

# PilotMAB project – Democratic Republic of the Congo

Mega-transect, Yangambi Man and Biosphere Reserve (Tshopo)  
Concept/coordination note

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March 2023



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## 1. Context and objectives

### PilotMAB project

The Mega-Transect is part of the PilotMAB project, implemented by the Royal Museum for Central Africa (RMCA) and funded by the Directorate-General for Development Cooperation and Humanitarian Aid (DGD) - Belgian Ministry of Development Cooperation.

### Yangambi MAB Reserve

Declared by UNESCO in 1976, the Yangambi Biosphere Reserve comprises approximately 235,000 hectares of tropical forest. Since the 1930s, Yangambi has hosted a research center dedicated to the study of tropical agriculture and forestry (Institut National d'Etudes et de Recherches Agronomiques (INERA), Ministry of Scientific Research and Technological Innovation). This history makes Yangambi MAB reserve a privileged site for the study of tropical rainforest in the Congo Basin.

### Mega-transect

The mega-transect is a scientific device crossing the MAB reserve from one side to the other. The device is intended to be a place for multi-resource analysis, involving researchers from different fields of study (pedology, wood biology, botany, mammalogy, entomology, archaeology, zoology, etc.). The mega-transect also offers a framework for different kinds of experimental plots to assess carbon dynamics and monitor biodiversity in different forest types.

### Administrative authorization for the realization of the project

The mega-transect project has the support of the DRC Ministry of Environment and Sustainable Development (MEDD) for its implementation. A letter of authorization written by the Secretary General for the Environment and Sustainable Development, is available in the appendix of this document (Annex 1).

### Recommendation

A general recommendation to anyone interested in conducting fieldwork in Yangambi would be to be well informed of the local administrative context before entering the field, and to respect the usual procedures. More information is available through the contact section of the present note.

## 2. Mega-transect: characterization

### General characterization

The mega-transect consists of a 79 km long straight line traced through the MAB forest (Figure 3). The 24 first kilometers follow a West to East axis (90°), and the remaining 55 kilometers are on an angle toward the North and the East (60°). This line is divided into plots (250 meters long) and subplots (25 meters long). This theoretical layout is materialized in the field by a straight path marked in its center with a wooden stake each 25 meter (Figure 1). The limits of each plot are geo-referenced.



Figure 1: image of the transect and the wooden stake materializing the limit of a plot (plot 1, subplot 1, section “L1B”).

### Plot characterization

The transect footprint, in which a botanical inventory is conducted, has the following characteristics (Figure 2):

- Plot width: 20 m (10 m on each side of the transect);
- Plot length: 250 m;
- Plot area: 0,5 ha;
- Number of plots along the transect: 316 (250 m x 316 = 79000 m<sup>2</sup>) ;
- Subplots: each plot is divided into 10 subplots (area = 500 m<sup>2</sup>). Each subplot is divided in two by the transect (northern part and southern part). This is the smallest unit of resolution for the recorded data (tree position, specific composition, environmental parameters, ...).

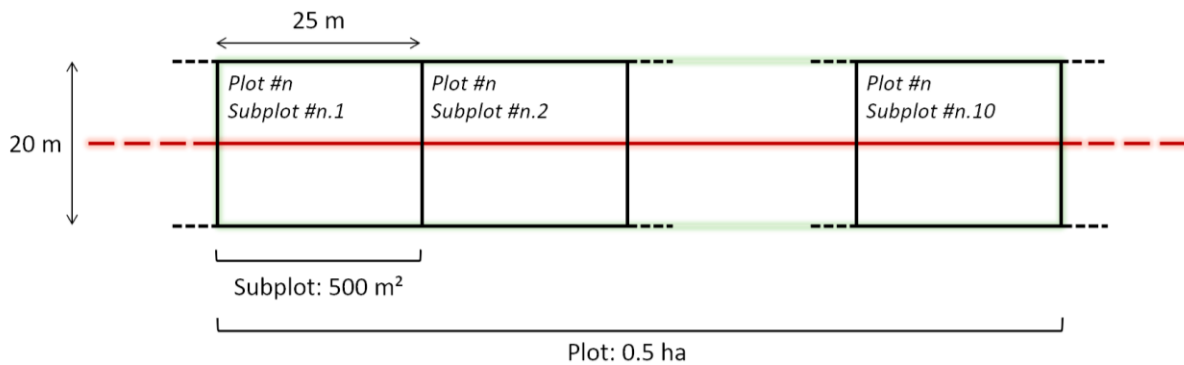


Figure 2: descriptive diagram of the spatial layout of the transect footprint (plots, subplots).

