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Country Package for "Forests, Nature and Climate" in Republic of Congo (CP-Congo)

Programming workshop for the scientific and capacity-building component

Brazzaville, 8-9 July 2024

Sommaire

1. National workshop in Brazzaville

The workshop was placed under the authority of Ms Rosalie Matondo, **Minister of Forest Economy**, in collaboration with Ms Delphine Edith Emmanuel, **Minister of Higher Education, Scientific Research and Technological Innovation**. Operational coordination was handled by OFVi, with the involvement of national higher education and research bodies in fields related to **carbon and biodiversity monitoring in forests and wetlands**, at various scales, as well as the French Embassy and the Permanent Secretary of the Country Package.

1.1 Objectives

The workshop was held on **8 and 9 July 2024 in Brazzaville** on the premises of the Banque Sino-Congolaise pour l'Afrique. The event was held just after the **International Conference on Afforestation and Reforestation (CIAR)**, organised in the Congolese capital from 2 to 5 July 2024. The overall aim of the workshop was to **build the scientific and capacity-building component of the CP-Congo**. It brought together some fifty Congolese and French scientists.

The activities carried out during the workshop were as follows:

- **Present the functioning of the CPs and the expectations** in terms of research and capacity development in Congo, consistent with the existing approaches of regional coordination of national research institutions, such as R2FAC or more recently CBSI.
- **Define a 5-year programme of scientific activities** contributing jointly to the priority points of the scientific component of the CP-Congo and the pillars of the OFVi.
- **Identify the needs** in terms of human resources, infrastructure and equipment required to implement the PFNC-Congo's actions.
- **To define together the targets for intervention** in the Congo by OFVi in order to meet the scientific information needs of the CP-Congo and regional events.
- **Programme the financial components** for the scientific research and capacity building required to implement the CP-Congo.
- **Drawing up the OFVi roadmap** within the more general framework of the CP-Congo.

This workshop enabled Congolese and French scientists to initiate their future collaborations for the CP-Congo, of which research and capacity building are two cross-cutting points.

1.2 Programme

Day 1 : Monday 08 July 2024 **Morning**
Introduction

General presentation of the CP-Congo	S.T. Mombouli (Permanent Secretary CP- Congo)
Presentation of the OFVi	A. Billand
Presentation of regional approaches (R2FAC, CBSI-SPBC)	V. Rossi, L. Koutika
Synergy between point 1 of the CP-Congo research strand and the OFVi pillars	
Presentation of the doctoral and post-doctoral training actions envisaged in the various pillars of OFVi	A. Fayolle
Working round tables	Participants
Discussion and summary	Participants
Afternoon	
Synergy between point 2 of the CP-Congo research strand and pillar 5 of OFVi	
Presentations of the capacity building actions envisaged in pillar 5 of the OFVi	A. Billand
Working round tables	Participants
Discussion and summary	Participants
Day 2 : Tuesday 09 July 2024 **Morning**	
Synergy between point 5 of the CP-Congo research strand and pillar 4 of OFVi	
Presentation of cartographic products from pillar 4 of the OFVi that could be used in the Congo national database	C. Lacroux
Working round tables	Participants
Discussion and summary	Participants
Afternoon	
Synergy between point 6 of the CP-Congo research component and pillars 1, 2 and 3 of OFVi	
Presentation of the new methodological approaches envisaged in pillars 1, 2 and 3 of the OFVi combining data from remote sensing with field data using AI to estimate the carbon stock accurately	T. Bossy
Working round tables	Participants
Discussion and summary	Participants
Conclusion	
Plenary presentation of the work	A. Billand
Conclusion by the French Ambassador to Congo	C. Bodonyi
Closing by the Minister for Forest Economy	R. Matondo

1.3 Stakeholders and research disciplines involved

A wide range of players were mobilised for this workshop in the Republic of Congo, including:

- **Universities**:
    - Marien Ngouabi University (UMNG)
        - Faculty of Science and Technology (FST),
        - Faculty of Letters, Arts and Human Sciences (FLASH),

