

Republic of Congo

Balancing Mining Development and Forest Conservation in the Congo Basin

Strengthening Land Use Planning in the Republic of Congo:
Assessment, Proposed Roadmap, and Draft Implementation Plan



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EXECUTIVE SUMMARY

OVERVIEW AND PURPOSE

Economic growth provides countries with important development benefits, including reduced poverty and improved livelihoods. But some economic activity – particularly development and exploitation of natural resources can also bring adverse impacts if the trade-offs are not adequately considered and balanced against the environmental and social costs. In the Congo Basin, home to the world’s second largest tropical forest area, these trade-offs often concern impacts on forests, as well as the livelihoods of rural people who depend on them.

In addition to globally important forest resources, the Congo Basin also contains rich mineral resources, including gold and iron. The drive to exploit these resources to finance further development could lead to negative environmental and social impacts, if implemented with incomplete consideration of the consequences. Increasing agricultural productivity is also seen as a means for addressing rural poverty, but will require balancing the demands of household subsistence and energy needs and large scale commercial agriculture and plantations. The associated infrastructure—roads, railroads, and energy supplies—needed to extract, process, and market mineral resources and agricultural production is a particular concern, because of the wider impact on communities and forested landscapes beyond individual investment sites.

Rapid and unplanned deforestation can lead to considerable economic costs for countries and social hardship for users of forest resources and the environmental services they provide: food, clean water, energy, materials for construction and shelter. Forest degradation can also cause irreversible environmental problems such as biodiversity loss and downstream changes in water regimes. In the Congo Basin, deforestation is now low, but is expected to increase significantly as investments in transportation, agriculture, energy infrastructure, and mineral development increase. While some deforestation will be inevitable as part of the development process, Congo Basin countries have an opportunity now to ensure that forest land development is planned and implemented in an integrated manner that avoids, minimizes, and/or offsets (following the mitigation hierarchy) unnecessary economic losses and social hardship. Early, integrated, planning for the development of mineral resources, forest and agriculture investments may help to reduce future impacts, create local development benefits, and enhance the sustainability of development.

This technical assistance activity on balancing mining and forest conservation grew out of an earlier regional study on *Deforestation Trends in the Congo Basin – Reconciling Economic Growth and Forest Protection* by the World Bank and PROFOR (2012, www.profor.org/). Through scenario analysis and modeling, that effort showed that significant deforestation is caused by economic forces outside the forest sector—including conversion for agriculture and resource extraction, such as mining and logging and the associated development of roads and other infrastructure. Improved and more integrated spatial planning was recommended as a way to anticipate and manage the emerging drivers of deforestation in the Congo Basin forests.

Building on that recommendation, this activity was launched to identify, by means of a concrete case study, entry points and provide technical information to support country-led efforts toward more balanced planning and management of natural resources for sustainable development in the Congo Basin. The aim was to develop analytical tools for assessing and developing different land use scenarios, and their associated economic, social, and environmental impacts. The approach was to engage with a

national process led by champions; support the process with maps, information, and technical analysis; propose ways to engage affected communities and stakeholders; and to promote a longer term vision or roadmap toward balanced spatial planning. In response to a request from the government to provide assistance in designing a practical and inclusive land use planning process the focus of the activities were adjusted to accompany the government in this process.

Scope and objectives of the activity. This report describes activities and results of a technical assistance activity, *Balancing Mining and Conservation in Congo Basin with Strategic Land Use Planning* (P146347), implemented jointly by the World Bank’s Environment and Natural Resources Global Practice and the Energy and Extractives Global Practice, with funding from the Program on Forests (PROFOR, TF015224) and from the Mining Technical Assistance Project (P133063). The World Resources Institute (WRI) implemented the main technical activities under a competitively awarded contract. Recognizing time and budget constraints, the effort initially focused on a specific forested landscape with an immediate need to balance competing land uses. The TRIDOM area¹ was seen as a relevant case study to begin learning how forest and mineral extraction and associated infrastructure can be planned to optimize production while minimizing or preventing environmental and social costs. In early discussions, the Republic of Congo (ROC) was receptive to the technical assistance activity and a focus on one country was an opportunity to concentrate technical resources on a single national planning process, rules and institutions.

Country engagement and opportunities. Due to the constructive engagement of the ROC’s key agency for national planning, the *Ministère de l’Aménagement du Territoire et de la Délégation Générale aux Grands Travaux* (MAT-DGGT)² and the opportunity provided by a new spatial planning law (*loi n° 43-2014 d’orientation pour l’aménagement et le développement du territoire*³), this activity was able to go beyond providing technical tools in a limited case study, to create dynamic engagement and a road map toward improving spatial planning processes in the country. This engagement has helped to open the door to higher level dialogue on strategic issues involving use of the country’s land and resources in support of its overall development objectives. With the technical support of WRI, MAT-DGGT has convened a wide range of stakeholders inside and outside of government in a series of consultative workshops to review technical and mapping analyses of national and sectoral spatial planning efforts and advise on ways to improve inter-sectoral coordination and integrated planning for sustainable development. Stakeholder recommendations and technical analyses were consolidated into a “roadmap” for strengthening land use planning in ROC, which is the main topic of this report.

Beyond the roadmap, this process has started to define and unlock the resources needed to begin implementation and scale-up of capacity building and analytical activities to support a national spatial planning effort. Building on Congo’s expanding national program for Reduced Emissions from Deforestation and Forest Degradation (REDD+), there are opportunities to direct resources toward spatial planning as an important element of the National REDD+ Strategy and efforts to address drivers of deforestation. The Forest Investment Program (FIP) and the Central African Forest Initiative (CAFI) are

¹ Where the Gabon, Cameroon, and the Republic of Congo borders touch, the Tri-National Dja-Odzala-Minkebe (TRIDOM) area is the largest block of intact forest in the Congo Basin. It is home to communities of indigenous peoples and significant biodiversity – elephants, gorillas and chimpanzees – and protected areas. The area is also rich in mineral resources, exploration licenses and potential for plantation agriculture development.

² Since April 2016, the ministry’s title has changed to Ministère de l’Aménagement du Territoire et des Grands Travaux (MATGT).

³ Translated approximately as “orientation law for land use planning”

now planning for Congo's future forest-related investment needs and the need to balance land use among forestry, agriculture, mining, infrastructure and conservation interests.

This activity included a desk study of international experience and good practices for strategic land use planning, a case study of land use in the TRIDOM area that identified competition and overlaps, technical mapping studies at the national level, and stakeholder consultation workshops on how to strengthen ROC's national spatial planning efforts in light of the new law. These steps lead to more strategic support for land use planning nationally and an effort to outline feasible, actionable steps toward more integrated multi-sectoral planning processes and more systematic and harmonized sectoral planning processes. This report focuses primarily on the latter development, consolidating recommended actions into a roadmap for a robust national planning process in the ROC.

Objectives of the report. This report aims to: (i) share findings from stakeholder engagement in developing a roadmap to strengthen ROC's land use planning; (ii) summarize existing and proposed spatial planning efforts and associated capacity; (iii) outline the main components of a national spatial planning roadmap including major activities and outputs of a proposed implementation plan. This executive summary highlights the analyses and technical inputs that supported the engagement process, the results of the road map development and key findings and recommendations.

ASSESSMENT OF EXISTING NATIONAL SPATIAL PLANNING EFFORTS IN ROC

The effectiveness of the current framework, institutions and processes for spatial planning in ROC were assessed as part of the dialogue on future planning needs. A brief summary of key findings follows.