## Current status

The current status of the mega-transect implementation is the following:

- Theoretical length: 79 km;
- Current length of the transect opened in the field: 39 km;
- Current length along which a botanical inventory has been conducted: 29 km.

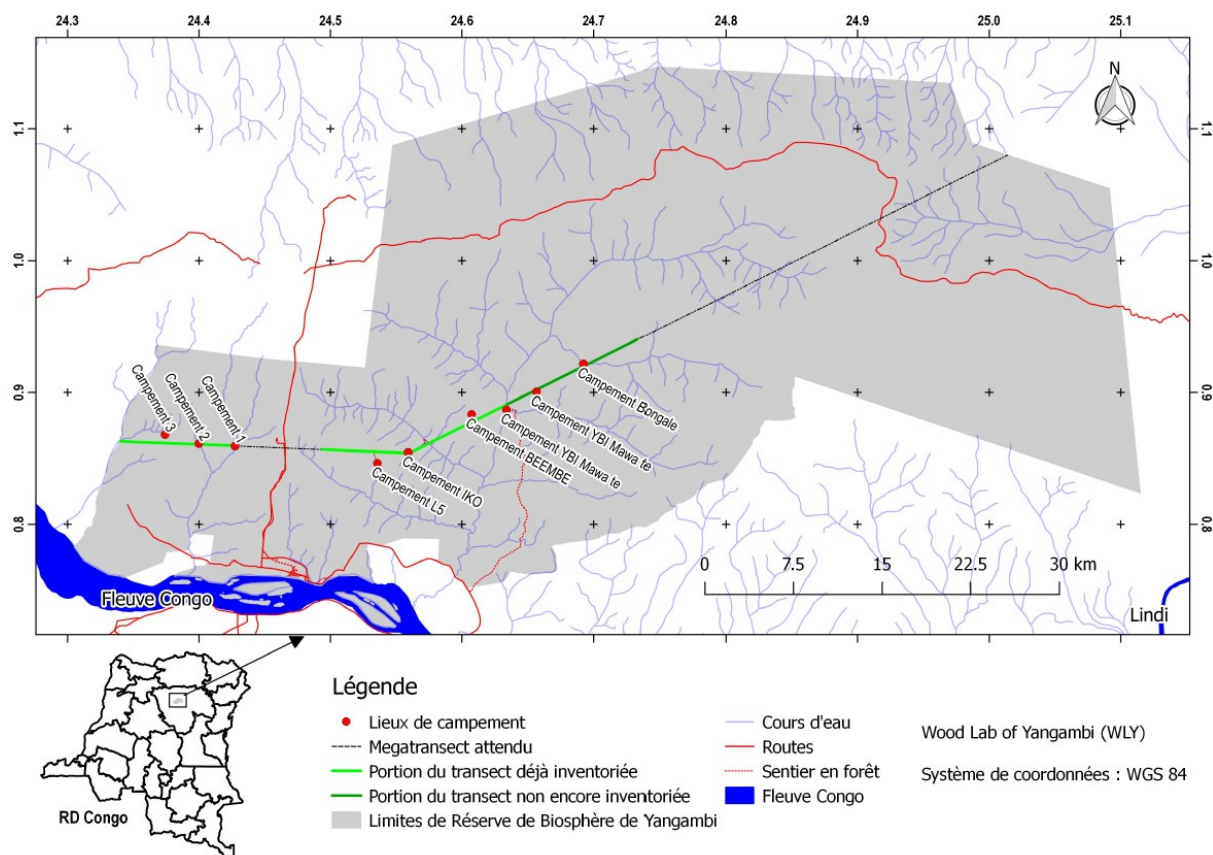


Figure 3 : layout of the mega-transect (Yangambi MAB reserve, Tshopo province, DRC). The portion of the transect that has been implemented is represented in dark green. The portion of the transect that has been inventoried is represented in light green.

## Botanical inventory

The criteria selected for the botanical inventory are the following:

- Tree diameter at breast height (DBH): the inventory threshold is set at  $DBH \leq 10$  cm;
- Species: 68 species of interest have been selected for the botanical inventory. A network of permanent plots was used to identify the species accounting for 70% of the total number of stems and the total basal area. These species were selected for the inventory. A few more species were included as well (commercial timbers, trace of anthropogenic activity, traditional use, ...). The full list can be found in the appendix (Annex 2).