        - Ecole Nationale Supérieure d'Agronomie et de Foresterie (ENSAF), with Laboratoire de Géomatique et d'Ecologie Tropicale Appliquée (LGETA),
        - Ecole Normale Supérieure (ENS),
    - Denis Sassou Nguesso University (UDSN)
        - Institut Supérieur des Sciences Géographiques, Environnementales et Aménagement (ISSGEA),
        - Laboratoire de Sciences de la Géographie, de l'Environnement et de l'Aménagement (LABGEA),
- **Operators and attached institutes**:
    - Ministry of Forest Economy (MEF)
        - Congolese Wildlife and Protected Areas Agency (ACFAP),
        - Centre National d'Inventaire et d'Aménagement des Ressources Forestières et Fauniques (CNIAF),
        - National Afforestation and Reforestation Project (PRONAR),
    - Ministry of Higher Education, Scientific Research and Technological Innovation (MESRIT)
        - Research Centre for the Sustainability and Productivity of Industrial Plantations (CRDPI),
        - National Geographic Institute (IGN),
        - Institut National de Recherche en Sciences de l'Ingénieur, Innovation et Technologie (INRSIIT),
        - Institut de Recherche Agronomique (IRA),
        - Institut National de Recherche Forestière (IRF),
        - Institut National de Recherche en Sciences Exactes et Naturelles (IRSEN), with the Herbier National de la République du Congo (IEC)
        - Institut National de Recherche en Sciences Sociales et Humaines (IRSSH),
- **Private companies** with an environmental/biodiversity approach
- **Conservation NGOs** (e.g. Renatura Congo, Noé, WCS, ESI Congo, etc.).

A wide range of scientific disciplines and themes were represented, including biodiversity, ecosystem services, social sciences, carbon, pedology, cartography, remote sensing, climatology, oceanology, agroforestry and the economics of natural resources.

2. Session 1: Synergy between point 1 of the research component of the CP-Congo and the pillars of OFVi

2.1 Introduction

The objective of the first axis of the Congo CP is to 'Train a new generation of local scientists and researchers in fields related to knowledge of the functioning of forest, marine and aquatic ecosystems, carbon resources and biodiversity. Scholarships are to be awarded in

particular in ecology, zoology, oceanography, soil science, geomatics, social and political sciences, forest economics, environmental economics and financial engineering'.

Point 1 is about **building the capacity of academic players in priority areas** related to the environment. To ensure the sustainability of scientific activities and methods, we need to **invest massively in science and training**, as proposed by the forestry ministers of the Congo Basin region in a plea published in the prestigious scientific journal Nature in 2021.

2.2 Objectives, activities and expected results

Discussions focused on **support for higher education students at Master's level and above**. It also appeared important to offer opportunities to young researchers.
The points raised during the discussions are summarised in the table below:

General objectives	• To increase sources of funding for master's, doctoral and post-doctoral students • Improve the way in which all the costs associated with a scientific study are considered • Support higher education at several levels
Key activities	• **Grants:** Supporting students through the award of several types of grant • **Training:** Support and/or create new training pathways
Expected results	• Increase in the number of students graduating in priority areas at master's, doctoral and post-doctoral level • Mobility of students and young researchers • Improved continuity of training courses between undergraduate and post-doctoral levels

2.3 Detailed activity plan and budget estimates

The various round tables all highlighted two main types of activity: **grants and support for training**. Grants should be available for students at Master's level and above, as well as for young researchers. To help applicants complete their scientific projects, it was felt important that **the grants** should not only cover salary, but should also **include additional funding for fieldwork and/or laboratory analysis** (small equipment, shipment of materials, laboratory costs, etc.). A **new 'Finalisation of thesis' grant** has been proposed because of the large number of doctoral students who finish the last months of their thesis without funding and whose supervisory teams do not have the budget to invite the members of the jury to the thesis defence. With regard to mobility grants, the emphasis was placed on encouraging **intra-African mobility and international mobility with other forestry countries in South America and Asia**.

The discussions highlighted the need to **support training at several levels of higher education**, with proposals for scientific themes with gaps. It appeared important to support **long-term actions** that take time to set up (creation and updating of modules and curricula), as well as more one-off actions that are easier and quicker to set up (thematic

schools). Some thematic schools, such as the one on remote sensing at UMNG, could be repeated annually. As far as PhD students are concerned, the **teaching of skills considered essential** for their future life as a researcher has been highlighted, such as how to store data correctly, how to publish in leading journals and how to have a basic understanding of economics in order to develop their skills in seeking funding see on bioeconomy issues.

Type	**Activities**	**Cost**	**Interested organisations**
Grants	Master's internship (6 months)	7 000 €	IGN, IRF, UDSN, UMNG
	Master's degree (2 years) abroad	36 000 €	UDSN, UMNG
	Thesis co-supervision or co-direction (3 years) with selection of candidates, impulse grants envisaged (6 months)	36 000 €	IRF, IRSEN, Renatura, UDSN, UMNG
	Finalisation of thesis (3 months)	8 000 €	IEC, UDSN, UMNG
	Post-doctorate (2 years)	20 000 €	IGN, IRF, UDSN, UMNG
	Intra-African or international mobility	3 000 - 6 000 €	IEC, IGN, IRF, Renatura, UDSN, UMNG
Training	Creation of thematic schools with a focus on field activities: '*Technological innovation and the economy*', '*Fieldwork*', '*Remote sensing*', '*Oceanography*' and '*Climate change*'	30 000 €	IEC, IGN, IRF, IRSEN, Renatura, UMNG
	Technical support for doctoral courses: '*Climatology*' and '*Geomatics*'	10 000 €	UDSN
	Creation of a doctoral module: '*Economics basics*', '*Data archiving*', '*Scientific publication*'	10 000 €	
	Creation or updating of degree courses: '*Environmental Economics*', '*Oceanography*', '*Climate Change*'	to be determined	IRSEN, Renatura, UDSN
	Creation of Specialised Masters: '*Climatology*', '*Geomatics*', '*Ecosystem Management*'	20 000 €	UDSN

