MOUTSOUKA-MAMONA Ministry of Interior and Decentralization Brazzaville, Congo Tel: (242) 066622023 / 055448574 Email: <a href="mailto:moutsoukaa@yahoo.fr">moutsoukaa@yahoo.fr</a></p>
<b>EQUATORIAL GUINEA</b>	
<p>Ms. Marcelina ANGUE MBA ESIE Direccion General de Estadisticas y Cuentas Nacionales Ministerio de Planificacion, Desarrollo Economico e Inversiones Publicas Malabo, Equatorial Guinea Tel: (240) 222 27 26 47 Email: <a href="mailto:marcelinaangue@yahoo.com">marcelinaangue@yahoo.com</a></p>	<p>Mr. Antonio Micha ONDO ANGUE Environment Expert Ministry of Fisheries and Environment Directorate General for Environment Malabo, Equatorial Guinea Tel: (240) 222 27 04 63 Email: <a href="mailto:amicha_antonio@yahoo.fr">amicha_antonio@yahoo.fr</a> <a href="mailto:ammicha025@gmail.com">ammicha025@gmail.com</a></p>
<b>GABON</b>	
<p>Mr. Estime Dimitri MENSAH-MAGNI Ministry of Economy, Trade, Industry and Tourism B.P. 2119 Libreville, Gabon Tel: (241) 07 65 33 10 Fax: (241) 72-04-57 Email: <a href="mailto:estyremensah@yahoo.fr">estyremensah@yahoo.fr</a></p>	

<b>SAO TOME AND PRINCIPE</b>	
<p>Ms. Ketty-Keila NETO DA SILVA BORGES National Institute of Statistics Largo das Alfândegas - Cx. Postal 256 São Tomé, São Tomé e Príncipe Tel: (239) 224 1850/ 9984722 Email: <a href="mailto:ketty05keila@hotmail.com">ketty05keila@hotmail.com</a></p>	<p>Ms. Aline CASTRO Directorate General for Environment Av. Kwame N'Krumah C. Postal N° 1023 São Tomé, São Tomé e Príncipe Tel: (239) 99 25 534 / 2224037 Fax: (239) 22 71 56 Email: <a href="mailto:Alinecastro527@hotmail.com">Alinecastro527@hotmail.com</a></p>
<b>COMIFAC</b>	
<p>Mr. Jerome GUEFACK The Central African Forests Commission BP 20 818 Yaoundé, Cameroon Tel: (237) 96 61 13 08 Fax: (237) 22 20 48 02 Email: <a href="mailto:Jerome.guefack@pacebco-ceeac.org">Jerome.guefack@pacebco-ceeac.org</a></p>	
<b>FAO</b>	
<p>Ms. Sachiko TSUJI Senior Fishery Statistician Food and Agriculture Organization of the United Nations Via delle Terme di Caracalla 00153 Rome, Italy Tel: (39-06) 570 55318 Fax : (39-06) 570 52476 Email: <a href="mailto:Sachiko.tsuji@fao.org">Sachiko.tsuji@fao.org</a></p>	
<b>ISSEA</b>	
<p>Mr. Jeannot NGBANZA Chief Department of Statistics The Sub-regional Institute on Statistics and Applied Economics (ISSEA) Rue Pasteur BP 294 Yaoundé, Cameroon Tel: (237) 99 83 42 55 Fax: (237) 22 22 95 21 Email: <a href="mailto:jengbanza@yahoo.fr">jengbanza@yahoo.fr</a></p>	<p>Mr. Robert NGONTHE The Sub-regional Institute on Statistics and Applied Economics (ISSEA) Rue Pasteur BP 294 Yaoundé, Cameroon Tel: (237) 77 70 46 62 Fax: (237) 22 22 95 21 Email: <a href="mailto:rngonthe@yahoo.fr">rngonthe@yahoo.fr</a></p>
<p>Mr. Emmail WANJO The Sub-regional Institute on Statistics and Applied Economics (ISSEA) Rue Pasteur BP 294 Yaoundé, Cameroon Tel: (237) 22 22 01 34 Fax: (237) 22 22 95 21 Email: <a href="mailto:wanjoemmail@yahoo.fr">wanjoemmail@yahoo.fr</a></p>	