National legal framework for land use planning provides a starting point. In 2014, ROC passed the new *orientation law for land use planning (Law No. 43-2014)*. This provides a decent framework and starting point for an improved national process. However, the law envisions some additional regulations, application texts, institutions and implementation structures that remain to be developed. The law is also complex in its requirements while capacity and resources for implementation are under-developed. The law requires preparation of a new national multi-sectoral spatial planning document (last prepared in 2005), but does not designate a time frame or require harmonization with sectoral plans.

The current national land use plan dates from over a decade ago. The multi-sectoral *Schéma National d'Aménagement du Territoire (SNAT)* was prepared in 2005 and aimed to balance economic and environmental interests and safeguard sensitive areas. It provides a long term development vision and high level designation of regions and land use management zones, each with sectoral priorities identified. The SNAT is not aligned with sub-national department or district boundaries and does not designate areas to a specific level of single uses. The A SNAT does not necessarily have to designate single uses or align with department or district boundaries but there are also no indications of the links between the SNAT and more detailed plans. There are not strong incentives for implementation, monitoring or evaluation and does not explicitly cover biodiversity and climate benefits (e.g., carbon storage potential). Finally, the *SNAT* does not seem to have achieved the status of a primary reference document for later national strategies and sectoral plans (e.g., National Development Plan of 2012).

Current land allocation practices could be better harmonized. ROC has a National Development Plan 2012-2016 (*Plan National de Développement - PND*), the multi-sectoral *Schéma National*

d'Aménagement du Territoire – SNAT for 2005-2025, and sectoral strategies (e.g., *Plan de Développement du Secteur Agricole - PDSA* for 2012-2035). However, a review of current land allocation practices found that land allocations and use permits in different sectors are generally issued without reference to a previous spatial planning document. More specifically, the Ministry of Agriculture provides permission for agricultural land use (under law n° 25-2008) and the Ministry of Agriculture and partner ministries have issued Express Occupation Permits for oil palm plantations (outlined in decree n° 2005-515); the Ministry of Forest Economy issues Forest Concession Permits (under law n° 16-2000); and the Ministry of Mines issues prospecting licenses and concessions (under law n° 4-2005). To promote more coordinated planning and development, procedures will be needed to ensure that future sectoral land allocations are more thoroughly linked to national spatial development priorities and associated zoning, as envisioned by the *orientation law for land use planning* (law n° 43-2014).

Evidence base for integrated spatial planning needs improvement. The spatial and tabular data in the SNAT are based on remote sensing, maps, censuses, and technical information on soils, etc., from before 2002 and sometimes even from the 1980s. There is not yet a single inventory and repository of key spatial data, although *MAT-DGGT* and other ministries are working to build the fundamental data sets and map layers (e.g., satellite images, cadastral plans, socio-economic surveys, maps of transportation infrastructure, hydrography, etc.) needed to support sound spatial planning. More efforts to obtain digitized boundaries of lower level administrative units, population distribution, and locations and land uses associated with forest dependent communities and indigenous peoples would be useful for more robust and informed planning. Institutional systems and capacity are also needed to build, analyze and maintain an improved national geospatial evidence base and apply it to forward planning efforts.

RECOMMENDATIONS FOR STRENGTHENING MULTI-SECTOR PLANNING

Multi-sector land use planning can be strengthened by investing in strengthening institutions, spatial data and analytical maps, improving the legal framework, and completion of national level multi-sector plans, particularly the *SNAT*. Strengthening ROC's spatial planning processes and institutions would result in tangible benefits, including: (i) contribute to a better understanding of the land use potential of each geographic area; (ii) indicate clearer boundaries for where and what types of investments should and should not be considered; (iii) reduce conflict between sectors or between national priorities, national government actors and local community needs; and (iv) encourage wider agreement in the context of national development planning (and related budgeting), including the relative priority of key investments and the need to allocate space for them to be implemented. The recommendations that result from the multi-stakeholder workshops and the roadmap development process include:

Establish a center for land use and spatial development planning. Such a center would provide an efficient, one-stop repository for all needed reference maps and online atlases related to land use planning. It could supply analytical and mapping services for sectoral and subnational planning, especially where capacity is under development and centralized services would be faster and more cost effective. Such a center could be linked to one institution or shared among several agencies, but in practice should likely be aligned with plans for a National Geomatics Center and a land use planning unit within *MAT-DGGT*.

Set up key national coordinating units, as envisioned under the orientation law for land use planning (law n° 43-2014). These include the *Conseil National d'Aménagement du Territoire* and the *Comité*

Interministériel d'Aménagement du Territoire. These institutions will need clear mandates and appropriate human and technical capacity and financial resources to engage in coordinating and servicing an improved national spatial planning process.

Invest in baseline data and analytical mapping capacity. A systematic update of spatial baseline data is needed to support analytical reference and zoning maps. This effort could begin with a thorough assessment of ongoing investments in spatial data by key sectors and raising awareness about the benefits of new types of macro-zones for the SNAT.

Align legal codes for land use and spatial development planning at sectoral level. Legal codes for land allocation and zoning in key sectors such as agriculture, forestry, and mining need to be reviewed and harmonized with the new national framework. These issues could be taken up in the process of developing the *Code d'Aménagement du Territoire*, which the Government proposes to be developed.

Broaden consultation, participation, and partnerships in the planning process. Many plans have difficulties in their implementation if stakeholders within and outside government are not engaged in the planning process. The planning process suggests three key points when rounds of consultation would provide valuable feedback and build buy-in: (i) after data collection and during the analysis stage when trends and issues are identified; (ii) when determining the preferred scenarios and options for development; and (iii) when considering the draft final plan.

Harmonize multi-sectoral land use planning efforts in an improved and updated SNAT. An improved and updated SNAT would provide the basis for realizing many of the objectives of the national spatial planning law. The SNAT can be strengthened by advancing sustainability, more explicitly linking to sector plans and priorities, identifying community and indigenous lands, and relying on comprehensive analysis and stakeholder engagement.

The following actions would result in a more robust and broadly supported national plan:

- ***Make sustainability more explicit in developing the revised SNAT.*** The process of revising the SNAT could take into account more fully the sustainability principles in the land use planning law and apply these in the delineation of macro-zones. For example, the country's National Agriculture Development Plan (*PDSA*) proposed no expansion of new agricultural land into primary forest, protection of riparian buffers, and other criteria to ensure more sustainable agricultural production. Similar approaches and criteria could be applied in the analysis and recommendations contributing to the revision of the SNAT. For example, sustainability criteria for infrastructure development could be proposed that seek to balance increased accessibility, greater territorial integration, reduction in transport costs, and minimized negative environmental impacts such as habitat fragmentation and biodiversity loss.
- ***Integrate more environmental and social issues into the SNAT revision process.*** The analysis, scenarios, and macro-zoning developed as inputs to the SNAT could be used to consider sectoral issues and trade-offs. For example, mapping and macro-zoning efforts could include additional specific land uses that are important for economic development and environmental sustainability, such as areas important for: (i) wildlife corridors (between protected areas, even in forest and mining concessions); (ii) supply of ecosystem services (e.g., carbon storage/REDD+, safeguarding of drinking water supplies, shore line protection/ mangroves); (iii) cultural services (e.g., spiritual, religious, and aesthetic values) and ; (iv) tourism development.

