

## **CROSS BORDER BIODIVERSITY CURRICULUM**



### **A REPORT ON THE CURRICULUM DEVELOPMENT WRITE SHOP**

**Editors**

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**ANAFE Executive Secretary**

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## Introduction

This write shop was a follow up of the Cross Border Curriculum development workshop which was a collaborative effort between the ICRAF Manager of the Tana Kipini-Laga Badana Bush Bushle Landa and Seascape Project and ANAFE. The purpose of the write shop was to develop the course content to be reflected in the cross border biodiversity curriculum using material/information which was generated during the cross border curriculum development workshop. The specific objectives were:

1. Analysis of Jobs, tasks, competences and topics generated during the workshop
2. Sequencing of reviewed modules
3. Ranking of modules
4. Time allocation to modules
5. Development of curriculum and learning objectives
6. Development of syllabi
7. Identification of teaching requirements

## Analysis of jobs, task, competences and topics

During the analysis of the jobs, tasks, competences and teaching topics which were identified by participants during the curriculum development workshop, the following were done:

- Review of the identified job opportunities for the curriculum graduates
- Review of some of the identified tasks related to the identified jobs
- review of identified areas of competences to:
  - identify possible combinations to form broader competence
  - identify competences which are amorphaously broad, requiring splitting or refocusing for clarity.
- restating some modules
- review of the topics identified for teaching

A summary of the reviewed available job positions for the graduates of this course, the tasks to be performed, competences needed and the topics to be taught during the write shop is given in Annex 1.

## Sequencing of topics

The identified modules were sequenced using a sequencing matrix to develop a teaching order, and also to identify interdependency levels of modules. Sequencing also helps in enhancing curriculum coherence, revealing the logical relationships between modules in a curriculum, enhancing the effectiveness of learning, minimizing inconsistencies in the curriculum and curtailing duplication. The results of sequencing of modules are reflected in the arrangement of modules in the curriculum, and topics in each of the modules.

## Ranking of the identified modules

Topics for teaching were subjectively ranked by identifying groups of modules starting with core modules, progressively to the lesser core ones (Table 1). Modules in the first group were given rank 1; second group is given rank 2, progressively till the last group. Ranking helps in categorizing topics into:

- a. Prerequisites
- b. Co-requisites
- c. Related
- d. Remedial

**Table 1: Summary of the ranking of modules**

Rank 1	Rank 2	Rank 3
1. Introduction to Biodiversity	Biodiversity enterprises	1. Biodiversity Management
2. Biodiversity research and training		2..Biodiversity conservation and evaluation

## Time allocation to modules group ranks

Time allocated to modules depends on the duration of the training programme and the total available time subsequently. In this case it was assumed that the programme would last for two years. Time allocated to each module group depends on total available time for the whole course, total number of module groups, and rank of the module group. Time allocation to module group rank was given by the following formula:

$$T_g = (n/\Sigma n)T$$

Where:  $T_g$  = Module group time  
 $T$  = Time available for the whole course  
 $n$  = Weighted rank of module group  
 $\Sigma n$  = Sum of ranks of all module groups

## Time allocation to each module

Time allocated to each modules depends on time allocated to the module group rank, and the number of modules in the group. Time for each module in a ranked group of modules was determined by dividing time allocated to the group by the number of modules in the group rank, by applying the following formula:

Where  $T_m$  =  $T_g/N_m$   
 $T_m$  = Time allocated to a module  
 $T_g$  = Time allocated to a group of modules  
 $N_m$  = Number of modules in a group

## Time allocation per topic

Time allocated to each topic depends on time allocated to a module and the number of topics in the module. Time allocation to each of the modules was done by dividing the number of topics in module by the time allocated to the module. The following formula was used:

$$T_t = T_m / N_t$$

Where  $T_t$  = Time allocated to a topic  
 $T_m$  = Time allocated to topics in a module  
 $N_t$  = Number of topics in a module

A summary of time allocation at module rank, module and topic level for this curriculum is given in table 2.

**Table 2: Summary of time allocation**

Module Rank	Modules in Rank	Rank time allocation	Module time allocation	Topics in a module	Topic time allocation
1	2	440	120	6	20
2	1	90	9	6	15
3	2	160	80	6	13

## Development of Course aim and module objectives

Course aim is largely dependent on the level of training and country education settings and paradigms, and therefore vary from what is stated here. During the write shop, it was envisaged that the aim of this course was broadly, to ‘build capacity for conservation and sustainable management of biodiversity in IGAD region in order to contribute to poverty reduction and lasting ecosystems goods and services.

The following are the objectives of a modules and they were developed by considering all the topics in the modules, and carefully wording the objectives to reflect the effects of the modules to the learner in relationship to the course aim of building biodiversity conservation capacity in the IGAD region.