<b>IUCN</b>	
<p>Mr. Belmont DJOMO Central and West African Programme/ Cameroon program International Union for Conservation of Nature (IUCN) B.P. 5506, Yaoundé, Cameroon Tel : (237) 77 32 82 76 Fax: (237) 22 21 64 97 Email: <a href="mailto:djobelmond@yahoo.fr">djobelmond@yahoo.fr</a></p>	<p>Ms. Camille Jepang SANDJONG Programme Officer Central and West African Programme/ Regional Programme for Water and Wetlands International Union for Conservation of Nature (IUCN) B.P. 5506, Yaoundé, Cameroon Tel : (237) 22 21 64 96 Fax: (237) 22 21 64 97 Email: <a href="mailto:Camille.Jepang@iucn.org">Camille.Jepang@iucn.org</a></p>
<b>UNECA (Addis Ababa)</b>	
<p>Mr. Chukwudozie EZIGBALIKE Senior Geo-Information Officer African Center for Statistics UNECA P.O. Box 3000 Addis Ababa, ETHIOPIA Tel: (251) 11544 569 Fax: (251) 11 551 0512 Email: <a href="mailto:ezigbalike.uneca@un.org">ezigbalike.uneca@un.org</a></p>	
<b>UNECA (Cameroon –SRO)</b>	
<p>Mr. Emile AHOHE Director Economic Commission for Africa (UNECA) Sub-regional Office for Central Africa Tel: (237) 22 23 1461/22 22 08 61 / (Ext: 21514) Email: <a href="mailto:eahohe@uneca.org">eahohe@uneca.org</a></p>	<p>Mr. Daniel GBETNKOM Economic Commission for Africa (UNECA) Sub-regional Office for Central Africa Tel: (237) 22 23 1461 /22 22 08 61 / (Ext: 21418) Email: <a href="mailto:dgbetnkom@uneca.org">dgbetnkom@uneca.org</a> <a href="mailto:dagbetnkom@yahoo.com">dagbetnkom@yahoo.com</a></p>
<p>Mr. Isidore KAHOU Economic Commission for Africa (UNECA) Sub-regional Office for Central Africa Tel: (237) 22 23 1461 Email: <a href="mailto:ikahoui@yahoo.com">ikahoui@yahoo.com</a></p>	<p>Ms. Delphine FOGANG Economic Commission for Africa (UNECA) Sub-regional Office for Central Africa Tel: (237) 22 23 14 61/ 22 22 08 56 (Ext: 21430) Email: <a href="mailto:dfogang@uneca.org">dfogang@uneca.org</a> <a href="mailto:fogang@un.org">fogang@un.org</a></p>
<p>Ms. Sylvie NGUIFFO Economic Commission for Africa (UNECA) Sub-regional Office for Central Africa Tel: (237) 22 23 14 61/ 22 22 08 56 (Ext: 21430) Email: <a href="mailto:sylvie@uneca.org">sylvie@uneca.org</a></p>	<p>Mr. Bertrand TACHAGO Economic Commission for Africa (UNECA) Sub-regional Office for Central Africa Tel: (237) 22 23 1427/22 22 08 61 / (Ext: 21418) Email: <a href="mailto:btachago@uneca.org">btachago@uneca.org</a></p>
<b>UNEP</b>	
<p>Mr. Christopher AMBALA Programme Officer Division of Early Warning and Assessment United Nations Environment Programme P.O. Box 30552 - 00100 Nairobi, Kenya</p>	

<p>Tel: (254-20) 7623818  Fax: (254-20) 7624489/90  Email: <a href="mailto:Chris.Ambala@unep.org">Chris.Ambala@unep.org</a></p>	
<p><b>UNSD</b></p>	
<p>Ms. Reena SHAH  Chief  Environment Statistics Section  United Nations Statistics Division  2 United Nations Plaza  Room DC2-1416  New York, NY 10017  USA  Tel: (1) 212-963-4586  Fax: (1) 212-963-0623  Email: <a href="mailto:shahr@un.org">shahr@un.org</a></p>	<p>Ms. Karen CASSAMAJOR  Statistician  Environment Statistics Section  United Nations Statistics Division  2 United Nations Plaza  Room DC2-1404  New York, N. Y. 10017  Tel: (1) 212-963-4561  Fax: (1) 212-963-0623  E-mail: <a href="mailto:cassamajor@un.org">cassamajor@un.org</a></p>