- ***Make the SNAT more coherent with sector plans.*** Since the publication of the SNAT in 2005, new sector plans have been published. Zoning in sector planning has to be aligned and reflected in the revised SNAT macro-zoning and include: (i) macro-zoning from the National Agricultural Development Plan (PDSA); and (ii) zoning proposed in forest areas from forest concession planning (e.g., local development areas, riparian areas, hunting areas), as well as similar plans from other sectors.
- ***Encourage and build on sector plans or analyses that take sustainability into account.*** The SNAT revision can take advantage of advanced spatial mapping tools and ways to define suitable areas for specific land uses in these sectors, for example mapping of palm oil potential using multiple economic, social, and environmental criteria.
- ***Reflect community and indigenous lands in macro-zoning.*** A revised SNAT that delineates land important for local development or local cultural use would signal strongly that community and indigenous lands are important for the country's economic and spatial development. The SNAT 2005 did not include specific zones for local development or community and indigenous lands. Forest concession maps combined with other mapping efforts can be the foundation for delineating lands used by forest-dependent communities for cropping, fuelwood, hunting, fishing, and other uses.
- ***Consider analyzing different spatial development scenarios.*** The SNAT 2005 presented a single final macro-zoning for the country. However, for many areas of the country, multiple land use options exist, some creating complementary benefits and some creating negative trade-offs between different land uses. An analytical process could examine the implications of alternative land use scenarios for the whole country or important sub-regions. This analytical step could then be combined with a revised consultation process to allow stakeholders within and outside government to understand the consequences and identify a preferred scenario.
- ***Develop innovative spatial initiatives.*** Spatial development initiatives such as green infrastructure networks, urban food sheds, and agricultural growth corridors are examples that have been developed in other countries. The SNAT revision process could explore similar initiatives, for example a region that prioritizes mining, wildlife conservation and carbon storage (REDD+) or regions suitable for sustainable oil palm production.

RECOMMENDATIONS TO STRENGTHEN SECTORAL LEVEL PLANNING

Planning efforts at the sectoral level – forest and biodiversity management, agriculture, and mineral development – were assessed for the following reasons: (i) proposed activities in these areas affect most of the country's land area; (ii) they are a high priority in the *Plan National de Développement 2012-2016*; and (iii) there are many areas of overlapping interest and better spatial planning in these sectors and alignment of their plans with multi-sector land use plans are essential for sustainable land management in the country.

The assessment covered the sector's relevance to multi-sectoral land use planning, leading institutions or focal points for capacity building, past planning efforts, and data and map availability to support important planning and information needs. Evidence-based land use planning combines information on the ecological and economic potential of forests and other ecosystems, agricultural potential, mining potential, and other land use options, which requires data and maps, analytical efforts, and zoning efforts. Suggestions to fill identified needs in three key sectors are summarized in Table ES1 below in three broad areas: (i) spatial data and baseline maps, (ii) analytical tools and studies to support land allocation decisions; and (iii) zoning maps and efforts to define boundaries for a land use classification system.

Table ES1 - Suggestions to strengthen sector level planning

	Forest and Biodiversity	Agriculture	Mining
Data and maps	- Consolidate spatial data for the forest sector and create new summary maps from the National Forest Inventory (INF). - Consolidate biodiversity and habitat data for forest and other ecosystems and create maps. - Over the long-term, formalize regular land cover/land use mapping updates.	- Consolidate existing land use data. - Explore options to delineate community lands (both in forest and non-forest ecosystems). - Fill important soil information gaps.	- Create consolidated mining concession database and associated GIS with contextual land use maps. - Consolidate public use data from exploration concessions and make them available for land use planning. - Create online platform for geologic maps and mining concession maps to be updated.
Analysis	- Prepare analytical studies and maps on: - o Forest potential and spatial priorities of forest use. - o Biodiversity conservation and priorities. - o Natural resource-based tourism potential.	- Prepare analytical studies on agriculture potential. - Consolidate information to delineate suitable areas for sustainable palm oil production.	- Evaluate the final spatial data sets from the geological mapping effort and create relevant maps for land use planning. - Prepare analytical study that identifies potential future mining areas
Zoning	- Strengthen (official) zoning and classification of the forest estate and create reference map. - Propose new macro-zoning for biodiversity conservation, ecosystem services management, and biodiversity offset areas and create reference map.	- Create reference maps to prioritize agriculture use and guide allocation of land for sustainable industrial agriculture. - Prepare a palm oil investment guide.	- Assess available options to locate infrastructure investments to avoid / protect sensitive areas (or consider other offsetting measures).

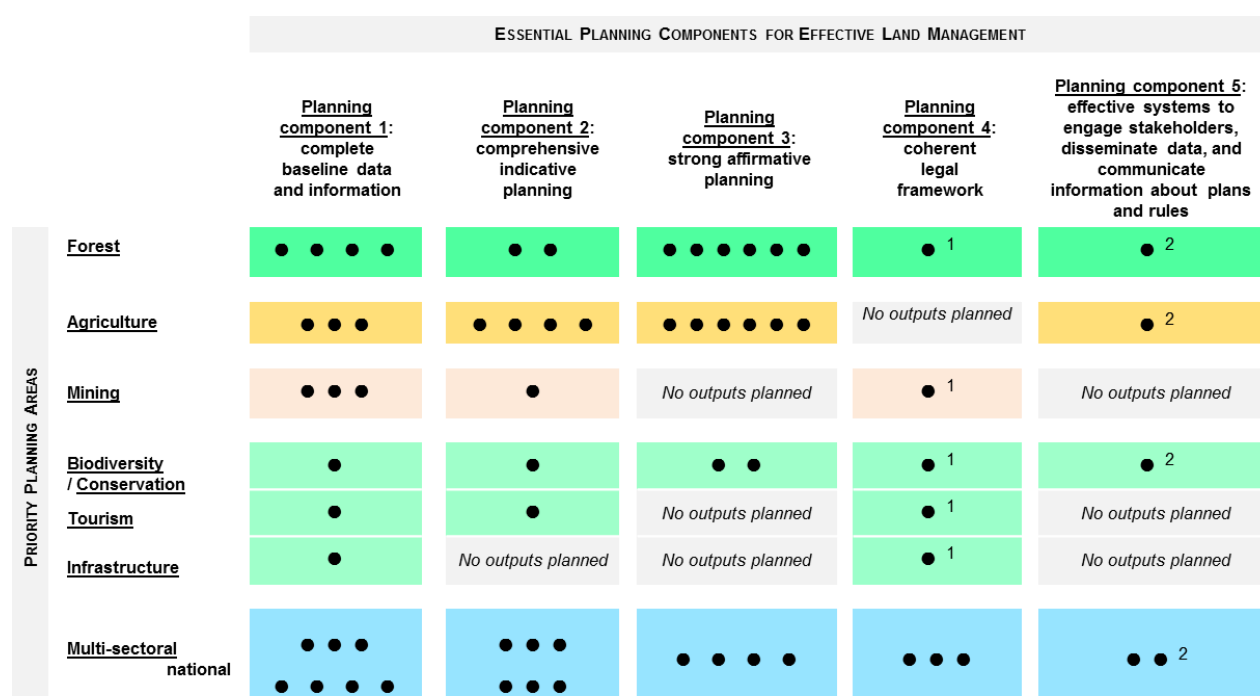
PROPOSED ROADMAP TO STRENGTHEN LAND USE PLANNING IN ROC

As a result of the consultative process and the technical inputs and stakeholder suggestions, the ROC government requested that the technical considerations and recommendations be consolidated into a step-wise roadmap to guide implementation of an improved national spatial planning program. The roadmap strives to suggest and organize priority activities and interventions over a five-year horizon. Of course, proper planning requires periodic assessment and revision, so the expectation is that the national spatial planning process would be continuous, with major milestones when updated national plans are published (e.g., on a five-year cycle).