The discussions also emphasised the importance of socio-economic integration in the subjects studied:

- Context and relevance of indicators: ecological studies must be conducted within a framework that recognises the legitimacy and social acceptance of the indicators used. Environmental indicators, for example, often respond only to environmental objectives without taking account of economic and social realities, which sometimes limits their effectiveness.
- Interactions between stakeholders: environmental decisions are often the result of negotiations between various stakeholders (farmers, decision-makers, etc.). Ignoring the socio-economic dimensions can lead to conflicts of interest and poor management of different resources.

At the same time, it highlights the consequences of not carrying out an in-depth socio-economic analysis:

- Risks to sustainability: the lack of an integrated approach can compromise the sustainability of environmental systems. For example, soil degradation and biodiversity loss affect not only the environment but also the livelihoods of local communities.
- Incomplete evaluation: evaluation methods that do not take socio-economic spin-offs into account may underestimate the real impacts of ecological projects. This includes indirect effects on the local economy, such as jobs and income generated by sustainable practices.

In short, if ecological issues are to be assessed holistically and appropriately, it is crucial to include socio-economic aspects in the studies. This not only provides a better understanding of the complex interactions between the economy and the environment, but also promotes sustainable management that benefits all the stakeholders involved.

3. Session 2: Synergy between point 2 of the research component of the CP-Congo and pillar 5 of the OFVi

3.1 Introduction

The objective of Point 2 of the CP-Congo is to 'Strengthen the capacities of national research organisations and public structures (national implementing agencies), and their networking at regional and international levels'. This ambition is closely aligned with Pillar 5 of OFVi, which aims to promote scientific cooperation through the development of infrastructures and the ongoing training of researchers. This synergy between the two strategic axes highlights the need for greater coordination and fruitful exchanges between national and international players to promote innovation and scientific excellence.

3.2 Objectives, activities and expected results

The points raised during the discussions are summarised in the table below:

General objectives	• Support the staff of research organisations in the context of ongoing training • Strengthen the mechanisms of research organisations • Encourage exchanges and the integration of researchers (junior and senior) into national and international scientific networks • Encourage cross-disciplinary work between different institutions and courses.
Key activities	• **Training:** organise training workshops for managers and teachers • **Equipment:** develop and rehabilitate research bodies • **Networks:** support national and international networks, assist researchers by awarding mobility grants
Expected results	• Acquisition of materials and equipment • Increasing the number of long-term data monitoring systems • Development and/or renovation of laboratories • Mobility of researchers • Strengthening national and international networks

Identification of priority themes and topics

During the discussions, a number of themes and topics emerged as being particularly relevant and were proposed for a training workshop.

The first need that emerged was training in remote sensing and geomatics. Very few academics are trained in remote sensing data processing techniques. Radar data processing techniques are lacking, even though they would enable work to be carried out on areas that are very often covered by clouds, making optical imagery unusable. In line with points 1 and 2 of the CP, **training courses should be set up for researchers and students**.

3.3 Detailed activity plan and budget estimates

The main activities include **training, equipment and networks**. There is potential for convergence between the activities of sessions 1 and 2, so the presence of specialist researchers at the thematic schools could be extended over a few weeks to run specific modules at Brazzaville universities. As far as equipment is concerned, it was felt that an effort should be made to **create new structures**, but also to **rehabilitate or support existing structures** with common and more specific equipment. It was emphasised that a distinction should be made between field equipment needs and laboratory equipment needs.

It was not possible to produce budget estimates for all the activities, as they were difficult to carry out in the time available for the workshop, such as the creation of a large national laboratory complex or support for updating curricula, the exact scope of which has yet to be defined. On the other hand, logistical and financial support for field missions covers a

wide range of equipment and needs, which would have to be defined in more detail for each structure.