## Annex 2

ESA/STAT/AC.248/1/E

### Workshop on Environment Statistics

(Yaoundé, Cameroon, 5-9 December 2011)

#### Work Schedule

#### Monday, 5 December

9:00-9:30 Registration

<b>9:30-10:30</b>	<b>Opening session</b>
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- |             |  |
|-------------|--|
| 9:30-9:40   | - Welcome address (UNSD)   |
| 9:40-9:50   | - Welcome address (ECA)  |
| 9:50-10:00  | - Welcome address (National Institute of Statistics of Cameroon) |
| 10:00-10:10 | - Election of officers; Adoption of agenda and work schedule     |

10:10-10:30 *Coffee Break*

<b>10:30-12:30</b>	<b>Session 1: The need for environment statistics and indicators</b>
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- |             |  |
|-------------|--|
| 10:30-11:10 | - National needs (National Institute of Statistics of Cameroon)                              |
| 11:10-11:50 | - International needs (UNSD)   |
| 11:50-12:30 | - Environment statistics and indicators for keeping Africa's environment under review (UNEP) |

12:30-2:00 *Lunch*

<b>2:00-4:00</b>	<b>Session 2: Environment statistics and indicators: concepts and methods, and data sources</b>
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- |           |   |
|-----------|---|
| 2:00-2:30 | - Basic concepts of environment statistics (UNSD)   |
| 2:30-3:00 | - Revised Framework for the Development of Environment Statistics and the core set of environment statistics (UNSD) |
| 3:00-3:30 | - The use of GIS and remote sensing for environment statistics (ECA)  |
| 3:30-4:00 | - International data sources for environment statistics (UNSD)  |

4:00-4:30 *Coffee Break*

<b>4:30-5:30</b>	<b>Country presentations</b>
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- |           |  |
|-----------|--|
| 4:30-4:50 | - Country presentation (São Tomé and Príncipe) |
| 4:50-5:10 | - Country presentation (Chad)                  |
| 5:10-5:30 | - Country presentation (Congo)                 |

## Tuesday, 6 December

<b>9:00-12:30</b> <b>Session 3: Statistics on Freshwater, Coastal and marine resources, Environmental health, and Natural disasters</b>
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9:00-9:30      - Indicators of coastal and marine resources (IUCN)

9:30-10:30    - Statistics on aquatic biological resources (FAO)

10:30-11:00      *Coffee Break*

11:00-11:20    - Natural disasters statistics and indicators (UNSD)

11:20-12:10    - Freshwater statistics and indicators; UNSD/UNEP Questionnaire  
‘Water’ tables (UNSD)

12:10-12:30    - Environmental health indicators (UNSD)

12:30-2:00      *Lunch*

<b>2:00-5:30</b> <b>Session 3: Working group session on methodologies and data collection for selected indicators</b>
---

2:00-3:30      - Moderated discussion in groups

3:30-4:00      *Coffee Break*

4:00-5:00      - Moderated discussion in groups (cont.)

5:00-5:30      - Presentation of agreed indicators to plenary session



## Wednesday, 7 December

### **9:00-11:30      Session 4: Statistics on Land use and agriculture, Forests and Biodiversity**

- 9:00-10:00      -    Agri-Environmental statistics and indicators within FAOSTAT (UNSD, on behalf of FAO)
- 10:00-10:30     -    Environmental issues on desertification in Cameroon, based on the report to the UNCCD (Ministry of Environment and Nature Protection, Cameroon)
- 10:30-11:00     *Coffee Break*
- 11:00-11:30     -    Indicators on Biodiversity (IUCN)
- 11:30-12:00     -    Indicators and statistics on the Congo Basin Forest Congo (COMIFAC)

### **12:00-12:30      Country presentations**

- 12:00-12:15     -    Country presentation (Equatorial Guinea)
- 12:15-12:30     -    Country presentation (Gabon)
- 12:30-2:00      *Lunch*

### **2:00-5:30      Session 4: Working group session on methodologies and data collection for selected indicators**

- 2:00-3:30      -    Moderated discussion in groups
- 3:30-4:00      *Coffee Break*
- 4:00-5:00      -    Moderated discussion in groups (cont.)
- 5:00-5:30      -    Presentation of agreed indicators to plenary session