1. Establishment and sustainable management of biodiversity related business enterprises
2. Conducting biodiversity research and training
3. Management of biodiversity conservation and valuation initiatives

## Identification of teaching resources

Available resources greatly influence implementation process of a curriculum. It is therefore recommended that a review of available resources is undertaken at institutional level, to establish required resources for curriculum implementation, as a way of preparedness for curriculum implementation, to enable advance sourcing. A review of financial, human

resource, teaching aids (books, laboratories, natural resources (forests, land, parks, land, lakes), demonstration plots/areas, audio-visuals, computers, machinery, tools and any other equipment should be carried out to establish status, action needed and actors as a way of preparing for the implementation of this curriculum. Effort was made to identify the basic required resources for delivery of the curriculum, however, detailed analysis of teaching resources will be best achieved at institutional level by considering modules individually, more especially when considering human resource needs.

## Conclusion

The write shop was very useful in putting together material and information which is now embodied the curriculum guide for Cross Border biodiversity. It was a very difficult but useful exercise, whose outputs we are very proud of.

Annex I			
Summary of Job positions, tasks, competences and topics to be taught			
JOB AREA	TASKS	COMPETENCES	STUDY TOPICS
Farm management	<ul style="list-style-type: none"> <li>Monitoring agrobiodiversity</li> <li>Enhancing farm productivity through agro biodiversity</li> <li>Enhancing and Sustaining soil biodiversity</li> <li>Diversifying farm products through biodiversity</li> <li>Mobilizing communities for biodiversity benefits</li> </ul>	<ul style="list-style-type: none"> <li>knowledge of biodiversity in enhancing farm productivity</li> <li>understand biodiversity value chains</li> <li>understand soil biota and soil conservation techniques</li> <li>Protect soil biodiversity for farm productivity</li> <li>Post-harvest management in biodiversity</li> <li>Extension skills</li> <li>Biodiversity interactions in agroecosystems</li> </ul>	<ul style="list-style-type: none"> <li>Species Identification and classification</li> <li>Resource economics</li> <li>Soil biology</li> <li>Soil and water conservation</li> <li>Post-harvest management</li> <li>Agroforestry practices</li> <li>Entrepreneurship</li> <li>Extension and community outreach in biodiversity</li> <li>agro ecology</li> <li>Principles of farm management</li> </ul>
Entrepreneurs hip	<ul style="list-style-type: none"> <li>Establishing entrepreneurial opportunities in biodiversity</li> <li>Establishing business opportunities in bio prospecting</li> </ul>	<ul style="list-style-type: none"> <li>Biodiversity based value addition</li> <li>Entrepreneurial skills</li> <li>Patent biodiversity innovations and products</li> <li>Development of biodiversity business plans</li> <li>capacity for biodiversity based value chains</li> </ul>	<ul style="list-style-type: none"> <li>bioprospecting</li> <li>entrepreneurship in biodiversity</li> <li>intellectual property rights</li> <li>business planning and decision making in biodiversity</li> <li>value chain analysis</li> <li>certification (quality and safety standards )</li> <li>biodiversity policy and legislation</li> </ul>
Education/Training	<ul style="list-style-type: none"> <li>Training in biodiversity</li> <li>Carrying out research in biodiversity</li> <li>Developing training resources on biodiversity</li> <li>Carrying out training needs assessment on biodiversity</li> <li>Carrying out community outreach on biodiversity</li> <li>Developing and reviewing biodiversity curriculum</li> </ul>	<ul style="list-style-type: none"> <li>Knowledge on biodiversity</li> <li>Pedagogy and didactic skills</li> <li>Andragogy</li> <li>Research skills</li> <li>Training Material development</li> <li>Community outreach skills</li> <li>Curriculum development ,implementation and monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Species Identification and classification</li> <li>Methods of teaching (problem based methodologies)</li> <li>Research methods</li> <li>Principles of adult learning</li> <li>Design and development of resource materials</li> <li>Extension and community outreach methodologies</li> <li>Principles of curriculum development</li> <li>Gender and youth in biodiversity management</li> <li></li> </ul>
Wild life management	<ul style="list-style-type: none"> <li>Mapping biodiversity</li> <li>Managing biodiversity</li> <li>Monitoring biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>Identification of biodiversity resources</li> <li>Assessment of biodiversity resources</li> <li>Interpret international, regional national and local biodiversity related policies</li> </ul>	<ul style="list-style-type: none"> <li>Mapping biodiversity</li> <li>Socio-cultural aspects of biodiversity</li> <li>indigenous knowledge in the management of biodiversity resources</li> <li>international conventions, laws</li> </ul>