The framework for organizing activities and interventions is based on an idealized spatial planning process that includes six aspects or components: (i) completion of baseline data and information, (ii) comprehensive indicative planning, (iii) strong affirmative planning, (iv) coherent legal framework, (v) effective stakeholder engagement and communication, and (vi) effective systems to implement, monitor enforce and adjudicate the plan. The roadmap process focused on advancing to a stage of better developed national spatial land use plans and did not fully cover the aspect of implementation and enforcement of these plans. More effort on this aspect is needed in future assistance projects and would have to reach to the sub-national level.

These components would not necessarily be implemented sequentially, but provide a logical framework for discussing needs and priorities. The workshop and consultation process resulted in detailed activities that could be carried out for each stage of the process and for each of the key sectors examined. The following Figure ES1 illustrates this organizing framework of components and the key sectors examined. The figure illustrates the level of effort and interventions expected to be needed for each sector and planning component to operationalize the road map to the planning stage.

Figure ES1 Roadmap with framework for strengthening sectoral and multi-sectoral planning



Notes:

● = Dots indicate the relative level of effort envisioned in the implementation road map, based on number of proposed activities and outputs.

¹ = Indicates supporting studies to identify legislative ambiguity and gaps.

² = Indicates efforts to set up new systems to share and access data, maps, plans, and other land use information.

Broad intervention areas selected for the roadmap. The specific interventions included in the proposed roadmap were prioritized based on the following principles, criteria and assumptions:

- Invest in data and information first.
- Apply analytical tools to develop land use options and to facilitate understanding.
- Invest in a few strategic planning processes and move toward implementation.
- Focus institutional changes and legal revisions on a limited set of strategic areas.
- Encourage systematic information sharing and stakeholder engagement.
- Designate a group of government conveners.

SEQUENCING OF KEY ACTIONS

The roadmap assumes a five-year time frame to launch the national spatial planning process at sectoral and multi-sectoral level and to achieve an improved and useful national planning product. This allows sufficient time for multiple planning outputs with stakeholder contributions to be prepared, assuming that each output stays within a recommended 12 to 18 month limit. Planning outputs that require a longer preparation time carry a greater risk of becoming too complex and delaying or avoiding implementation. After the first comprehensive product, iteration through another cycle of planning or two will be needed to allow for complete alignment of sectoral and multi-sectoral planning processes.

IMPLEMENTING THE ROADMAP: MULTI-SECTORAL LEVEL

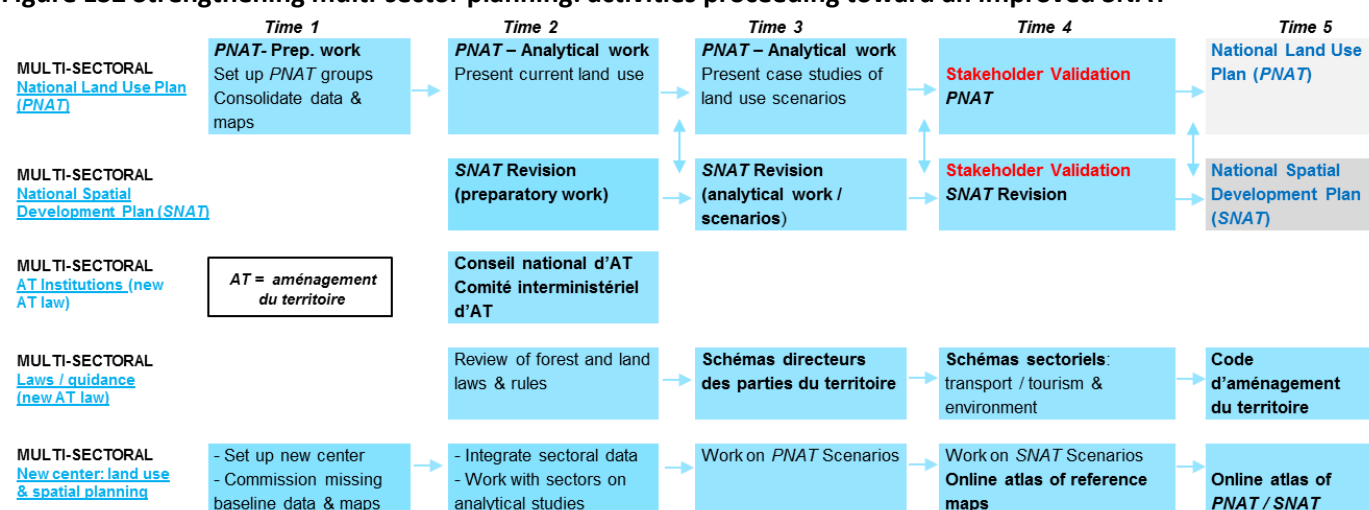
The proposed implementation plan for a national spatial planning process includes prioritized and sequenced activities at both national/multi-sectoral level and sectoral level. The draft implementation

plan seeks to build planning capacity and provide key technical outputs that will contribute to improvement of the national level planning program and system. The implementation plan builds on the key components of the orientation law for land use planning.

Institutionally, *MAT-DGGT* has the strategic mandate for multi-sectoral planning and is envisioned as the overall coordinating agency for the roadmap process, and co-lead for proposed sectoral activities. Sectoral agencies are proposed as focal points for the preparation of technical products at sectoral level, which will then feed into the national, multi-sectoral process – eventually leading to an improved and strengthened *SNAT*. In addition, other stakeholders and private sector interests have an important role in providing technical inputs and feedback in the planning implementation process.

Figure ES2 summarizes the sequencing of major packages of activities and outputs to strengthen multi-sectoral planning. The main report provides a more detailed summary of all outputs and a preliminary work plan.

Figure ES2 Strengthening multi-sector planning: activities proceeding toward an improved SNAT



IMPLEMENTING THE ROAD MAP: SECTORAL FOCUS

It is important that the sequencing of major packages of activities and outputs to strengthen sectoral planning are seen as useful by the stakeholders for enhanced performance within the sector itself, in addition to informing the national planning process. Figure ES3 summarizes sector specific actions.

Forest sector. To build land use planning capacity, it is proposed to start with the sector that covers the largest land area and already has spatial planning experience based on its coordination of forest management plans. In addition, there is much at stake in finding the right balance between safeguarding the country's forest capital and obtaining large economic returns from forest lands. The multi-resources forest inventory (*IFN*) project underway will help to fill an important gap by providing information on land cover and land use based on extrapolated sample plot data. In addition, establishing official forest boundaries and land use zoning within forest lands, especially in the savannah region, would create greater certainty and fewer conflicts for agricultural and other land investments. If the national *SNAT* updating process moves faster than the availability of key forest sector outputs, it may be necessary to update land use and cover maps as an interim exercise. In the longer term, there will be a need for regular updates and long-term support for these types

of maps (perhaps as part of building a National Geomatics Centre). *Ministère de l'Economie Forestière et du Développement Durable (MEFDD)* and *Centre National d'Inventaire et d'Aménagement des Ressources Forestières et Fauniques (CNIAF)* would be the expected focal agencies for this effort.

Agriculture sector. Agriculture is a critical land use in the country in terms of both area and the number of people involved; it can also be an important driver of forest loss and other ecosystem change. Strengthening land use planning capacity for the agriculture sector can build on the *PDSA* experience of delineating macro-zones and applying criteria to avoid forest loss. The roadmap envisions emulating these criteria in other sectors. The process going forward can introduce both sustainability considerations and the perspective of multiple land uses in a specific area. Planning activities around oil palm and other commercial plantation crops can help to avoid a boom-and-bust cycle. The roadmap also suggests systematic spatial planning of small-scale agriculture intensification with associated infrastructure investments (e.g., roads, markets). With comprehensive stakeholder participation, such activities could help to boost livelihood opportunities and land security for local people. *Ministère de l'Agriculture et de l'Elevage (MAE)* and *Centre National des Etudes des Sol (CNES)* would be the expected focal agencies for this effort.