## **Thursday, 8 December**

<b>9:00-12:30</b>	<b>Session 5: Statistics on Air, Energy and Waste</b>
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- |             |  |
|-------------|--|
| 9:00-10:00  | - Climate change: Environmental and policy issues; International/regional data sources for the indicators; and Data collection and compilation at national level (UNSD, on behalf of UNFCCC) |
| 10:00-10:30 | - National communication to the UNFCCC (Ministry of Environment and Nature Protection, Cameroon)   |
| 10:30-11:00 | <i>Coffee Break</i>  |
| 11:00-11:30 | - Energy statistics and indicators (UNSD)  |
| 11:30-12:30 | - Waste statistics and indicators; the UNSD/UNEP Questionnaire 'Waste' tables (UNSD)   |
| 12:30-2:00  | <i>Lunch</i>   |

<b>2:00-5:30</b>	<b>Session 5: Working group session on methodologies and data collection for selected indicators</b>
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- |           |  |
|-----------|--|
| 2:00-3:30 | - Moderated discussion in groups                       |
| 3:30-4:00 | <i>Coffee Break</i>                                    |
| 4:00-5:00 | - Moderated discussion in groups (cont.)               |
| 5:00-5:30 | - Presentation of agreed indicators to plenary session |

## **Friday, 9 December**

<b>9:00-10:30</b>	<b>Session 6: Institutional aspects of environment statistics</b>
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- |             |  |
|-------------|--|
| 9:00-10:00  | - ECOWAS Programme on Environment Statistics (UNSD, on behalf of ECOWAS) |
| 10:00-10:30 | - Sub-regional Institute on Statistics and Applied Economics (ISSEA)     |

10:30-11:00            *Coffee Break*

<b>11:00-12:30</b>	<b>Session 7: Towards a regional programme of environment statistics (UNSD/regional institutions)</b>
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12:30-2:00            *Lunch*

<b>2:00-3:30</b>	<b>Session 7: Towards a regional programme of environment statistics (UNSD/regional institutions) (cont.)</b>
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3:30-4:00            *Coffee Break*

<b>4:00-4:30</b>	<b>Closing session: adoption of conclusions and recommendations</b>
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<b>4:30-5:00</b>	<b>Evaluation</b>
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## Annex 3

### Core set of indicators including suggested changes for the Central African region

MDG – Millennium Development Goals

CSD – Commission on Sustainable Development

*The Working Group recommendations from the Central African Region, arising from discussion in the Environment Statistics Workshop held in Yaoundé, 5-9 December 2011, are in Bold, Italicized font.*

#### **Natural Disasters and Environmental Performance**

Priority area	Indicator	Code
Exposure to natural disasters	Percentage of population living in hazard prone areas [CSD]	1
	Frequency of extreme events*	2
Impacts of natural disasters	Human and economic loss due to natural disasters [CSD]	1
Early warning systems	Proportion of population having access to information on natural disasters from early warning systems**	2
Adaptive capacity	Public expenditure on disaster reduction and related measures as a percentage of Gross National Income (GNI)	2

\* Indicates repetition of the indicator in the Air section.

\*\* The indicator needs further development.

#### **Air**

Priority area	Indicator	Code
Air quality	Ambient concentrations of air pollutants in urban areas [CSD]	2
Climate change	Carbon dioxide emissions, total, per capita and per \$1 GDP (PPP) [MDG]	1
	Emissions of greenhouse gases [CSD]	1
	Frequency of extreme events *	3
	Deviation of annual average precipitation from long-term annual average* <i>Working Group 2 recommended that where long series (30 years) of data are not available, countries should use existing data.</i>	1
	Deviation of annual average temperature from long-term annual	1

	average <i>Working Group 2 recommended that where long series (30 years) of data are not available, countries should use existing data.</i>	
Ozone layer depletion	Consumption of ozone-depleting substances [MDG] <i>Working Group recommended that the substances being referred to should be defined in line with Montreal Protocol on Substances that Deplete the Ozone Layer</i>	1

\* Indicates repetition of the indicator in the Natural Disasters and Environmental Performance section.