Type	**Activities**	**Cost**	**Interested organisations**
Training	Support for updating curricula with mobility of international researchers	to be determinated	UDSN, UMNG
	Training workshops for stakeholders and/or teachers: '*Remote sensing and geomatics*', '*Digital tools*', '*Data management*', '*Project set-up and management*', '*Communication/outreach/social networks/ethics*' and '*Equipment maintenance*'	20 000 €	UDSN, UMNG
Equipment	Provision of materials and equipment for existing structures: - Shared equipment (wi-fi, computers) - Geomatics - Tropical ecology - Wood quality - Soil quality - Functional traits - Phenotyping - Climatology - Hydrology - Oceanography	 500 000 € 50 000 € 10 000 € 15 000 € 30 000 € 30 000 € 150 000 €	IEC, IRF, IRSEN, LABGEA, LGETA
	Creation of a large national laboratory complex with environmental sciences (Loundoungou super-site) and observation systems	to be determinated	
	Rehabilitation of the national herbarium	50 000 €	IEC
	Monitoring systems for long-term data: - Weather station - Forest plot - Oceanographic station - Camera traps	 20 000 € 100 000 € 30 000 € 60 000 €	IGN, IRF
	Logistical and financial support for field missions	to be determinated	IGN, IRF, UDSN, UMNG
Networks	Mobility of researchers for stays, conferences, symposia and seminars	2 500 €	IGN, IRF, IRSEN, UDSN, UMNG
	Organisation of national seminars	5 000 €	
	Integration into international scientific networks	5 000 €	

	Support for networks and/or learned societies *	to be determinated	

* Mention was made of federations of institutes in Central Africa such as the Observatoire des Forêts d'Afrique Centrale (OFAC), the Réseau de recherche sur les forêts d'Afrique centrale (R2FAC), and the Réseau des Institutions de Formation Forestière et Environnementale de l'Afrique Centrale (RIFFEAC); the network of herbaria; learned societies such as the Association Internationale des Géographes Francophones (AIGF) and the Association pour l'Etude et Taxonomie de la Flore Africaine Tropicale (AETFAT).

Although **OFVi is not intended to finance major infrastructure**, small-scale equipment can be financed as part of targeted projects.

4. Session 3: Synergy between point 5 of the research component of the CP-Congo and pillar 4 of the OFVi

4.1 Introduction

The objective of Point 5 of the CP-Congo is to "Set up a process for the creation, analysis and use of dynamic national data on carbon stocks and biodiversity, including uncertainty calculations and a public data access portal for users."

Setting up a platform is one solution for providing transparent, easy-to-use access to national data on **carbon stocks and biodiversity**. Nevertheless, given the scattered nature of carbon and biodiversity data, it is necessary to **define the institutional framework and scope** of this platform beforehand. In addition, an assessment of the existing situation should ensure the relevance of any new initiative.

4.2 Objectives, activities and expected results

The first objective of the session was to identify the scope of "dynamic national data on carbon stocks and biodiversity".

<u>Identifying data of interest</u>

A consultation at the start of the session enabled us to identify existing data from the field:

- The national forest inventory carried out and stored by the CNIAF. The last inventory was carried out in 2015 and published in 2019. Renewal is therefore necessary in order to monitor forest evolution.
- A national herbarium (IEC) has existed since the early 20th century. It needs updating, however.
- The CRDPI, as a collaborative platform, would provide technical expertise and analytical tools to facilitate understanding of biodiversity and carbon-related issues,

particularly in forest plantations and wetlands. It would be a scientific player in the mangrove platform.
- Data on forest exploitation and management are scattered.
- UMNG's science faculty has a history of monitoring savannahs, which represent a significant ecosystem in the country.
- There is a need to monitor other ecosystems that may represent important carbon sinks, in particular wetlands. Some resources exist for monitoring peatlands in the north of the country. Little is being done on mangroves.
- Interest in soil data. Pedology department at UMNG.
- Little climatic data, existing data collected by airplanes and airports.
- Most animal biodiversity data is collected and stored by protected area managers (mostly private).

Cartographic data were also identified:

- Mapping and characterization of wetlands (CongoPeat peat bogs, mangroves)
- Deforestation and degradation
- WRI/CNIAF

Identifying existing platforms

Although incomplete, this data is an encouraging starting point. However, there is **no infrastructure in place to centralize them**. Some platforms do exist, notably at CNIAF for carbon data monitoring and at IRSEN for biodiversity and climate data.

However, access to and use of these platforms remain limited due to a **lack of resources and the absence of a data-sharing policy** between institutions (even within the same ministry). The importance of including OFAC for regional management of research products and forest monitoring was mentioned.

Identifying the equipment needed

The inventory revealed that there is currently **no infrastructure capable of hosting and maintaining a platform that would centralize all carbon and biodiversity data in the Congo**. Several hypotheses were put forward for the platform: it could be built from scratch, it could be based on the existing infrastructure to create a **single platform grouping all the data**, or it could be made up of several thematic platforms, either **within a national or regional institution such as OFAC**. A final possibility would be to set up a web portal linking to the databases of each institute. This would avoid the need to organize a transfer to centralize data

Whatever the preferred solution, the distribution and storage of a large amount of data requires infrastructure and equipment that is currently lacking. In particular, there is a **need for servers, or even a data centre to store data**. Similarly, software is needed to process the data correctly, as is a **quality protocol to standardise data formats and sampling**. In

addition, staff need to be trained in data management and archiving, and best practice needs to be put in place.