Mining sector. Through spatial planning, the mining sector has an opportunity to move toward a more strategic and comprehensive planning perspective. Rather than planning for individual mining sites, this approach would consider multiple potential mining sites and their associated infrastructure routing, energy needs and biodiversity conservation priorities. The roadmap proposes sectoral activities that can support the national multi-sector process leading to an improved and updated *SNAT*. *Ministère des Mines et de la Géologie (MMG)* and *Centre de Recherches Géologiques et Minières (CRGM)* would be the expected focal agencies for this effort.

Planning for conservation, tourism, and infrastructure are additional sectoral planning priorities that are essential to an integrated, strategic national spatial planning process. The suggested activities for these sectors remain to be discussed and detailed in consultation with key government agencies and are not shown in Figure ES3.

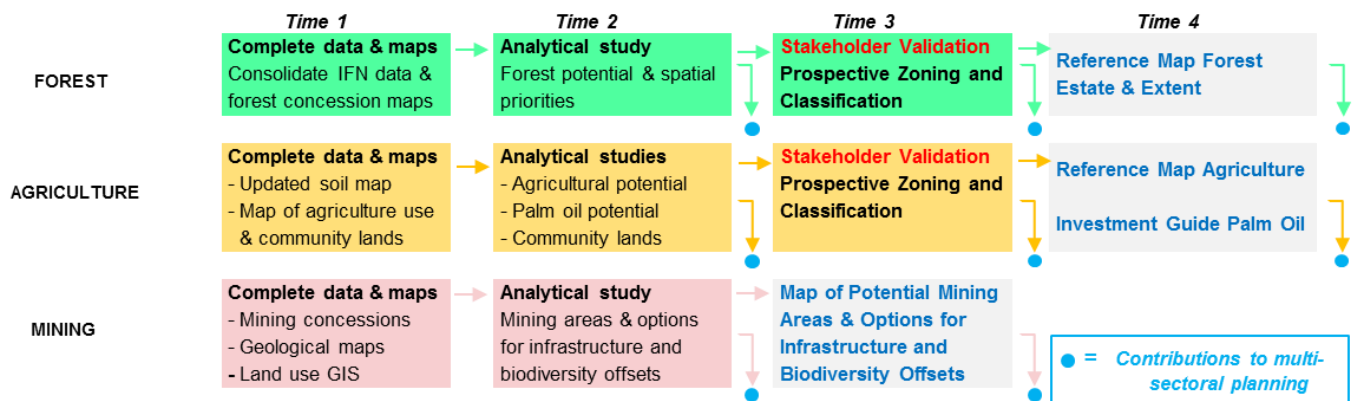
Conservation areas and biodiversity. Systematic land use planning for biodiversity and conservation priorities needs to be added to ROC's strategic national planning efforts. Such planning could include gradation of protections, from strict protection (e.g., national parks) to multiple use areas where land use changes are permitted (but certain management rules apply). The national spatial plan (revised *SNAT*) should include delineation of land supplying different ecosystem services, such as areas that supply clean drinking water, deliver shoreline and flood protection, provide opportunities for recreation and spiritual enrichment, are important habitat for wildlife, native trees and other species, and store carbon.

Tourism sector. Planning for ROC's tourism sector could easily build on the first round of sectoral efforts. This planning process would examine how different natural assets are providing benefits for tourism, recreation, and spiritual enrichment and identify new areas with tourism potential. This effort would strengthen the analytical foundation for planning in the tourism sector and could help to achieve the objectives of the country's national strategy for sustainable tourism (in progress) – and contribute to a revised *SNAT* by adding tourism development into the macro-zoning. Some existing studies on tourism development, mostly focused on tourism infrastructure and local level

planning for ecotourism (e.g., zones linked to protected areas), provide a base to build toward a more comprehensive and strategic national level.

Infrastructure. Spatial data and information on transport and energy infrastructure is an essential layer for land use planning in the sectors mentioned above and for multi-sectoral plans such as the *SNAT*. At a minimum, investments need to be made to have up-to-date spatial data and maps of current and planned infrastructure. There is an opportunity to introduce a broader strategic perspective into the planning of infrastructure and go beyond the routing criteria typically applied such as travel distance, travel time, travel volume, engineering costs, and number of people served. Additional criteria could include, for example, avoiding high biodiversity areas, minimizing habitat fragmentation, or reducing the indirect and cumulative impacts of transport infrastructure such as increased logging, unplanned agricultural development, and wildlife poaching.

Figure ES3 Strengthening sector planning: sequencing of major activities and outputs



NEXT STEPS AND AREAS FOR IMPROVEMENT

The proposed roadmap prioritizes key activities that are important to launch a national spatial planning program and to produce sound technical products that can support ROC's government in revising and improving the national multi-sectoral plan, or *SNAT*. However, the roadmap also postpones action on a number of broad intervention areas. These areas can be addressed in a follow-up program that also aims to support and ensure successful roll out and implementation of the revised plans as part of the country's development process. The framework in Figure ES1 provides a strategic tool that *MAT-DGGT* and its collaborating agencies can use to identify areas that may require strengthening in the future. This section summarizes some key intervention areas that could be undertaken with more time and resources.

Implementation of the plans after preparation. As noted, the roadmap process has not addressed in detail the activities and investments that will be needed to implement, monitor, enforce, and adjudicate national spatial plans, or address grievances once they are improved. Priority was placed on the need to get foundational data, maps and systems in place to support the emerging national spatial planning process. An effort was also made to link proposed activities to ongoing projects, build on existing planning capacity, and focus on what can be delivered in a reasonable time frame. More detailed consideration of implementation needs (institutions, mandates, capacity) should be undertaken as part of the proposed five-year roadmap period.

Subnational roles and capacity in the spatial planning process. The roadmap process focused on the national level institutions that have the mandate for spatial planning and has not addressed potential

activities and priorities at sub-national level. Provincial and district level governments will also need institutions, mandates and capacity to contribute to the national spatial planning program. An assessment of sub-national planning roles and associated needs could be undertaken as part of the national effort proposed in the roadmap.

Beyond the technical, institutional and capacity needs built into the roadmap, the following additional areas could be considered relevant for developing a comprehensive program of support to strengthen ROC's national efforts to improve spatial planning for sustainable development:

- Government capacity to organize and manage a multi-sectoral national planning process;
- Incentives and regulatory changes needed to ensure smooth planning across sectors;
- Stakeholder capacity to participate in planning process;
- Resource estimates for implementation of the roadmap;
- Funding plan to implement roadmap.

Caveat. The selection of interventions and specific activities in the proposed implementation plan is based on the earlier assessment of needs and gaps. It should be noted that not all planning components were assessed at the same depths, based on the technical expertise and resources available to the team. For example, the recommendations for component 1 (data and mapping) are more specific than for component 4 (legal framework). The final road map and implementation plan will require further validation discussions with *MAT-DGGT* and the sectoral ministries. This is necessary, for example, to ensure that all relevant ongoing projects are considered and that the interpretation of the orientation law is properly aligned. In addition, government partners may have alternate suggestions on the scope, frequency, and timing of participation and consultation for the sectoral and multi-sectoral plans.

