



## CAMEROON BIOSECURITY PROJECT

*Development and Institution of a National Monitoring and Control System (Framework) for Living Modified Organisms (LMOs) and Invasive Alien Species (IAS)*

# COURSE NOTES ON DETECTION, DIAGNOSTICS AND MONITORING OF BIOLOGICAL INVASIONS AND LIVING MODIFIED ORGANISMS IN CAMEROON

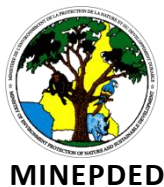
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### Under the Supervision of:

Project Component 3 Taskforce (MINESUP)

&

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## Table of Contents

<b>TABLE OF CONTENTS</b> .....	<b>i</b>
<b>ACRONYMS AND ABBREVIATIONS</b> .....	<b>ii</b>
<b>LIST OF FIGURES</b> .....	<b>iv</b>
<b>LIST OF TABLE</b> .....	<b>vi</b>
<b>PREFERRED WAY TO CITE THIS DOCUMENT</b> .....	<b>vii</b>
<b>CONTACT DETAILS OF THOSE WHO PARTICIPATED</b> .....	<b>viii</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>x</b>
<b>DISCLAIMER</b> .....	<b>xi</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>1</b>
<b>RÉSUMÉ EXÉCUTIF</b> .....	<b>3</b>
<b>I. INTRODUCTION</b> .....	<b>6</b>
<b>II. COURSE NOTES</b> .....	<b>16</b>
II.1. CHAPTER 1: <u>P</u> RE-COURSE KNOWLEDGE ASSESSMENT <u>R</u> ELATIVE TO COURSE OBJECTIVES .....	18
II.2 CHAPTER 2: <u>I</u> NTRODUCTION: AN OVERVIEW OF DETECTION, DIAGNOSTICS AND MONITORING OF BIOLOGICAL INVASIONS: WHY? WHAT? HOW? AND WHEN? .....	20
II.3 CHAPTER 3: <u>M</u> ATCHING MONITORING WITH OBJECTIVES, PATHWAYS & SPECIES: <u>A</u> PPROACHES & TOOLS TO USE IN DIFFERENT CIRCUMSTANCES .....	50
II.4 CHAPTER 4: <u>G</u> UIDELINES FOR COLLECTION, DOCUMENTATION <u>A</u> ND LABELING FOR EFFICIENCY AND EFFECTIVENESS .....	61
II.5 CHAPTER 5: <u>A</u> N INTRODUCTION TO TECHNIQUES FOR LMO DETECTION, <u>I</u> DENTIFICATION AND QUANTIFICATION .....	67
II.6 CHAPTER 6: <u>A</u> N OVERVIEW OF INTERNATIONAL BODIES, NETWORKS AND DATABASES THAT CAN <u>A</u> SSIST CAMEROON IN DETECTION, DIAGNOSIS <u>A</u> ND MONITORING OF LMOS AND IAS .....	79
CHAPTER 7: <u>A</u> N OVERVIEW OF CAMEROONIAN INSTITUTIONS AND CAPACITIES FOR DETECTION, DIAGNOSTICS <u>A</u> ND MONITORING OF LMOS AND IAS.....	107
II.8 CHAPTER 8 : <u>P</u> OST-COURSE KNOWLEDGE ASSESSMENT .....	116
<b>ANNEXES</b> .....	<b>119</b>