Setting up an institutional framework

The main consequence of this assessment was to highlight the **imperative need to define the institutional framework** for the platform before any initiatives are taken. The Congolese administrative framework requires **prior agreements between the various ministries responsible for the institutes holding or seeking access to the data**. An interministerial workshop is therefore needed beforehand so that all the players can agree on the format that the data access portal should take.

4.3 Detailed activity plan and budget estimates

As set out in the objectives, the first activity is to set up an **interministerial workshop to define the institutional framework and specify the scope of the platform**. This workshop will ideally take place before 2025 and will bring together national institutes (see 1.3 for details of acronyms) from multiple ministries:

- Ministry of Forest Economy (MEF) with ACFAP, CNIAF, PRONAR and DGEF
- Ministry of Higher Education, Scientific Research and Technological Innovation (MESRIT) with CRDPI, IEC, IGN, INRSIIT, IRA, IRF, IRSEN, IRSSH
- Ministry for the Environment, Sustainable Development and the Congo Basin (MEDDBC)
- Ministry of Hydrocarbons
- Ministry of Mining and Geology
- Prime Minister's Office (Forestry and Environment Advisers, CAFI and CP Permanent Secretariats)
- Ministry of Finance and Budget

Representatives of the main universities (UMNG, UDSN), representatives of regional players, whether institutional (OFAC), international organisations providing a large amount of data historically (WRI, WCS) or potential regional partners (AGEOS).

The platform then needs to be set up quickly. Depending on the framework defined during the workshop, it might be possible to start by **strengthening the existing platforms** and then setting up **a single web portal redirecting users to the various platforms**.

It is difficult to estimate the costs of a platform whose exact scope and form it will take are not yet known. However, a number of operational elements have been quantified. For example, for a functional platform on biodiversity, IRSEN estimates its needs at around €65,000 over the duration of the OFVi project. For the platform processing wildlife data, ACFAP should be involved in the process.

Type	**Activities**	**Cost**

State of play	State of play ~ 30 days	12 000 €
National strategy	Interministerial workshop set up	
	Strengthening existing platforms Centralised web portal	65 000 € to be determinated
	Creation of a new centralised platform - engineer post - software licences - communication, web and social networks team	to be determinated 84 000 € /an 10 000 € /an 6 000 € /an

5. Session 4 : Synergy between point 6 of the CP-Congo's research component and pillars 1, 2 and 3 of the OFVi

5.1 Introduction

The objective of Point 6 of the CP-Congo is to 'Establish a robust national biodiversity and carbon monitoring system that can serve as a basis for the development of a credit and certificate market integrating the results into the data management system. This system is recognised and linked to the MRV monitoring system for deforestation and forest degradation, and is being developed within the Congo Ministry of Forest Economy'.

Point 6 is intrinsically linked to point 5, as a **biodiversity and carbon monitoring system** necessarily involves setting up a platform to make the monitoring data accessible.

This point focuses on the **means of collecting the data and the methods for analysing and using it effectively**.

5.2 Objectives, activities and expected results

Assessment and enhancement of existing data

As with point 5, the first step was to **identify current knowledge, in particular the actors** collecting or possessing data, the existing sites and the **inventories and protocols** already in place.

As with field data, **mapping data** is crucial for dynamic monitoring of carbon and biodiversity. Their availability must be ensured, and **access to satellite and airborne data should be generalised.** In particular, free and open-access data is not always used due to a lack of skills, knowledge or the means to download and store it.

Strengthening monitoring and inventories

The assessment identified a need to **map forest types throughout the Congo**, in particular to improve monitoring of deforestation and degradation, which are essential proxies for understanding changes in carbon stocks and biodiversity. Similarly, the **mapping of peat lands and wetlands** could also be significantly improved. Particular attention should be paid to peat bogs outside the central basin and to mangroves.

The existing inventory should also make it possible to **intensify inventories** throughout the region, including planted forests and peat bogs, which are sometimes less well studied. The last forestry census dates back to 2015, so an update is necessary. This update should provide an opportunity to **standardise the protocols** in order to ensure the quality of the data collected.

Similar work needs to be carried out to **characterise biodiversity** (including in aquatic environments such as rivers, peat bogs and mangroves). Because of the fact that there is less historical data than for the inventories, the effort required to set up a protocol and **make equipment and materials available** is greater.