ABBREVIATIONS

CAFI	Central African Forest Initiative
CARPE	Central Africa Regional Program for the Environment (USAID)
CERGE	Centre de la Recherche Géographique et de la Production Cartographique
CNES	Centre National des Etudes des Sol
CNIAF	Centre National d'Inventaire et d'Aménagement des Ressources Forestières et Fauniques
CRGM	Centre de Recherches Géologiques et Minières
DEP	Directions des Etudes et de la Planification
DGG	Direction Générale de la Géologie
DRG	Direction de la Recherche Géologique
ER-PIN	Emission Reduction Program Idea Notes
FAO	Food and Agriculture Organization of the United Nations
FIP	Forest Investment Program
FMU	forest management unit
FSC	Forest Stewardship Council
GIS	Geographic Information System
IFN	Inventaire Forestier National
IGN	Institut Géographique National
JRC	Joint Research Centre
MAE	Ministère de l'Agriculture et de l'Elevage
MAT-DGGT	Ministère de l'Aménagement du Territoire et de la Délégation Générale aux Grands Travaux
MEFDD	Ministère de l'Economie Forestière et du Développement Durable
MEH	Ministère de l'Energie et de l'Hydraulique
MID	Ministère de l'intérieur et de la décentralisation
MMG	Ministère des Mines et de la Géologie
MoU	Memorandum of Understanding
MRV	measurement, reporting and verification
MTACMM	Ministère des Transports, de l'Aviation Civile et de la Marine Marchande
MTE	Ministère du Tourisme et de l'Environnement
NEPAD	New Partnership for Africa's Development
NPFE	Non-permanent Forest Estate
OFAC	Observatoire des Forêts d'Afrique Centrale
OIBT	Organisation internationale des bois tropicaux
PAGEF	Project Appui à la Gestion Durable des Forêts du Congo
PDSA	Plan de Développement du Secteur Agricole
PFDE	Projet Forêt et Diversification Economique
PFE	Permanent Forest Estate
PNAT	Plan National d'Affectation des Terres
PND	Plan National de Développement
PNT	Plan National des Transports
PROFOR	Program on Forests
PRONAR	Programme National d'Afforestation et de Reboisement
REDD	Reducing Emissions from Deforestation and Forest Degradation
ROC	Republic of Congo

SCAEMPS	Strengthening Central Africa Environmental Management and Policy Support (SCAEMPS) program
SDSU	South Dakota State University
SIAF	Service des Inventaires et Aménagement Forestier
SIFODD	Système d'Information pour la Gestion Forestière et de la Développement Durable
SNAT	Schéma National d'Aménagement du Territoire
SNE	Société Nationale d'Electricité
TRIDOM	Tri-National Dja-Odzala-Minkebe
UCL	Université Catholique de Louvain
USAID	United States Agency for International Development
WCS	Wildlife Conservation Society
WRI	World Resources Institute
WWF	World Wide Fund for Nature

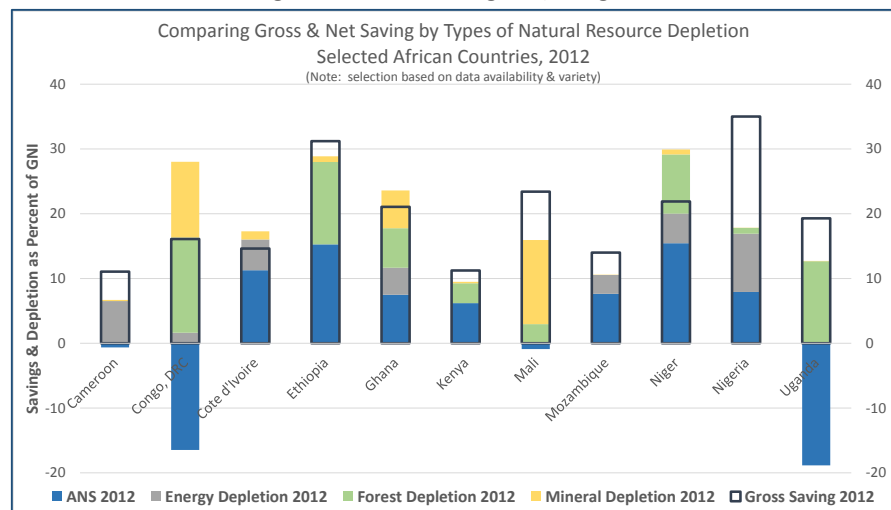
1.1 Background

The Congo Basin countries foresee major growth in transport infrastructure, and in the mining, and agriculture sectors. Newspaper accounts, political statements, and long-term development strategies confirm the ambitious visions for economic development in the region.

A wide range of investment and infrastructure projects are expected to catalyze this growth. For example, Pointe Noire aims to become the largest container terminal of Central Africa (Caslin, 2015). An improved road system from Pointe Noire north to Ouessou in the Republic of Congo (RoC) could transport a greater share of goods from this region to the country's coast instead of Douala in Cameroon. Likewise, a proposed bridge across the Congo River would link the commerce of Brazzaville and Kinshasa and their surrounding areas (NEPAD, 2016).

Most countries in Sub-Saharan Africa are heavily dependent on natural resource extraction, but these resources are highly depleted in most cases. Figure A to the right (using data from the World

Development Indicators database) illustrates Adjusted Net Saving and Natural Resource Depletion for a range of countries, where data are complete. Where the value of resource depletion exceeds gross savings, countries enter a condition of negative saving (DRC is an example) – which means consumption of assets, an indicator of an unsustainable development pattern.



The scale and scope of such significant investments will likely accelerate the scope and rate of land use change. Rich iron ore deposits are expected to drive new mining exploitation in the tri-country region of northwest Congo, southeast Cameroon, and northeast Gabon. Although the pace of financing and project implementation has somewhat slowed as a result of depressed iron ore demand and lower commodity prices, the region remains a potentially lucrative source of mining revenue should commodity prices rebound. Forest lands and savannah ecosystems are also targeted for expansion of palm oil and other agricultural crops at large industrial scale. Agricultural concessions, for example the Atama plantation in the Republic of Congo, are under consideration, or already awarded (Hance, 2016).

Yet, land use planning and strategic zoning that would balance uses of land in line with the priorities of multiple stakeholders are under-developed. Strategic development and land use plans are generally not up to date, rely on a weak evidence base and rely on governance processes that are not inclusive enough to address potential trade-offs and conflicts. Sectoral level plans are useful, – for example, concession-level planning in the Republic of Congo's forestry sector – but not well integrated or harmonized with

competing sectors and demands on land. Up to now, planning and zoning have had limited impact on the wider policy decision making at national scale.

Fortunately, there are opportunities for improvement at this early stage where investments are still at the planning stage. Most efforts to develop and exploit resources beyond timber are just getting off the ground. There is still time to develop plans and reap the benefits from sound planning that aims to balance economic, environmental, and social needs and reflects the contributions from a broad range of stakeholders. National level REDD+ and climate change dialogues, for example, are creating some momentum for considering cross-sectoral impacts of development on forests, which have value as stocks of carbon. In addition, the Republic of Congo has passed a new *orientation law on land use planning* (Law n°43-2014) that awaits implementation (RoC, 2014). It reflects the country's commitment to take advantage of all available technical tools that strengthen the foundation for growth, boost the competitiveness of the productive system, and protect and improve the living environment.

1.2 Motivation and Objectives

The Congo basin has vast forest resources, considerable mineral wealth, and enormous development needs. How to balance natural resource use for sustainable development is a major challenge for national and local government actors. A recent World Bank and PROFOR analysis found that most drivers of deforestation in the Congo basin come from activities outside of its forestry sector (World Bank and PROFOR, 2012). They include global demand for raw materials (e.g., timber, agricultural commodities, minerals), new mining operations, and investments in energy and transport infrastructure.

This technical assistance activity (implemented with PROFOR funding) was motivated by the question of how to help the Congo basin countries address these drivers of forest change and find a balance between mineral resource development needs, biodiversity conservation, and other land uses. The technical assistance activity aimed at developing analytical tools to support the Republic of Congo with national land use planning processes and stakeholder engagement toward more sustainable and balanced development.