## 3. Data availability

Data are available for the parts of the transect that are implemented, including the following:

- GPS coordinates of plots and camp sites;
- Maps, featuring vegetation types and other field based indications (Annex 3);

- Botanical inventory records (Annex 4).

These data can be requested through the contacts and form provided below in the “Contact and information” and “Sharing form” sections of this document.

#### 4. Contact and information

Additional information:

Félix Laurent, PilotMAB project coordinator  
 Royal Museum for Central Africa, Leuvensesteenweg, 13,  
 3080 Tervuren, Belgium  
 Email : [felix.laurent@africamuseum.be](mailto:felix.laurent@africamuseum.be)

Or:

Nestor Luambua Kashikija, Yangambi Wood Laboratory coordinator and local coordinator of the mega-transect  
 Email : [nestorluambua7@gmail.com](mailto:nestorluambua7@gmail.com)

Project website: <https://congobasincarbon.africamuseum.be/>

#### 5. Fieldwork/prospects for the mega-transect: sharing form

The use of the mega-transect for the implementation of multi-resources scientific fieldwork is the vocation of the project. Our goal is to promote this scientific device and encourage researchers of all fields to collaborate, share data, and harmonize their activities within it.

From this perspective, we encourage interested researchers and stakeholders to contact us, list the data they would like to obtain, and join our network via the following form.

Field leader/ promotor name	
Institution	
Project name	
Field of interest	
Fieldwork dates (or estimate)	
Region (section of the transect) of interest	
Type of data/samples collected	

Additional information	
Data requested and section of the transect targeted	

## 6. Project partners, stakeholders

The logos of the project partners, involved in the implementation of the mega-transect, are featured hereafter.



The network of institutions involved in research activities along the mega-transect includes the following.



## 7. Appendices

Annex 1: letter of authorization for the Mega-Transect, written by the Secretary General for the Environment and Sustainable Development.

République Démocratique du Congo  
Vice - Primature  
Ministère de l'Environnement et Développement  
Durable



SECRETARIAT GENERAL A L'ENVIRONNEMENT  
ET DEVELOPPEMENT DURABLE  
Le Secrétaire Général

Kinshasa, le 10 SEPT 2021

N° <sup>15M</sup> /SG/EDD/BTB/TKK/2021

Transmis copie pour information à :

- Son Excellence Madame le Vice-Premier Ministre, Ministre de l'Environnement et Développement Durable ;
- Monsieur le Directeur Général de l'INERA ;
- Monsieur le Directeur-Chef de Service des Inventaires et Aménagement Forestiers (DIAF).  
(Tous) à KINSHASA/GOMBE.-
- Monsieur le Directeur Général des Forêts.  
à KINSHASA/LIMETE.-
- Monsieur le Gouverneur de la Province de la Tshopo ;
- Monsieur le Coordonnateur Provincial à l'Environnement et Développement Durable ;
- Monsieur le Directeur de Ressources & Synergies Development (R&SD) ;  
(Tous) à KISANGANI/MAKISO.-
- Monsieur le Directeur de Centre de Recherche de l'INERA - Yangambi ;  
à YANGAMBI.-

Objet : Projet PilotMAB à la réalisation d'un inventaire forestier dans la Réserve de Biosphère de Yangambi.

✓ A Monsieur le Directeur du Musée Royal de l'Afrique Centrale (MRAC) à TERVUREN/BELGIQUE.-

### **Autorisation**

Monsieur le Directeur,

Dans le cadre du mécanisme national de surveillance des forêts, le Ministère de l'Environnement et Développement Durable (MEDD) a pour mission la récolte de données



scientifiques robustes ayant notamment trait à la dynamique forestière, la structure et la composition des forêts. Eu égard à l'étendue considérable des superficies forestières nationales, le MEDD encourage la mise en place de partenariats susceptibles de l'assister dans cette tâche.

Le projet PilotMAB, développé par le Musée Royal de l'Afrique Centrale (MRAC) à Tervuren en Belgique en partenariat étroit avec Ressources & Synergies Development (R&SD) et l'Institut National pour l'Etude et la Recherche Agronomiques (INERA), vise à mettre en œuvre des activités de recherche, de formation et d'éducation dans les Réserves de Biosphère de Yangambi dans la Province de la Tshopo et de Luki dans la Province du Kongo Central au sein du biome de la forêt tropicale.