Finally, these updates and improvements to the inventories should make it possible to build up **collections of flora and fauna**, which will also require additional resources in terms of protocols and equipment.

Finally, the various protocols and resources need to be renewed regularly to ensure dynamic monitoring, as with the Reference Emission Level for Forests (NERF). To this end, mapping using remote sensing methods is essential, and requires the allocation of IT resources and training for staff capable of carrying out this monitoring.

As far as forest inventory techniques are concerned, in order to offset the costs and difficulties of accessing many of the country's study areas, it would seem appropriate to invest in research into 'top-down' inventory methods using airborne images.

In terms of research, the themes that seem to emerge most often concern monitoring the state of the forest, in particular deforestation due to gold panning and agriculture, as well as the different types of degradation (certified, conventional, illegal). In all cases, the importance of a multi-disciplinary approach, particularly including social and human sciences, was emphasised in order to understand the socio-economic and cultural factors leading to forest degradation.

<u>Developing a national carbon and biodiversity strategy</u>

Like the platform, which requires an interministerial institutional framework, the development of a national carbon and biodiversity strategy could be steered by an **interministerial technical committee** comprising the MEF, the MESRIT and the MEDDC. This committee should be supplemented and nurtured by a national network of stakeholders, including in particular the private sector (forestry and mining). Indeed, many data and research sites are privately owned, whether by protected areas, forest concession holders or mining companies. Improved dialogue with these stakeholders should make it possible to expand data collection and ensure compliance with the strategies put in place.

Finally, for the monitoring and implementation of a national strategy, it could be interesting to include international players who can share regional resources and experience. Among the possible collaborations, the international NGO WRI and its global forest watch tool are essential. The FAO has expertise in monitoring land use, while the Gabonese agency AGEOS has the best capacity and expertise in remote sensing in the region. So, in order to optimise costs and capacities, regional discussions and partnerships seem essential.

The creation of a **national observatory to monitor carbon and biodiversity is complementary to the data access platform and the national strategy**. It will use the platform's data to ensure that the strategy in place is properly implemented. Dynamic monitoring will essentially involve alerts based on remote sensing data.

5.3 Detailed activity plan and budget estimates

There has been little discussion of the costs of the various activities, which depend in part on the results of the preliminary assessment. In addition, the activities are complex and national in scope, and therefore difficult to budget for.

Type	**Activities**	**Cost**
State of play	State of play ~ 20 days	10 000 €
Inventories	Updating of inventory and equipment methods	to be determinated
	Mapping of all habitat types	to be determinated
	Contribution to the floristic reference collection Creation of a fauna reference collection	to be determinated to be determinated
	Setting up a scientific super-site with natural and planted forests and peatlands	to be determinated
National strategy	Creation of an interministerial committee	
	Creation of a national observatory to monitor carbon and biodiversity	to be determinated

Workshop participants stressed the need for resources to enable the observatory to function. It would need servers to store the data, access to broadband internet and computers powerful enough to download and process the remote sensing data.

Appendix 1. Terms of reference

1 Country package for Forests, Nature and Climate

1.1 General context

The Kunming-Montreal Global Biodiversity Framework aims to protect at least 30% of land and 30% of sea by 2030. However, existing market mechanisms and the current price of carbon credits are not sufficient to support large-scale conservation. Country package for Forests, Nature and Climate (CP) are proposed as **integrated solutions to ensure sustainable financing for the conservation of these crucial areas**. CPs offer technical, scientific, financial and diplomatic support, as well as commercial partnerships, to countries committed to protecting their lands and seas. The aim is to **mobilise new and additional sources of international funding** from public, private, multilateral and philanthropic institutions to achieve these ambitious conservation goals

1.2 Background and agenda

At COP27, France, in collaboration with Colombia, the Philippines and Gabon, proposed the creation of new financial and political contracts to encourage governments to protect the world's vital carbon and biodiversity reserves. In partnership with the United States, Costa Rica, China, the Global Environment Facility (GEF) and the World Bank, France has launched Positive Conservation Partnerships (PCP). In parallel, another 'Forest and Climate Leaders Partnership' (FCLP) initiative has been set up to establish political leadership on forest and climate issues, with a focus on Forest and Land Use Investment Packs (FLIP) in key forest countries.

The One Forest Summit (OFS), jointly organised by France and Gabon in Libreville in March 2023, provided an opportunity for governments to take forward the CFP initiative and for scientists to discuss the scientific and technical support needed for their implementation through workshops and conferences. The Summit's final declaration refers to the scientific initiative entitled *One Forest Vision* (OFVi), initiated by a coalition of French research institutions and presented at the Summit, the expectations, programming and funding of which now need to be agreed with each of the stakeholder countries, including the Congo.