The objectives of this activity were to develop analytical tools and knowledge products to assist the RoC government to carry out more informed land use planning. During this process, opportunities arose to engage in broader consultation processes with key land use planning stakeholders, provide technical support to selected government partners, and ultimately develop ideas for a strategy to improve land use planning. The lead government agency for carrying out this project in the Republic of Congo was the *Ministère de l'Aménagement du Territoire et de la Délégation Générale aux Grands Travaux (MAT-DGGT)*, the lead agency for land use planning.

PROFOR's and the Word Bank's rationale for seeking opportunities to strengthen analytical tools and land use planning processes came from the insights of an international study of land use planning experiences (World Bank, 2014). The study identified the following lessons learned:

- *Investing in strategic planning pays off.* It requires systematic stakeholder involvement which can help reduce future land use conflicts and increases the long-term prospects of investments.
- *Analyze tradeoffs of land use options and associated political economy early.* Understanding of these issue can highlight potential areas of common interests among stakeholders, but also risks, pressure points, and vested interests.

- *Analytical tools facilitate understanding.* Spatial tools can help visualize development scenarios, land use impacts, and tradeoffs between different land use options. They are most effective when combined with stakeholder engagement.
- *A government convener is the key for a successful planning process.* A convening institution within government that has a broader perspective and a strategic mandate to develop and implement the plan can bring people together and balance the interests of multiple stakeholders.
- *Planning in stages allows for learning.* No plan is perfect, and it is the plan's implementation that matters. The objectives of a plan must be realistic and the time-horizon for plan development and implementation must allow for opportunities to adapt, learn, and adjust to avoid costly mistakes.
- *Systematic information sharing helps in plan development and implementation.* The case studies demonstrated that information sharing helps build cooperation, buy-in, and shared understanding.

1.3 Approach used and partnerships developed

The World Bank competitively awarded the implementation of this work to the World Resources Institute (WRI). WRI has had a presence in Brazzaville for almost a decade and long-standing working relationships with government and non-government actors in the country since 2002. With its support to WRI, PROFOR leveraged the ongoing work of WRI and its partners under the multi-year USAID CARPE-funded Strengthening Central Africa Environmental Management and Policy Support (SCAEMPS) program. SCAEMPS aims to build in-country capacity to more effectively develop, implement, and monitor natural resource management policies in the Republic of Congo and the Democratic Republic of Congo, including ensuring that land use planning efforts at multiple scales prioritize biodiversity conservation, forest protection, and customary claims to land and resources. The PROFOR funded convening process to engage key stakeholders for improved land use planning complemented the development of a land use planning atlas, an envisioned information and planning platform under SCAEMPS.

The approach to this work had three main aspects. The key components were:

- *Process:* WRI conducted a series of multi-stakeholder and individual discussions to raise awareness of the new law, share information on planning processes, gather feedback from stakeholders, make proposals and generate support for a draft roadmap.
- *Technical:* WRI compiled data, produced maps and analyzed data availability, needs, and capacity.
- *Policy:* WRI carried out an initial review of the legal and policy framework for land use planning including the new orientation law on land use planning and relevant planning documents such as the National Spatial Development Plan (*Schéma National d'Aménagement du Territoire – SNAT*) published in 2005 (MdP, 2005).

The activity benefited from close collaboration with a wide range of partners. Their engagement helped to reach beyond the original contribution of technical products and contribute to a road map for improving spatial planning in the country. The following partners each made unique contributions to the process:

- *MAT-DGGT*: lead convener with a focus on practical efforts to implement the new orientation law on land use planning and the development of a roadmap.
- *MEFDD*: key sectoral land user, contributor of map and technical information, and supporter of future funding to build land use planning in support of forestry and biodiversity and *SNAT* process.
- *MAE, MMG, and MID*: shared background information on sectoral planning efforts and contributed in stakeholder workshops.
- *Republic of Congo media*: covered workshop events in print and on the Internet and brought public attention beyond technocratic inputs (see Box 2).
- *WRI*: delivered analytical inputs, technical assistance, and facilitation to the engagement process that developed the draft roadmap and implementation plan.
- *WWF, WCS, and Congo NGO partners*: provided data and maps, shared planning experiences, and “ground-truthed” analysis and ideas introduced during stakeholder workshops.
- *USAID*: through its Central Africa Regional Program for the Environment (CARPE), the Agency provided indirect technical and policy analysis support via implementing partners WRI, WCS and USFS.
- *World Bank*: engaged in dialogue on follow on needs for supporting spatial land use planning, mobilized future resources through *PFDE*, *FIP* and *CAFI*, and provided logistical, technical, and process facilitation inputs.
- *PROFOR*: provided flexible funding and supported continuation and deepening of the work.

1.4 Engagement process and outputs

The project consisted of two phases. The first phase (October 2014 – June 2015) gathered information on different planning efforts and underlying policies in the Congo and highlighted areas where sectoral planning and land use planning could be improved.

The engagement process created strong interest among participating stakeholders to improve planning processes and embark on developing a roadmap to strengthen land use planning. *MAT-DGGT* convinced representatives from sector ministries to participate and actively engage in the workshops and in the analysis of the current planning capacity. *MAT-DGGT* also expressed the official support to further develop such a roadmap and signed a memorandum of understanding with WRI that outlined a set of activities for long-term collaboration.

During the second phase (August 2015 – June 2016), the engagement shifted from the initial focus on a case study and technical inputs to a broadening of the scope based on the relevance of the process to national planning. The objectives of this phase were to further analyze key documents and planning processes, engage with selected sectoral ministries (agriculture, forests, and mining), provide technical support to *MAT-DGGT*, and to determine the scope of major elements of a roadmap to strengthen land use planning. Additionally, in light of funding from the World Bank, specific support was requested to include capacity building for land use planning for forestry and biodiversity as inputs into the *SNAT* process. Box 2 summarizes main activities and outputs from the two phases.

The following activities and outputs are expected to be completed in the remaining months:

- Finalize summary document with assessment, proposed roadmap, and draft implementation plan in English (May 2016).
- Produce French version of summary document and associated documents for consultation workshop in Brazzaville (May 2016).
- Conduct consultation workshop in Brazzaville (June 2016).

Media coverage helped to shine light on land use planning processes and gaps. Both print and Internet media covered the two stakeholder workshops and the signing of a MoU between MAT-DGGT and WRI in 2015, demonstrating the level of attention this activity received in terms of responsiveness to key government officials and agencies. Land use planning can benefit greatly from communication support that makes use of radio, TV, print, Internet, and mobile phone messages to raise awareness about existing land use laws and planning processes or to share information about draft plans and land use options under consideration in a specific geographic area. See Box 2 for examples from this process.

Box 1 Activities and outputs

Phase 1

1. Consolidated information about infrastructure and mineral extraction plans and social and environmental threats
2. Produced detailed maps and overlays showing forests, biodiversity, and potential threats.
3. Conducted comparative analysis that identified the key features of successful spatial planning processes to provide a framework for what to do beyond identifying threats.
4. Held two major workshops (March and June 2015) to present results and to collect ideas and viewpoints of main institutional actors concerned with land use, allocation and planning and move toward a consensus on a coherent roadmap for implementation of the land use planning orientation Law no43-2014. The second workshop presented more detailed results and sought agreement on the main outline of a roadmap to strengthen land use planning.
5. Produced a final draft roadmap to strengthen land use planning which was endorsed by MAT-DGGT.