## Land

Priority area	Indicator	Code
Land tenure/ownership	Proportion of population with secure land tenure <i>Working Group 1 indicated that this indicator is available in national household surveys. E.g. from the Cameroon Household Surveys (1996, 2001, 2007, 2012).</i>	2
	Percentage distribution of land area by ownership rights** <i>Working Group 1 indicated that this indicator is available in national household surveys. E.g. from the Cameroon Household Surveys (1996, 2001, 2007, 2012).</i>	2
Land quality (degradation)	Land affected by desertification [CSD] <i>Working Group 1 indicated that this indicator is available in national household surveys. E.g. from the Cameroon Household Surveys (1996, 2001, 2007, 2012).</i>	1
	Land degradation [CSD]	2
	Proportion of land area affected by contamination <i>Group 2 recommends that this indicator be raised to priority code 1 and combined with one of the indicators in Priority Area: Agriculture, Use of Pesticides/fertilizers, "Number of reported cases of pesticide contamination" (see below).</i>	2
Land use change	Land use change [CSD] <i>Working Group 1 recommended that this be reduced in priority to Code 2</i>	1

\*\* The indicator needs further development.

## Agriculture

Priority area	Indicator	Code
Agriculture	Agricultural Production Index [FAO]	3
Irrigation	Proportion of agricultural land area under irrigation	1
	Use of agricultural pesticides [CSD]	1

<i>In working Group 2, a note was made for CEMAC participants to check in their respective ministries of agriculture for the availability of this indicator and its methods of measurement.</i>	Number of reported cases of pesticide contamination <i>Group 2 recommends that this indicator be combined with one of the indicators in Priority Area: Land quality degradation, Proportion of land area affected by contamination (see above).</i>	2
	Use of fertilizers	1
Rangeland carrying capacity	Livestock pressure over carrying capacity	1

## **Forests and woodlands**

<b>Priority area</b>	<b>Indicator</b>	<b>Code</b>
Forest change <i>Working Group 2 recommends: harmonization of the terms afforestation, deforestation, reforestation, as their explanation often poses problems in translations between French and English.</i>	Proportion of land area covered by forest [MDG]	1
	Proportion of forests damaged**	2
	Area of forest under sustainable forest management [CSD]	2
	Rate of afforestation/deforestation	1
Forest resources management	Proportion of exports of forestry products	1
Established protected forest areas	Proportion of protected forest area to the total forest area	1

\*\* The indicator needs further development.

## **Coastal and Marine Resources**

<b>Priority area</b>	<b>Indicator</b>	<b>Code</b>
Urbanization of coastal zones	Percentage of total population living in coastal areas [CSD] <i>Working Group 1 suggested that this indicator should take the density of the population into account (in line with criterion used by UNIDO)</i>	1
Coastal and marine pollution	Proportion of coastal areas affected by pollution**	2
	Coastal water quality	2
	Number and area of marine aquaculture sites	2
Coastal erosion/sedimentation	Coastal area lost to erosion**	1
Marine biodiversity	Number of marine species, threatened and extinct	1

	Change in area under mangrove forest	2
	Proportion of marine area protected [CSD]	1
	Total & per capita marine fish catch	1
	Total & per capita marine aquaculture fish catch	2
	Proportion of fish stocks within safe biological limits [MDG]	2
Climate change - sea level rise	Annual sea level change	2
Poverty eradication	Proportion of population making a living from marine resources	2

\*\* The indicator needs further development.

## Freshwater

Priority area	Indicator	Code
Water accessibility	Proportion of population using an improved drinking water source [MDG]*	1
	Proportion of population served by the water supply industry	1
Water availability	Proportion of total water resources used [MDG]	2
	Proportion of population using harvested rainwater <i>Working Group 1 suggested that the sources cited could be household surveys, Demographic Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS) and population censuses.</i>	2
	Ratio of external renewable water resources to total renewable water resources	2
	Total annual renewable water resources per capita	1
	Change in surface water discharge	2
	Annual groundwater recharge	2
	Urban water supply from dams**	2
	Proportion of population using water from boreholes for domestic use in rural/urban settings	2
	Emissions of organic water pollutants (BOD) total/per worker	2
	Biochemical oxygen demand in water bodies [CSD]	2
	Chemical oxygen demand in water bodies	2
	Average annual concentration of total phosphorus in lakes and rivers	2
	Average annual concentration of total dissolved solids/sediment flux in lakes and rivers**	2
	Average annual concentration of total nitrogen in lakes and rivers	2
	Average annual concentration of dissolved oxygen in lakes and rivers	2

Priority area	Indicator	Code
	Presence of faecal coliforms in freshwater [CSD]	2
Water use	Total annual water use per capita	2
	Proportion of freshwater used by economic activity	2
	Water use intensity by economic activity [CSD]	2
Water management issues	Wastewater treatment [CSD]	1
	Proportion of population connected to wastewater collection system	1
	Volume of treated wastewater for domestic use	2
	Volume of wastewater disposed into wetlands**	2

\* Indicates repetition of the indicator in the Health and Environment section.