At the G7 summit in Hiroshima in May 2023, the leaders expressed their support for FLIPs by evoking 'Country Packages' intended for a selection of countries hosting vital reserves of carbon and biodiversity. In the end, the unifying concept of Country Packages for Forests, Nature and Climate (CP) was retained in support of a panel of a dozen countries to form the new integrated implementation framework for the PCP, FCLP and FLIP, during discussions at the Summit for a New Global Financial Pact in Paris in June 2023.

At COP28 in Dubai on 9 December 2023, the political declaration establishing a partnership for forest ecosystems, nature and climate was signed by the Republic of Congo and the French Republic, the European Union, the Bezos Earth Fund and the Country Package Seed Fund (Rob Walton Foundation, Conservation International, Gordon and Betty Moore Foundation).

The signatories have made major commitments in four areas:

I. Strengthen the material, financial and human capacities of scientific research at national level in order to gain a better understanding of and make better use of the carbon resources of vegetation and soils, and the country's biodiversity, with particular attention paid to mangroves, peatlands and natural forests.
II. Support and extend the network of protected and conserved areas, using rights-based approaches, within a landscape approach, to achieve 30% protection of land and 30% of sea by 2030, with a focus on areas of high ecological integrity, high biodiversity and carbon-rich areas and sustainable development for communities.
III. Support the implementation of the Republic of Congo's National Afforestation and Reforestation Programme and the adoption of the establishment of an African and World Decade for Afforestation and Reforestation.
IV. Systematically raise the Congolese population's awareness of biodiversity and climate protection and their benefits.

1.3 Scientific and capacity development process

CPs require strong scientific, technical and capacity development support to ensure their success. This support must be collaborative with the scientific and technical community in the country concerned and benefit from the support of international players, NGOs and companies with relevant data and operational methods.

The scientific position must be broad and interdisciplinary, covering aspects such as improving knowledge and methods for long-term monitoring of interactions between climate, forests and carbon, carbon resources and biodiversity in terrestrial environments, wetlands and coastal areas, and support for policies to prevent deforestation and territorial planning. It must also include the co-construction of research actions for sustainable solutions with local stakeholders, including access to and sovereignty over scientific data. Support for the long-term financial value of conservation efforts through financial tools for remunerating carbon and biodiversity resources (credits, certificates, etc.) will also be proposed.

A programme of capacity building and support for national research infrastructures will be essential to guarantee data sovereignty, train new generations of researchers and experts, particularly in data collection, management, analysis and resource monitoring, and provide them with work programmes and resources.

In short, the CPs need robust scientific support, an interdisciplinary approach and capacity building to ensure sustainable conservation and achieve their ambitious objectives over the long term.

2. CP-Congo in association with regional scientific initiatives, including *One Forest Vision (OFVi)*

2.1 Scientific component of the CP-Congo

The scientific component of the CP-Congo focuses on seven points:

1. Train a new generation of local scientists and researchers in fields related to knowledge of the functioning of forest, marine and aquatic ecosystems, carbon resources and biodiversity. Scholarships should be awarded in particular in ecology, zoology, oceanography, soil science, geomatics, social and political sciences, forest economics, environmental economics and financial engineering;
2. Strengthen the capacities of national research bodies and public structures (national implementing agencies), and their networking at regional and international levels;
3. Map and categorise areas of ecological interest (HCV/HSC), mangroves and peat bogs, which could be the subject of substantial funding enabling them to be converted into protected areas or equivalent recognition (while respecting the customary rights of indigenous peoples and local communities), with a view to contributing to the target of protecting 30% of land and 30% of sea, while integrating the conservation and protection series;
4. Study the costs and benefits, including the opportunity costs of protecting areas of ecological interest on land and at sea, particularly in economic terms, but also in environmental and social terms;
5. Put in place a process for creating, analysing and using dynamic national data on carbon stocks and biodiversity, including uncertainty calculations and a public data access portal for users;
6. Establish a robust national biodiversity and carbon monitoring system that can serve as the basis for the development of a market for credits and certificates integrating the results into the data management system. This system recognises and is linked to the MRV monitoring system for deforestation and forest degradation developed by the Ministry of Forest Economy of the Congo;
7. Involve public structures (national executing agencies) from start to finish in the implementation of all field operations, with a view to greater ownership of the effects and impacts of the partnership.

2.2 Synergy between the CP-Congo and the OFVi initiative

Since the One Forest Summit, held in Libreville in March 2023, the French side has drafted a proposal for a '*One Forest Vision*' initiative, supported by a coalition of 6 French public research establishments (CEA, CNRS, CIRAD, INRAE, IRD and MNHN). This OFVi initiative, which was presented at the 3 Basins Summit held in Brazzaville in October 2023 and adopted in its final declaration, has not yet been discussed with researchers and teacher-researchers from Congolese research and higher education institutions.