		<ul style="list-style-type: none"> <li>• Enforcement of biodiversity laws and regulations</li> <li>• Wildlife –human conflicts management</li> <li>• Biodiversity management planning</li> </ul>	<ul style="list-style-type: none"> <li>• National legislations and local bylaws in on cross border biodiversity</li> <li>• Resource-based Conflicts management</li> <li>• Planning diversity of wildlife</li> </ul>
Biodiversity conservation and development	<ul style="list-style-type: none"> <li>• Establishing the state and status of biodiversity</li> <li>• Developing biodiversity conservation strategy</li> <li>• Develop capacity for managing and advancing biodiversity</li> <li>• Biodiversity resource assessment</li> <li>• Advising policy formulation</li> </ul>	<ul style="list-style-type: none"> <li>• Biodiversity inventory and characterization (typology)</li> <li>• Strategic planning</li> <li>• Human resources development</li> <li>• Resource mobilization</li> <li>• Biodiversity valuation</li> <li>• Application of IK</li> <li>• Awareness and application of relevant policies</li> <li>• Community mobilization and sensitization</li> <li>• Resource use planning</li> <li>• Identify threats to biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• Surveying biodiversity</li> <li>• Species Identification and classification</li> <li>• Training staff</li> <li>• Proposal writing</li> <li>• Domesticating of species</li> <li>• Indigenous knowledge in biodiversity</li> <li>• Biodiversity management techniques</li> <li>• Policy making, interpretation and application</li> <li>• Resource valuation methods and tools</li> <li>• Communicating biodiversity</li> <li>• Biodiversity planning</li> <li>• Threats to Biodiversity conservation</li> <li>• Identification and quantification of flora and fauna</li> <li>•</li> </ul>
Biodiversity tourism	<ul style="list-style-type: none"> <li>• Establish biodiversity hotspots</li> <li>• Inventory biodiversity by ecosystem and species</li> <li>• Communicate biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• Characterize biodiversity sites</li> <li>• Develop species identification manuals</li> <li>• Integrate IK into tourism models</li> <li>• Design communication strategies and packages</li> <li>• Communicate with stakeholders/clients</li> </ul>	<ul style="list-style-type: none"> <li>• Common and unique plant species by taxa</li> <li>• Common and unique animal species</li> <li>• Animal behaviour</li> <li>• Local uses of plants and animals</li> <li>• Reproductive biology of key species</li> <li>• Indigenous knowledge on plants and animals</li> <li>• Communicating tourism</li> <li>• Tour planning and management</li> <li>• Marketing biodiversity tourism (Writing brochures and publicity tools )</li> <li>• Biodiversity site management and protection</li> </ul>
Germplasm and gene bank management	<ul style="list-style-type: none"> <li>• Characterize species and that require conservation</li> <li>• Collect and preserve species for conservation</li> <li>• Establish a gene bank</li> </ul>	<ul style="list-style-type: none"> <li>• Identify threatened and endangered species</li> <li>• Develop a database on species</li> <li>• Apply appropriate conservation strategies</li> <li>• Germplasm propagation</li> <li>• Germplasm collection and testing</li> </ul>	<ul style="list-style-type: none"> <li>• CITES protocols</li> <li>• Threat thresholds for plant and animal species</li> <li>• Insitu and exsitu conservation</li> <li>• Nursery planning and establishment</li> <li>• Nursery management</li> <li>• Seed testing and management</li> <li>• Propagation methods and tools</li> </ul>