## Acronyms and Abbreviations

ABIS	Automated Bee Identification System,
AIMS	Automatic Identification and characterization of Microbial Populations
ALIS	Automated Leafhopper Identification System,
ANOR	National Agency for Standardisation
APHIS	US Animal and Plant Health Inspection Service up to 2005
AVH	Australia's Virtual Herbarium
BioNET	The Global Network for Taxonomy
BOLD	Barcode of Life Database
CABI	Centre for Agriculture and Biosciences International
CARA	Conservation of Agricultural Resources Act (South Africa)
CBD	Convention on Biological Diversity
CBOL	Consortium for the Barcode of Life
CBP	Cameroon Biosecurity Project
CDC	Centers for Disease Control and Prevention
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement (French International Center in Agronomy for Development)
COP CBD	Conference of Parties to the Convention on Biological Diversity
CPB	Cartagena Protocol on Biosafety to the Convention on Biological Diversity
DAISY	Digital Automated identification System for the rapid screening of invertebrates
DNA	Deoxyribonucleic Acid
EFSA	European Food Safety Authority
EMPRES	Global Animal Disease Information System (EMPRES-AH -
EMPRESi	Emergency Prevention System for Animal Health
EoL	Encyclopedia of Life
EPPO	European Plant Protection Organisation
FAO	Food and Agricultural Organisation of the United Nations
GBIF	Global Biodiversity Information Facility
GDD	Global Disease Detection Program
GEF	Global Environment Facility
GISP	Global Invasive Species Program
GMO	Genetically Modified Organism
GTI	Global Taxonomy Initiative
HIV	Human Immuno virus
IAS	Invasive Alien species
IITA	International Institute of Tropical Agriculture
IMPM	Institute of Medical Plants Studies
IOE	International Organisation for Animal Diseases
IRAD	Institute of Agricultural Research for Development
ISPM	International Standards for Phytosanitary Measures

LANAVET	National Veterinary Laboratory
LMO	Living Modified Organism
MINADER	Ministry of Agriculture and Rural Development;
MINCOMMERCE	Ministry of Trade (Focal Point for the World Trade Organisation);
MINEPDED	Ministry of Environment, Protection of Nature and Sustainable Development
MINEPIA	Ministry of Livestock, Fisheries and Animal Industries
MINESUP	Ministry of Higher Education
MINFOF	Ministry of Forestry and Wildlife
MINMIDT	Ministry of Mines, Industries and Technological Development
MINRESI	Ministry of Scientific Research and Innovation
MINSANTE	Ministry of Public Health
MINTRANSPORT	Ministry in charge of Transport (Focal Point for Ballast Water Convention)
NEMBA	National Environmental Management: Biodiversity Act (South Africa)
NPPO	National Plant Protection Organization
OIE	World Organisation for Animal Health
PCR	Polymerase Chain Reaction
Q&A	Questions and answers
rDNA	Recombinant Deoxyribonucleic Acid
SAPIA	Southern African Plant Invaders Atlas
SDGs	Sustainable Development Goals
SODECOTON	Société de Développement du Coton (National Parastatal charged with the production of Cotton)
SODEPA	Société de Développement et d'Exploitations des Productions Animales (Meat Production Commission)
SOP	Standard Operation Practices
SPIDA	Species Identification Automated) for identification of spiders via their webs,
TBI	Tephritid Barcode Initiative
UAV	unmanned aerial vehicle
UNEP	United Nations Environment Programme
WAHIS	World Animal Health Information Database
WHO	World Health Organisation

## List of figures

Figure 1 <i>Alternanthera brasiliana</i> an IAS in a small urban cassava farm near Yaoundé (left), the plant (right) (Photo: Onana J.M. 2017) .....	23
Figure 2. From left to right: cassava mosaic, maize attacked, insect borer of maize stem, black pod cocoa disease. ....	24
Figure 3. From left to right: Voucher specimen (left) in the National Herbarium for identification by comparison (right) (source: Onana JM 2012) .....	26
Figure 4 Example of illustrations of field guides (left) or photograph (right) <sup>102</sup> .....	27
Figure 5. Morphological description of the plant and illustration of a voucher specimen in the volume of the series <i>Flore du Cameroun</i> <sup>101</sup> .....	27
Figure 6.1: Example of Dichotomous keys : left animal <sup>22</sup> , right plants, extract of the genus <i>Carapa</i> (Meliaceae, mahogany family) key <sup>100</sup> .....	28
Figure 6.2: Example of a section from a hyperlinked, tabular key to the Wood types <sup>21</sup> .....	29
Figure 6.3 RIHA (Réseau Informatique des Herbiers d’Afrique): model for databasing in the National Herbarium of Cameroon.....	30
Figure. 6.4 Overview of a barcode sequence .....	31
Figure 6.5 Identification using barcode.....	32
Figure 7. <i>Browalia americana</i> alien species potentially invasive.....	34
Figures 8A, 8B. <i>Bambusa vulgaris</i> (Indian bamboo) (left) and his distribution (right) green circles) in Cameroon <sup>98</sup> .....	35
Figures 9A, 9B. Water hyacinth (A) and map of the Republic of Cameroon showing the distribution and location of water hyacinth (B) in 2012 (from Sonia Kenfack compiled from various sources).....	35
Figure 10: Options to effectively deal with introductions of alien species (from Wittenberg and Cock, 2001) <sup>35</sup> .....	36
Figure 11: Modified version of Wittenberg and Cock’s alien species options flowchart to illustrate points where taxonomic resources can be applied .....	37
Figure 12: The Action Learning Cycle as part of an adaptive planning, monitoring and evaluation system .....	52
Figure 13 Example of SOP developed by WHO for African region Source : OMS (2014) <sup>99</sup>	58
Figure 14A. Basic material for botanical record and specimen collection .....	63
Figure 14B Data to record in the lab:.....	63
Figure 15: Typical data entered on herbarium sheet <sup>103</sup> .....	64
Figure 16 Overview of a high resolution photo in the web (ex. <i>Vepris oubanguiensis</i> (not IAS) photo from African Plant Initiative (API now Gstor).....	65
Figure 17: Evolution of GMO detection methods and associated reference materials (from Holst-Jensen 2009) <sup>58</sup> .....	72
Figure 18 A: ELISA reader for Enzyme linked immunisorbent assay.....	74
Figure 18B: Lateral flow strip.....	74
Figure 19A: Classical PCR machine .....	75
Figure 19B : Real Time PCR Machine.....	75