The general objectives of OFVi are in line with the commitments of the NCFPs. They aim to increase the capacity of tropical forest countries to monitor forest degradation, carbon reserves and biological diversity. Various areas of research are needed to achieve these objectives. These include the identification of sites to be included in the '30x30' initiative, the monitoring of biodiversity inside and outside protected areas, and the assessment of carbon reserves with a view to offsetting. To meet these challenges, OFVi has proposed a five-pillar approach:

- Pillar 1: Field understanding of forest carbon and biodiversity at the landscape scale.

- Pillar 2: Large-scale assessment of tropical forest carbon.
- Pillar 3: Use of remote sensing and artificial intelligence down to tree scale.
- Pillar 4: Co-construction, development and integration of advanced mapping and monitoring products for forests and wetlands.
- Pillar 5: Capacity building, training and involvement of citizen science

OFVi will thus contribute to points 1, 2, 5 and 6 of the research component of the CP-Congo by constituting a tool aimed at promoting collaborative research. A specific component for the Congo has already been identified for OFVi with the financial support of the French Ministry of Higher Education and Research (MESR) and the Ministry of Europe and Foreign Affairs (MEAE).

The aim of this workshop is to ensure that the avenues envisaged by OFVi are consistent with the expectations of research in the Congo, in order to eventually produce a joint multi-year programming document for research support and capacity building, in support of the commitments of the CP.

2.3 Other initiatives to support the scientific component of the CP-Congo

Parmi ces initiatives on peut d'ores et déjà lister :

- ***Congo Basin Science Initiative* (CBSI):** a collective of researchers whose aim is to stimulate investment in understanding the workings of the Congo Basin and training a new generation of scientists.
- ***Scientific Panel for The Congo Basin* (SPBC):** a structure similar to the "Large-Scale Biosphere-Atmosphere Experiment in Amazonia" (LBA), whose aim is to carry out a multidisciplinary synthesis and in-depth assessment of current knowledge of Congo Basin ecosystems.
- **Réseau de Recherche sur les Forêts d'Afrique Centrale (R2FAC):** a group of institutions within the framework of the COMIFAC convergence plan, whose aim is to contribute to the development and sustainable management of the environment and forest ecosystems of Central African countries, through research and knowledge production activities that take account of ecological, socio-economic and political realities.

Appendix 2. List of participants

Institution	**Fonction**	**Name**
AFD	Environmental Project Manager	Morgane SEGER
French Ambassy	Deputy Cooperation Advisor	Marie FABIEN

CEA-UVSQ	LSCE IPSL	Thomas BOSSY
CIRAD	Dir. Dpt Dims	Alain BILLAND
CIRAD	UR Forêts & Sociétés	Guillaume LESCUYER
CIRAD	AT Forêts HVC/HSC programme PUDT	Vivien ROSSI
CIRAD	Representative in Congo	Eric FORNI
CIRAD	UR Forêts & Sociétés	Adeline FAYOLLE
CRDPI	Resp. Forest Ecology Research and Study	Patrick MISSAMBA-LOLA
IGN	Researcher	Blaise LOUZALA
INRAE	Deputy Coordinator OFVi	Camille LACROUX
INRSSH	Rep. General Manager	Piervon N'SONDE
INRSSH	Teacher-researcher	Jean-Hervé NGUEDE NGOMO
IRF	Chief Executive Officer	Victor KIMPOUNI
IRF	Scientific director	Garel MAKOUANZY
IRSEN	Research assistant	Roland NGOMO
IRSEN	Chief Executive Officer	Victor MAMONEKENE
IRSEN-IEC	Researcher	Carine MAMPOUYA
IRSEN/Renatura	Research assistant	Dorelle LOEMBA
IRSEN-IEC	Researcher	Edmond MIABANGANA

MEF-CNIAF	MNV Unit	Muriel LOKOKA
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PRIM-CP	Assistant Permanent Secretary	Jeanette MBOUNGOU
MESRIT	CRSIT	Gabin NGANTSO
MESRIT	Head of CCIRF Department	Noël WATHA-NDOUDY
Observatoire indépendant externe des forets	Manager	Gady Inès MVOUKANI
OLIVE PEOPLE DEVELOPMENT	Director	Patrick GAINCKO
Primature	Forest Economy Attaché	Augustin NGOLIELE
RENATURA	Director	Nathalie MIANSEKO
RENATURA	Oceanographic pole	Guy MABIALA
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UMNG-ENS	LTEF	Hugues Bruno GOMA
UMNG-ENS	LTEF	Elferd ELOALI
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UMNG-ENSAF	Teacher-researcher	Chauvelain DOUH

UMNG-ENSAF	Teacher-researcher	Roméo EKOUGOULOU
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