		<ul style="list-style-type: none"> <li>• Gene bank design</li> <li>• Managing a gene bank</li> </ul>	<ul style="list-style-type: none"> <li>• Gene bank planning and establishment</li> <li>• Collection and processing materials for gene banking</li> <li>• Gene bank records management</li> <li>• Germplasm Transfer Agreements</li> </ul>
Natural resources valuation	<ul style="list-style-type: none"> <li>• Valuing biodiversity resources</li> <li>• Biodiversity risk assessment and management</li> <li>• Resource audit</li> <li>• Certification</li> </ul>	<ul style="list-style-type: none"> <li>• Biodiversity value chain analysis</li> <li>• Valorization of biodiversity resources and services</li> <li>• Cost benefit analysis of tangible and intangible biodiversity resources and services</li> <li>• Risks analysis and management</li> <li>• Evaluating investment in biodiversity</li> <li>• Criteria and indicators of sustainable biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• Uses of biodiversity species</li> <li>• Value chain for different products</li> <li>• Valuation of goods and services</li> <li>• Risk assessment, aversion and management</li> <li>• Profitability of investing in biodiversity (case studies)</li> <li>• Setting performance targets</li> <li>• Assessing performance</li> <li>• Monitoring and evaluation of biodiversity status</li> </ul>
Biodiversity conservation and development	<ul style="list-style-type: none"> <li>• Establishing the state and status of biodiversity</li> <li>• Developing biodiversity conservation strategy</li> <li>• Develop capacity for managing and advancing biodiversity</li> <li>• Biodiversity resource assessment</li> <li>• Advising policy formulation</li> </ul>	<ul style="list-style-type: none"> <li>• Biodiversity inventory and characterization (typology)</li> <li>• Strategic planning</li> <li>• Human resources development</li> <li>• Resource mobilization</li> <li>• Biodiversity valuation</li> <li>• Application of IK</li> <li>• Awareness and application of relevant policies</li> <li>• Community mobilization and sensitization</li> <li>• Resource use planning</li> <li>• Identify threats to biodiversity</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Surveying biodiversity</li> <li>• Species Identification and classification</li> <li>• Training staff</li> <li>• Proposal writing</li> <li>• Domesticating of species</li> <li>• Indigenous knowledge in biodiversity</li> <li>• Biodiversity management techniques</li> <li>• Policy making, interpretation and application</li> <li>• Resource valuation methods and tools</li> <li>• Communicating biodiversity</li> <li>• Biodiversity planning</li> <li>• Threats to Biodiversity conservation</li> <li>• Identification and quantification of flora and fauna</li> </ul>
Forest management	<ul style="list-style-type: none"> <li>• Developing integrated forest management plans</li> <li>• Implementing the integrated plans</li> <li>• Enriching cross border biodiversity</li> <li>•</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Forest biodiversity conservation</li> <li>• Forest biodiversity management planning</li> <li>• Community mobilization for biodiversity conservation</li> <li>• Enforcement of forest biodiversity laws and regulations</li> <li>• Exchanging genetic materials</li> </ul>	<ul style="list-style-type: none"> <li>• Forest biodiversity management planning</li> <li>• Land surveying, photogrammetry and mapping</li> <li>• Forest biodiversity inventory and characterization techniques</li> <li>• Community mobilization</li> <li>• Plant taxonomy and dendrology</li> <li>• plant nursery management</li> <li>• participatory forest management</li> </ul>

		<ul style="list-style-type: none"> <li>• Mobilizing resources for cross border biodiversity conservation</li> <li>• Understanding of user rights and zoning regulations</li> <li>• developing maps of biodiversity resources</li> <li>• propagating plant species</li> </ul>	<ul style="list-style-type: none"> <li>• Database creation and management for plant genetic resources</li> <li>• International treaties on germplasm exchange</li> <li>• International, regional and national policies and legislation regulation on forest biodiversity</li> <li>• Plant propagation</li> <li>• Plant conservation strategies</li> <li>• Project development</li> <li>• Biomass assessment</li> <li>• Ecology and climate</li> </ul>
Land scape management	<ul style="list-style-type: none"> <li>• Landscape based biodiversity assessment and management</li> <li>• Land valuation and validating of land use types (Land surveying)</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge on tools to assess biodiversity</li> <li>• Expertise on project management</li> <li>• Land health management</li> <li>• Understanding of cross boarder biodiversity resources</li> <li>• Identifying and mapping biodiversity resources in the landscape</li> <li>• Applying cultural values /ITK for biodiversity conservation</li> <li>• Valuing landscape as a natural ,cultural, economic and educational resources</li> <li>• Diagnosing and analysing information</li> <li>• Using cultural values /ITK for biodiversity conservation</li> </ul>	<ul style="list-style-type: none"> <li>• Design of research and development projects for cross boarder resources management</li> <li>• Indigenous Technical Knowledge for biodiversity conservation</li> <li>• Land use types</li> <li>• Land valuation</li> <li>• Communication and report writing skills with respect of projects</li> <li>• Landscape ecology</li> <li>• Agro biodiversity management</li> <li>• Extension and advisory services</li> <li>• Management of migratory species</li> <li>• Population genetics</li> <li>• Genetic diversity studies</li> <li>• Biogeography</li> <li>• Land photogrammetry and survey</li> </ul>
Research	<ul style="list-style-type: none"> <li>• Data management on cross boarder biodiversity</li> <li>• Designing studies on cross boarder biodiversity</li> <li>• Develop strategies, protocols and policy recommendation</li> <li>• Resource mobilization</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Developing database,</li> <li>• Documenting research findings</li> <li>• Dissemination of research findings</li> <li>• Experimental design, data analysis and interpretation of the findings</li> <li>• Handling of genetic resources</li> <li>• Multi-disciplinary research design and execution</li> <li>• Developing robust research tools</li> </ul>	<ul style="list-style-type: none"> <li>• Proposal development</li> <li>• Database creation and management</li> <li>• Scientific writing</li> <li>• Research methods</li> <li>• Statistical and bioinformatics</li> <li>• Genomics tools for genetic diversity, breeding and germplasm management</li> <li>• Soil science, botany sociology, economics</li> <li>• Biogeography</li> <li>• Development studies</li> <li>• Information and communication</li> <li>• Technology</li> <li>• Data mining</li> <li>• Participatory research approaches</li> </ul>