\*\* The indicator needs further development.

## **Biodiversity**

Priority area	Indicator	Code
Ecosystem	Proportion of terrestrial area protected by ecological region [CSD]	1
Wetlands	Number of wetland species, threatened and extinct	2
	Change in the area of wetlands	2
	Number of Ramsar sites	1
	Proportion of rehabilitated area of wetlands	2
Species	Threatened plant species as a percentage of total known plant species <i>Working Group 2 suggests that in some cases, this can be represented by the number of threatened species</i>	1
	Threatened animal species as a percentage of total known animal species <i>Working Group 2 suggests that in some cases, this can be represented by the number of threatened species</i>	1
	Proportion of species threatened with extinction [MDG]	2
	Abundance of selected key species [CSD]	2
Invasive species	Abundance of invasive alien species [CSD]	2



## Energy

Priority area	Indicator	Code
Energy production	Primary energy production total, per capita and by source Given the lack of trust in respondents providing data in this area, recommendation was made for the data collection on this indicator to be done through the ministries in charge of energy.	1
	Electricity production total, per capita and by source	1
Energy consumption <i>Working Group 2 requested clarification regarding the definition of energy consumption to be used.</i>	Share of renewable sources in total energy use [CSD] <i>Working Group 2 recommended that this indicator to be a top priority – Code 1 instead of 2</i>	2
	Share of imports in total energy supply	2
	Intensity of energy use, total and by economic activity [CSD]	2
	Annual energy consumption, total and by main user category [CSD]	2
	Total energy consumption per capita	1
	Traditional fuel use as a percentage of total energy consumption	1
Access to electricity	Share of households with access to electricity	1

## Waste

Priority area	Indicator	Code
Waste generation and management	Generation of waste [CSD]	1
	Waste treatment and disposal [CSD] <i>Working Group 2 recommends this to be classified as Code #1</i>	2
	Municipal waste collected per capita	1
	Composition of municipal waste by main material groups 1	2
	Proportion of population served by municipal waste collection	1
	Generation of hazardous waste [CSD]	1
	Hazardous waste imported/exported	2
	Number and capacity of facilities for the disposal of hazardous waste	2

## Health and Environment

Priority area	Indicator	Code
Mortality	Under five mortality rate [MDG] <i>Working Group 2 proposes to establish this as a priority indicator:</i> <ul style="list-style-type: none"> <li>Under five mortality rate for children living in unhealthy environments</li> </ul> <i>These data are available every 5 years for DHS every three years for MICS. They are available for almost all countries of the region.</i>	3
	Maternal mortality ratio per 100,000 live births [MDG] <i>Working Group 2 proposes to establish this as a priority indicator:</i> <ul style="list-style-type: none"> <li>Maternal mortality ratio per 100,000 live births for children living in unhealthy environments</li> </ul> <i>These data are available every 5 years for DHS every three years for MICS. They are available for almost all countries of the region.</i>	3
	Mortality rate <i>Working Group 2 proposes to establish this as a priority indicator:</i> <ul style="list-style-type: none"> <li>Mortality rate of adults living in unhealthy environments.</li> </ul> <i>The sources for this indicator would be the Demographic Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) in the countries concerned. The data are available for almost all countries of the region.</i>	3
Health care	Percent of population with access to primary health care facilities [CSD]	3
	Public expenditure on health as a percentage of Gross National Income (GNI)	3
Access to safe water and sanitation	Proportion of population using an improved sanitation facility [MDG]	1
	Proportion of population using an improved drinking water source [MDG]*	3
Informal settlements	Proportion of urban population living in slums [MDG]	1
	Informal settlements, area and percentage of population	2
Diseases related to water	Incidence of water-related diseases	1
Diseases related to air pollution	Incidence of air pollution related diseases	1

\* Indicates repetition of the indicator in the Freshwater section.