Figure 19C: Microarray scanner .....	75
Figure 19D : Sequencer: Can sequencer millions of bases in 6h .....	75
Figure 20. Data available in GBIF database for Cameroon on the 31st December 2016.....	83
Figure 21: The four quadrants of knowledge management <sup>96</sup> .....	101
Figure 22: Company growth cycles as an illustration of the accelerating pace of change (see text for explanation).....	102
Figure 23. Bundles of classified voucher plant specimens incorporated in cupboards in the National Herbarium of Cameroon are tools for identification of invasive plants species .....	111

## List of table

Table 1 Structure of the modules .....	11
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## Contact details of those who participated

### ➤ **Authors:**

#### **Dr. HDR Jean Michel Onana**

Senior Lecturer & Senior Scientific Officer  
University of Yaoundé I  
Faculty of Science,  
Department of Plant Biology  
Tel +(237) 673 928 731/ 699 743 878  
Email: jeanmichelonan@gmail.com

#### **Pr. Stephen M. Ghogomu**

Associate Professor  
University of Buea,  
Associate Coordinator, Biotechnology Unit,  
Head of the Molecular & Cell Biology Laboratory  
Tel +(237) 678455646  
Email: stephen.ghogomu@ubuea.cm

### ➤ **Members of the Project Coordination Unit:**

#### **Mr. Rigobert Ntep**

Cameroon Biosecurity Project  
Coordinator Ministry of Environment,  
Protection of Nature and Sustainable  
Development  
CIDE, Yaoundé, Cameroon  
Tel: +237 677 30 39 32  
Email: rntep@yahoo.fr

#### **Mr. Declan Chongwa Ambe**

Cameroon Biosecurity Project  
Assistant  
Ministry of Environment, Protection of  
Nature and Sustainable Development  
Yaoundé, Cameroon  
Tel: +237 677 02 22 85 / 696 86 66 19  
Email: declanambe@yahoo.co.uk

#### **Mr. Clouvis Johnbang**

Cameroon Biosecurity Project  
Financial Assistant  
Ministry of Environment, Protection of  
Nature and Sustainable Development  
Yaoundé, Cameroon  
Tel: +237 675 95 92 97 / 698 09 94 77  
Email: clouvisjohnbang@yahoo.com

➤ **Project Technical Advisers:**

**Dr. David Mbah**

Project Technical Adviser  
Cameron Academy of Sciences  
Tel: 677 839 141  
Email: dambah@yahoo.co.uk

**Dr John Mauremootoo**

Supporting Project & Programme  
Planning, Monitoring and Evaluation  
Phone/Fax: +44 (0)1934 876565  
Email: John@InspiralPathways.com  
Skype: johnmaure  
Website: www.inspiralpathways.com

➤ **Members of the Component 3 Taskforce**

**Dr. Annie WAKATA**

Head Component 3  
MINESUP  
Tel: +237 674 60 03 31  
Email: annie\_beya@yahoo.fr

**Mr. Valentin Wagnoun**

Component 3 Co-Lead  
MINEPDED  
Tel: +237 677 86 69 58  
Email: valiwa1@yahoo.fr

