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CAMEROON BIOSECURITY PROJECT

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

TRAINING MANUAL ON DETECTION, DIAGNOSIS AND MONITORING OF BIOLOGICAL INVASIONS IN CAMEROON

This Training Manual has been produced with the support of UNEP/ GEF and the Government of Cameroon via the Ministry of Environment, Protection of Nature and Sustainable Development.

Under the Supervision of:

Project Component Three Taskforce (MINESUP)

&

The Biosecurity Project Coordination Unit (MINEPDED)

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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
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	Institutes 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 and 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
MINMINT	Ministry of Mines, Industries and Technological Development
MINRESI	Ministry of Scientific Research and Innovation
MINSANTE	Ministry of Public Health
MinT	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	National Parastatal charged with the production of Cotton which currently carries out field confined trial of GM Cotton in Cameroon
SODEPA	Société de Developpement 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

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EXECUTIVE SUMMARY

Purpose (context and justification)

The Project Objective of the UNEP/GEF funded Cameroon Biosecurity Project (*Development and Institution of a National Monitoring and Control System (Framework) for Living Modified Organisms (LMOs) and Invasive Alien Species (IAS)*) being executed by MINEPDED in collaboration with other key institutions is to increase capacity to prevent and control the introduction, establishment and spread of IAS and management of LMOs in Cameroon through the implementation of a risk-based decision making process. This project intends to address the gaps existing in the area of IAS management (which has been documented as one of the major causes of accelerated biodiversity loss including nefarious impacts on human and animal health as well as diminishing returns in ecosystems services provision). Since LMOs present several benefits to science, agriculture, health and economic growth but carry along with them the potential to become invasive, the need for detecting, diagnostics and monitoring of these novel organisms has also been underscored in the framework of this project.

Activity C4 is based on the development and implementation of a programme of training of trainers and project personnel in detection, diagnostics and monitoring of biological invasions and the development of a training manual under Component 3 of the Project entitled: Build capacity to enable the control of the entry, establishment and spread of IAS and management of LMOs (*Capacity building*). 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 activity

The activity aims at producing a manual and delivering a training course in detection, diagnostics and monitoring of biological invasions - traditional, molecular and biodiversity informatics for Cameroon. The Trainers will produce 8 training modules based on the above information as well as the course manual on detection, diagnostics and monitoring of biological invasions in order to increase stakeholder awareness of the options available for a comprehensive range of taxa.

By the end of the course the trainees (potential national trainers and project personnel) were expected to:

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

Methodology

The Consultants examined multiple sources of information both from within Cameroon, notably 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 initial step after presenting a work plan which was validated by the Component's Task Team was the gathering of information produced by previous activities of the Cameroon Biosecurity Project (reports, previous training manuals, the current biosecurity profile, interviews with national experts, literature from organisations involved in IAS/LMOs related issues, the invasive species list for Cameroon), focusing on DDM of biological invasions and taking into account cases studies which can be applicable to the Cameroonian context which illustrate good practice approaches. Using these information sources and the international literature, the consultants drafted the manual which was used as a basis for the Training of Trainers in a national workshop which brought together over thirty-five experts. The experts whose capacity was to be enhanced during the training course were selected from target biosecurity-related institutions and some non-governmental organisations from Cameroon. They were comprised of stakeholders from customs, environmental inspection, agricultural /livestock inspection, researchers, curators at the National Herbarium, lecturers in Universities notable those in which biotechnology centres exist, and representatives of NGOs dealing with environmental public awareness occupying various positions that required them to have a general overview of the importance and understanding of the components of detection, diagnostics and monitoring of biological invasions. The training approach was interactive, with presentations in

plenary, sub group discussions on case studies followed by sub-group results presentations, questions and answer sessions.

Valuable input was provided by the experts during the one-day training. This enabled the repositioning of views and examples used in the document to be in coherence with the Cameroonian context. Some of the experts also provided further information which was used to redraft the manual. Additional updates were made following feedback received from the Component 3 Task Team during their examination of the first draft consultancy manual.

Results

The above collection and write up in the form of eight training modules prepared as PowerPoint presentations by the Consultants was used for the Trainers of Trainers as well as the production of a technical Manual on Detection, Diagnostics and Monitoring including dispensing a one-day Training course in a Workshop, and a Report. These are the main outcomes of the process.

The manual has been divided into the following modules:

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

Each module was summarised and a module quiz for participants was produced to test their understanding of the teaching material.

Next Steps in conformity with the CBP logframe

Despite the existence of several key actors in the field of LMO/IAS diagnostics, detection and monitoring, biosecurity measures still encounter a set of drawbacks – lack of proper coordination in actions and strategies; weak law enforcement; insufficient biosecurity legislation; poor infrastructure, insufficient technical capacity building through training of trainers; insufficient public awareness creation and insufficient government funding for functional biosecurity institutions and personnel to carry out biosecurity duties. In the area of cooperation or partnership development, much effort has to be done in order to tap the diverse opportunities offered by bilateral/multilateral cooperation existing in the area of management of IAS and LMOs in general and enhancing national capacity for diagnostics, detection and monitoring in particular especially from countries with tremendous experience like Australia and New Zealand that are quite ready to provide needed support to developing countries like Cameroon. Some available expertise is sometimes poorly utilised creating frustrations that can contribute to a brain drain.