Parmi ces activités, un objectif majeur du projet PilotMAB est également de favoriser la connaissance du milieu forestier constituant ces réserves, et plus largement le Bassin forestier du Congo. A cette fin, et plus spécifiquement en ce qui concerne la Réserve de Biosphère de Yangambi, le projet prévoit la réalisation d'un méga-transect traversant les trois zones de la Réserve de Biosphère de Yangambi, notamment la zone centrale, la zone tampon et la zone de transition.

Outre la récolte de données directement pertinentes pour le MEDD, ce transect est destiné à devenir un lieu d'analyse multi-ressources, impliquant des chercheurs de différents domaines d'études (pédologie, biologie du bois, botanique, mammalogie, entomologie, archéo-anthracologie, etc.). De plus, ce dispositif permettra de fournir des données de terrain susceptibles d'être ensuite comparées à de l'imagerie satellitaire et servir de base à de nouvelles recommandations de gestion, au niveau provincial comme national.

Les spécifications de ce projet sont annexées à la présente lettre, reprises sous la mention « Note conceptuelle concernant la réalisation des objectifs du projet PilotMAB, au sein de la réserve UNESCO MAB de Yangambi en Province de la Tshopo (RDC) ».

Etant entendu que ces travaux d'inventaire correspondent parfaitement aux objectifs du MEDD et, plus généralement, qu'ils fourniront des outils pertinents en matière de gestion forestière, Nous encourageons le démarrage rapide de l'installation De ce méga-transect ainsi que les travaux d'inventaires floristiques et de suivi scientifique sous-jacents. Nous attendons le rapport détaillé du déroulement des activités sur le terrain.

Pour ce faire, j'autorise l'équipe d'experts composée du personnel de l'INERA Yangambi et de la DIAF/SG-EDD (liste ci-jointe) à exécuter ce projet conformément aux termes de référence en annexe et sollicite les autorités tant administratives que militaires ainsi que de la Police Nationale d'apporter assistance à cette équipe en cas de nécessité.

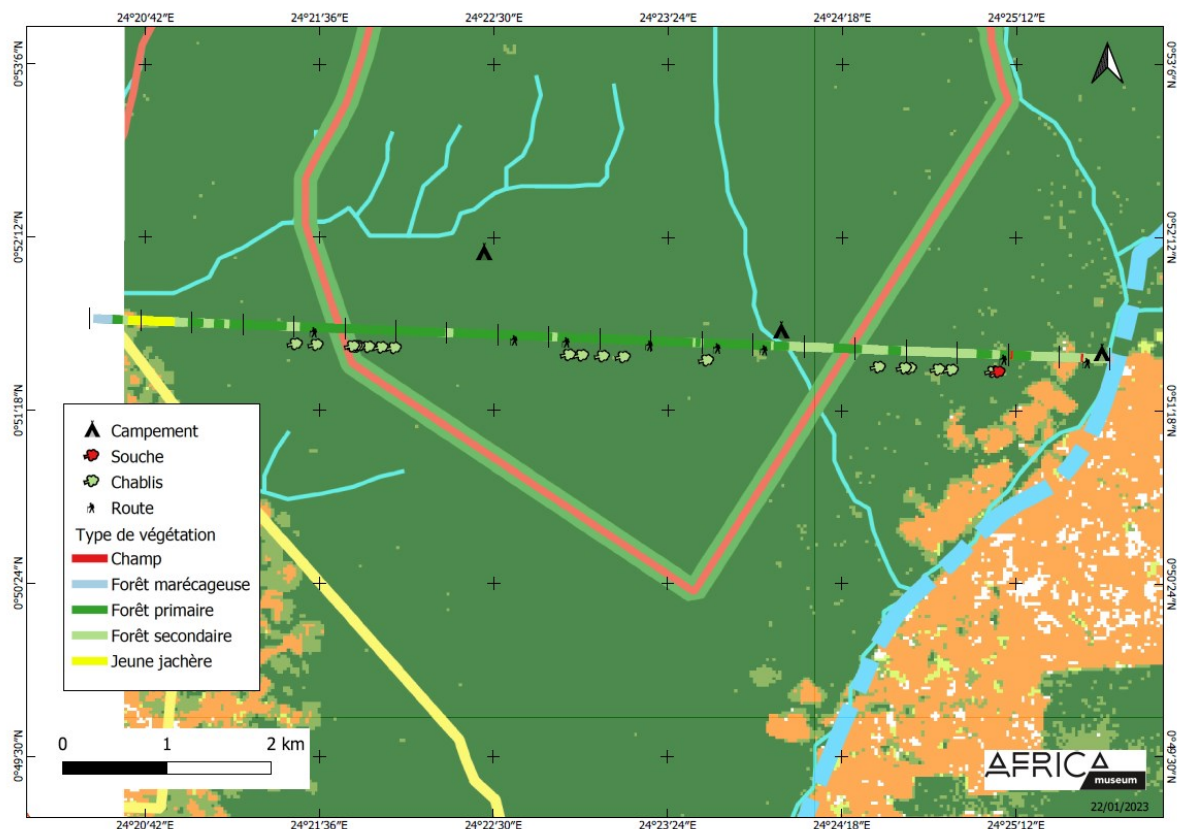
Veillez-agréer, **Monsieur le Directeur**, l'expression de mes sentiments patriotiques.