**Mr. Alain Hervey Njike Tchoukwam**

Component 3 Support Staff  
MINESUP  
Tel: +237 677170084  
Email: ahnjike1@yahoo.fr

**Dr. Roger Noël Iroume**

Component 3 Task Team Member  
Inspector General  
MINRESI  
Yaoundé, Cameroon  
Tel: +237 677335433  
Email: iroumerog@hotmail.fr

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## **EXECUTIVE SUMMARY**

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### **Context and justification**

The Capacity building is based on the development and implementation of a programme of training of human resources in the trade or management of biological material in detection, diagnostics and monitoring of biological invasions and LMOs. Low levels of detection, diagnostic and monitoring capacity was identified as one of the prevailing biosecurity weaknesses amongst multiple key stakeholder institutions including the private sector in Cameroon. The information generated from diverse technical and scientific sources and compiled in a single document will address this barrier by creating an easy to access and comprehensible reference source from which various stakeholders can fetch knowledge for use in their specific disciplines and levels, geared towards managing the complex issues of IAS and LMOs in Cameroon.

### **Objective of the course notes**

The activity aims at delivering a course in detection, diagnostics and monitoring of biological invasions and management of LMOs in Cameroon. The course will be divided in eight training modules based on the above information. By the end of the course the trainees should:

1. Have an overview of diagnostics – from detection to management
2. Know types of sampling techniques available for different groups
3. Know types of identification tools and how to use them.
4. Know systems for monitoring biological invasions
5. Know approaches and tools for Matching monitoring with objectives, pathways & species
6. Understand guidelines for collection, labelling and documentation including data basing.
7. Know about techniques for detection, identification and quantification of LMOs.
8. Know about the institutions and capacities for detection, diagnostics and monitoring in Cameroon.
9. Know about international institutions, organisations and networks that can assist Cameroon in detection, diagnosis and monitoring.

### **Methodology to deliver the course**

The trainers will examined multiple sources of information both from within Cameroon, notably the course notes on detection, diagnosis and monitoring of biological invasions and management of LMOs in Cameroon, technical reports produced within the CBP, as well as

pertinent national legislation and information from concerned international organisations, research and scientific institutions including other governmental Institutions. The second step will be to take into account cases studies which can be applicable to the Cameroonian context which illustrate good practice approaches in managing the biological invasions and living modified organisms (LMOs). The training approach will be interactive, with presentations in plenary, sub group discussions on case studies followed by sub-group results presentations, questions and answer sessions. Field or laboratory practice will be done such as collecting specimen, identification of biological material and reporting to illustrate the different steps of the management of biological invasions and LMOs.

## Results

The above collection and write up in the form of eight modules prepared as PowerPoint presentations will be used for the training on Detection, Diagnostics and Monitoring. The course will be divided into the following chapters:

- *Chapter 1: Pre-course knowledge assessment relative to course objectives*
- *Chapter 2: Introduction. An overview of detection, diagnostics and monitoring of biological invasions: What? Why? How? and When?*
- *Chapter 3: Matching monitoring with objectives, pathways & species: approaches & tools to use in different circumstances.*
- *Chapter 4: Guidelines for collection, documentation and labelling for efficiency and effectiveness.*
- *Chapter 5: An introduction to techniques for LMO detection, identification and quantification.*
- *Chapter 6: An overview of international bodies, networks and databases that can assist Cameroon in detection, diagnosis and monitoring of LMOs and IAS,*
- *Chapter 7: An overview of Cameroonian institutions and capacities for detection, diagnostics and monitoring of LMOs and IAS;*
- *Chapter 8: Post-course knowledge assessment relative to course objectives.*

Each chapter is summarised and a module quiz for participants is produced to test their understanding of the teaching material. Model answers are provided in Annex 3 to assess the knowledge gained. The overview of the PowerPoint slides module by module is shown in Annex 5.