  
**Benjamin TOIRAMBE/BAMONINGA**

Annex 2: list of species of interest selected for the botanical inventory of the mega-transect.

	<b>Espèce</b>		<b>Espèce</b>
1	Afzelia spp	35	Leplaea thompsonii
2	Albizia ferruginea	36	Lovoa trichilioides
3	Albizia spp.	37	Macaranga monandra
4	Alstonia boonei	38	Macaranga spinosa
5	Anonidium mannii	39	Macaranga zenkeri
6	Autranella congolensis	40	Microdesmis yafungana
7	Brachystegia laurentii	41	Milicia excelsa
8	Canarium schweinfurthii	42	Musanga cecropioides
9	Carapa procera	43	Nauclea diderrichii
10	Cavacoa quintasii	44	Pancovia harmsiana
11	Ceiba pentandra	45	Pancovia laurentii
12	Celtis mildbraedii	46	Panda oleosa
13	Celtis tessmannii	47	Pericopsis elata
14	Chrysophyllum lacourtianum	48	Petersianthus macrocarpus
15	Cleistanthus caudatus	49	Piptadeniastrum africanum
16	Coelocaryon botryoides	50	Polyalthia suaveolens
17	Coelocaryon preussii	51	Prioria balsamifera
18	Cola griseiflora	52	Prioria oxyphylla
19	Combretum lokele	53	Pterocarpus soyauxi
20	Cynometra hankei	54	Pterocarpus spp
21	Dialium pachyphyllum	55	Pycnanthus spp.
22	Drypetes gossweileri	56	Ricinodendron heudelotii
23	Drypetes likwa	57	Scorodophloeus zenkeri
24	Elaeis guineensis	58	Staudtia kamerunensis
25	Entandrophragma spp	59	Strombosia grandifolia
26	Erythrophleum suaveolens	60	Strombosiopsis tetrandra
27	Funtumia spp.	61	Tabernaemontana crassa
28	Garcinia epunctata	62	Tessmannia africana
29	Garcinia punctata	63	Trichilia monadelpha
30	Gilbertiodendron dewevrei	64	Trichilia prieuriana
31	Guarea cedrata	65	Tridesmostemon omphalocarpoides
32	Isolona thonneri	66	Trilepisium madagascariense
33	Khaya spp	67	Turraeanthus africanus
34	Klainedoxa gabonensis	68	Vernonia doniana

Annex 3: example of vegetation type map, produced for the westernmost 10 km of the transect.



Annex 4: example of the botanical inventory record produces for a subplot (Section “L1B”, Plot 8, Subplot 1).

Section	Date	ID Plot	ID Subplot	Species	POM	DBH	Side	Observation
MONI L1 B	07-02-23	8	1	Entandrophragma spp	1.3	10.3	N	angolensis
MONI L1 B	07-02-23	8	1	Drypetes gossweileri	1.3	19.2	N	
MONI L1 B	07-02-23	8	1	Leplaea thompsonii	1.3	23	N	
MONI L1 B	07-02-23	8	1	Anonidium mannii	1.3	30.6	N	
MONI L1 B	07-02-23	8	1	Panda oleosa	1.3	63.5	N	
MONI L1 B	07-02-23	8	1	Pterocarpus soyauxi	3.4	75.5	N	empattement, numéro 753
MONI L1 B	07-02-23	8	1	Drypetes gossweileri	1.3	10.5	S	
MONI L1 B	07-02-23	8	1	Dialium pachyphyllum	1.3	11.4	S	
MONI L1 B	07-02-23	8	1	Isolona thonneri	1.3	38.6	S	penché
MONI L1 B	07-02-23	8	1	Panda oleosa	1.3	42.1	S	penché, bosse
MONI L1 B	07-02-23	8	1	Pterocarpus soyauxi	1.3	51.8	S	