## RÉSUMÉ EXÉCUTIF

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### Contexte et justificatif

Le renforcement de capacité repose sur la mise en œuvre d'un programme de renforcement des capacités des ressources humaines de différentes entités impliquées dans le commerce ou la gestion de matériel biologique dans la détection, le diagnostic et le suivi des invasions biologiques et des organismes vivants modifiés par l'élaboration d'une note de cours. Les faibles niveaux de détection, de diagnostic et de capacité de surveillance ont été identifiés comme l'une des faiblesses de la biosécurité en vigueur parmi les multiples institutions clés, y compris le secteur privé au Cameroun. Ensuite Les informations générées à partir de diverses sources techniques et scientifiques et compilées dans un document unique aborderont cette barrière en créant une source de référence facile à accéder et compréhensible à partir de laquelle diverses parties prenantes peuvent récupérer des connaissances à utiliser dans leurs compétences et niveaux spécifiques, orientés vers la gestion du complexe problème d'espèces étrangères envahissantes et d'organismes vivants modifiés au Cameroun.

### Objectif des notes de cours

L'activité vise à dispenser un cours sur la détection, le diagnostic et la surveillance des invasions biologiques, et des organismes vivants modifiés au Cameroun. Le cours sera divisé en huit modules de formation. À la fin du cours, les personnes formées devront :

1. Avoir un aperçu des diagnostics - de la détection à la gestion
2. Connaître les types de techniques d'échantillonnage disponibles pour différents groupes
3. Connaître les types d'outils d'identification et comment les utiliser.
4. Connaître les systèmes de surveillance des invasions biologiques
5. Connaître les approches et les outils pour assortir le suivi avec des objectifs, des voies et des espèces
6. Comprendre les lignes directrices pour la collecte, l'étiquetage et la documentation, y compris les bases de données.
- 7 Connaître les techniques de détection, d'identification et de quantification des OVM.
8. Connaître les institutions et les capacités de détection, de diagnostic et de surveillance au Cameroun.
9. Connaître les institutions internationales, les organisations et les réseaux qui peuvent aider le Cameroun dans la détection, le diagnostic et le suivi.

## **Méthodologie pour dispenser le cours**

Les enseignants consulteront plusieurs sources d'information, notamment les notes de cours sur la détection, le diagnostic et le monitoring des invasions biologiques et les organismes vivants modifiés au Cameroun, les rapports techniques, ainsi que la législation nationale pertinente et l'information disponible auprès d'organisations internationales intéressées, à la recherche et aux institutions scientifiques, y compris d'autres institutions gouvernementales. La seconde étape sera de prendre en compte des études de cas applicable dans le contexte du Cameroun et qui illustrent de bonnes pratiques pour la gestion des invasions biologiques ou des organismes vivants modifiés. L'approche de formation sera interactive, avec des présentations *powerpoint* en plénière, des discussions en sous-groupes sur les études de cas suivies de présentations de résultats de sous-groupes, de questions et de réponses. Des sessions pratiques sur le terrain ou en laboratoire tel que la collecte d'échantillon, l'identification et le reportage aideront à illustrer les différentes étapes évoquées ci-dessus sont à prévoir.

## **Résultats**

Le cours sera délivré sous la forme de huit modules préparés en tant que présentations *PowerPoint* et délivrés en huit modules présentés dans les notes de cours sous forme de chapitre ainsi qu'il suit :

- Chapitre 1: Evaluation des connaissances avant le cours par rapport aux objectifs du cours
- Chapitre 2: Introduction. Un aperçu de la détection, du diagnostic et de la surveillance des invasions biologiques: Quoi? Pourquoi? Comment? et Quand?
- Chapitre 3: Assortir le suivi-évaluation avec les objectifs, les voies de circulation et les espèces: approches et outils à utiliser dans différentes circonstances
- Chapitre 4: Lignes directrices pour la collecte, la documentation et l'étiquetage pour l'efficacité et l'efficience
- Chapitre 5: Introduction aux techniques de détection, d'identification et de quantification des OVM
- Chapitre 6: Un aperçu des organismes internationaux, des réseaux et des bases de données qui peuvent aider le Cameroun dans la détection, le diagnostic et le suivi des OVM et des EEE
- Chapitre 7: Aperçu des institutions camerounaises et des capacités de détection, de diagnostic et de suivi des OVM et des EEE
- Chapitre 8: Evaluation des connaissances post-cours par rapport aux objectifs du cours



Chaque module sera résumé au début du module et un test de connaissances acquises à la fin du module pour les participants afin d'évaluer les niveaux de compréhension et d'assimilation du contenu du module. Les réponses modèles sont données à l'Annexe 3. L'aperçu des présentations des diapositives powerpoint module par module est donné à l'annexe 5.