Phase 2

1. Provided technical support to MAT-DGGT to prepare proposal to PFDE and launch some of the preliminary work to strengthen land use planning in the country.
2. Engaged with key sectoral ministries to assess current planning efforts and determine scope of current data holdings and technical capacity.
3. Reviewed Congo's laws, planning documents and international land use experiences to determine scope of needs and to outline specific activities for the roadmap.
4. Prepared a draft section of a roadmap, a more granular document than what was discussed at the June 2015 workshop (presented in this document).
5. Prepared a first draft section of an implementation plan (presented in this document).
6. Prepared first draft of a summary that included a documentation of the engagement process, assessments of current situation, and the draft roadmap and implementation plan.

1.5 Insights from the engagement process

The following are the main opportunities and stakes for land use planning in the country:

- Growing political will for comprehensive, participatory land use planning in Congo as evidenced by the passing of the orientation law on land use planning and emphasis on principles of participation within the law.
- *MAT-DGGT* is strongly interested to strengthen land use planning, and Law n°43-2014 gives the ministry the mandate to lead an aligned effort that fosters greater collaboration between MAT-DGGT and sector ministries and agencies.
- The stakes for the future of forests, biodiversity, people and economic development are high.
- The foundation of a REDD+ process with proposed links to improving land use planning is being established.
- With mining prices being low, there is a window of opportunity.
- The Ministry of Forests (*MEFDD*) has allocated much of Congo's forest areas. Effective land use planning process would lead to some rebalancing of major land use categories and identification of priority uses for different sectors.

The road map is a good start, but many challenges remain. The main challenges identified through workshops and engagement with experts that need to be addressed to strengthen land use planning in the country include:

- Support is needed to develop multi-sectoral plans and sectoral plans at macro and micro levels.
- Resources are required to conduct consultations with and participation of relevant stakeholders at national and departmental levels.
- Capacity building of stakeholders is necessary so that they can meaningfully engage, at central, regionally and locally.
- Sustained long-term support needed for an iterative and inclusive process that allows for inputs and improvements across sectors.

Box 2. Media Coverage shined light on land use planning



1.6 Objectives and Structure of the Report

This activity was launched to identify entry points and provide technical information to support country-led efforts toward more balanced planning and management of natural resources for sustainable development in the Congo Basin. The aim was to develop analytical tools for assessing and developing different land use scenarios, and their associated economic, social, and environmental impacts. The approach was to engage with a national process led by champions; support the process with maps, information, and technical analysis; propose ways to engage affected communities and stakeholders; and to promote a longer term vision or roadmap toward balanced spatial planning.

This report describes activities and results of a technical assistance activity, *Balancing Mining and Conservation in Congo Basin with Strategic Land Use Planning* (P146347), implemented jointly by the World Bank's Environment and Natural Resources Global Practice and the Energy and Extractives Global Practice, with funding from the Program on Forests (PROFOR, TF015224) and from the Mining Technical Assistance Project (P133063). In early discussions, the Republic of Congo (ROC) was receptive to the technical assistance activity and a focus on one country was an opportunity to concentrate technical resources on a single national planning process, rules and institutions.

This report presents the main outputs of the technical assistance activity, specifically a technical assessment of the current situation, an explanation of the process of engagement and the technical analyses, a draft roadmap, and proposed options for an implementation plan. The rationale for land use planning is covered in Chapter 2, including discussion of the relevance of integrated spatial planning, demonstrating the benefits of spatial analysis with national and regional examples, and introducing the new orientation law on land use planning. Chapter 3 provides an assessment of multi-sectoral and sectoral planning efforts. The proposed roadmap is described in Chapter 4. This will be the main topic of discussion at a workshop with stakeholders in Brazzaville in June.

2.1 Strategic relevance and advantages of engaging in integrated spatial planning

Strategic Relevance. Integrated spatial planning calls for multiple sectoral ministries, businesses, communities, traditional leaders, and local authorities to come together in a coordinated process that may be time consuming and expensive, well before the promised or proposed benefits of investment and development materialize. So, why should they do it? What's in it for them?

Stakeholders and communities in the planned space. Communities and people living and working in the planned space constitute a wider set of beneficiaries of integrated spatial planning. Through the planning and consultative process, communities can provide information on their development and investment needs, as well as constraints they face in terms of financing, skills, technology and access to markets – or threats that they may perceive from some kinds of investments. They can also help to define and demarcate the ways that they are currently using specific areas and resources, to document these existing economic, historic, traditional or spiritual uses of space relative to other plans and proposals. Thus, by participating, communities and stakeholders can advocate for their real needs to be addressed and that their real interests are protected by the planning process. People can also benefit from the planning process by better understanding the wider economic development issues, the direction of planned development, including future employment, schooling or housing opportunities. On the other hand, communities may suffer from uncoordinated planning or poor implementation. For example, if an infrastructure project cuts off access to, or leads to deterioration of, traditional resource use areas, or brings in new people who compete for limited resources, local communities would be negatively affected. An open and participatory planning process, with checks, balances and feedback opportunities, would provide communities with a legitimate course of action to seek consultation or redress in cases where implementation does not respect the agreed plans, or where unanticipated negative effects arise.

National-level convening institutions with a mandate for economic development and spatial planning. These institutions benefit by using the spatial planning process as a key tool to advance ROC's economic development. Having a more clearly planned development path, with wide societal buy-in, can contribute to a country's (or project's) longer-term investment prospects. The process of planning builds consensus among stakeholders on the way forward, which is likely to reduce conflicts and costs over time. Sound governance and solid planning provide a reputational signal to international markets, investors and financiers. The planning process also helps to clarify potential gainers and losers under different scenarios, which provides a basis for defining and discussing appropriate compensation or redress, rather than protracted controversy.

Sectoral ministries and agencies. These institutions can benefit in the planning process by raising the visibility of their specific sectoral needs and issues within the larger development context. The process provides a national or regional context for specific sectoral projects, showing how the proposed sectoral investments contribute to wider economic development priorities. This can help to enlist political, institutional and budgetary support for key sectoral priorities and investments, as well as increased cooperation, broader buy-in and shared understanding. The planning process also provides a broader context and mandate for identifying competing and overlapping plans or proposed land uses that may need to be discussed, assessed, and adjudicated. The planning process can help to describe and quantify trade-offs or compromise solutions, rather than determine outcomes from strictly sectoral perspectives. This makes these scenarios, impacts, and trade-offs more concrete for decision-makers. Integrated spatial

planning recognizes that activities and sectors interact in a defined geographic space – and that each sector depends on and is impacted by others, as well as the overall enabling environment for investment, financing, and good governance. The planning process can also help to identify incentives or institutional issues that need to be taken up and resolved at a higher policy making level. This type of high level reform or the investment climate or the governance rules would be difficult to achieve from the perspective of a single sectoral ministry.

Investors and financiers (including the World Bank). For these actors a rigorous spatial planning process can help to anticipate, manage, and mitigate adverse environmental and social impacts that may come up in specific projects or investments. Feedback from intended beneficiaries, local authorities and representatives of other sectors can reveal areas of potential conflict and build in the dialogue steps and design improvements that can make a project sounder and accepted. Awareness and information dissemination around the planning process can also provide a common base, greater predictability, and technical understanding that allows different types of investors to come together, thus making project financing more feasible.

2.2 The benefits of spatial analysis of land use patterns: national and regional examples

Phase one of the project demonstrated how the land demand for mining, agriculture, forest production, and the environment (e.g., biodiversity conservation, wildlife management, ecosystem services such as carbon storage) could benefit from more harmonized sectoral planning. Spatial analysis that supports land use planning – within each sector and across multiple sectors – can help to:

- optimize sector investments and safeguard the country's natural capital;
- address the current lack of coordination between sector planning; and
- support a strategic approach to infrastructure planning and reduce possible negative impacts.

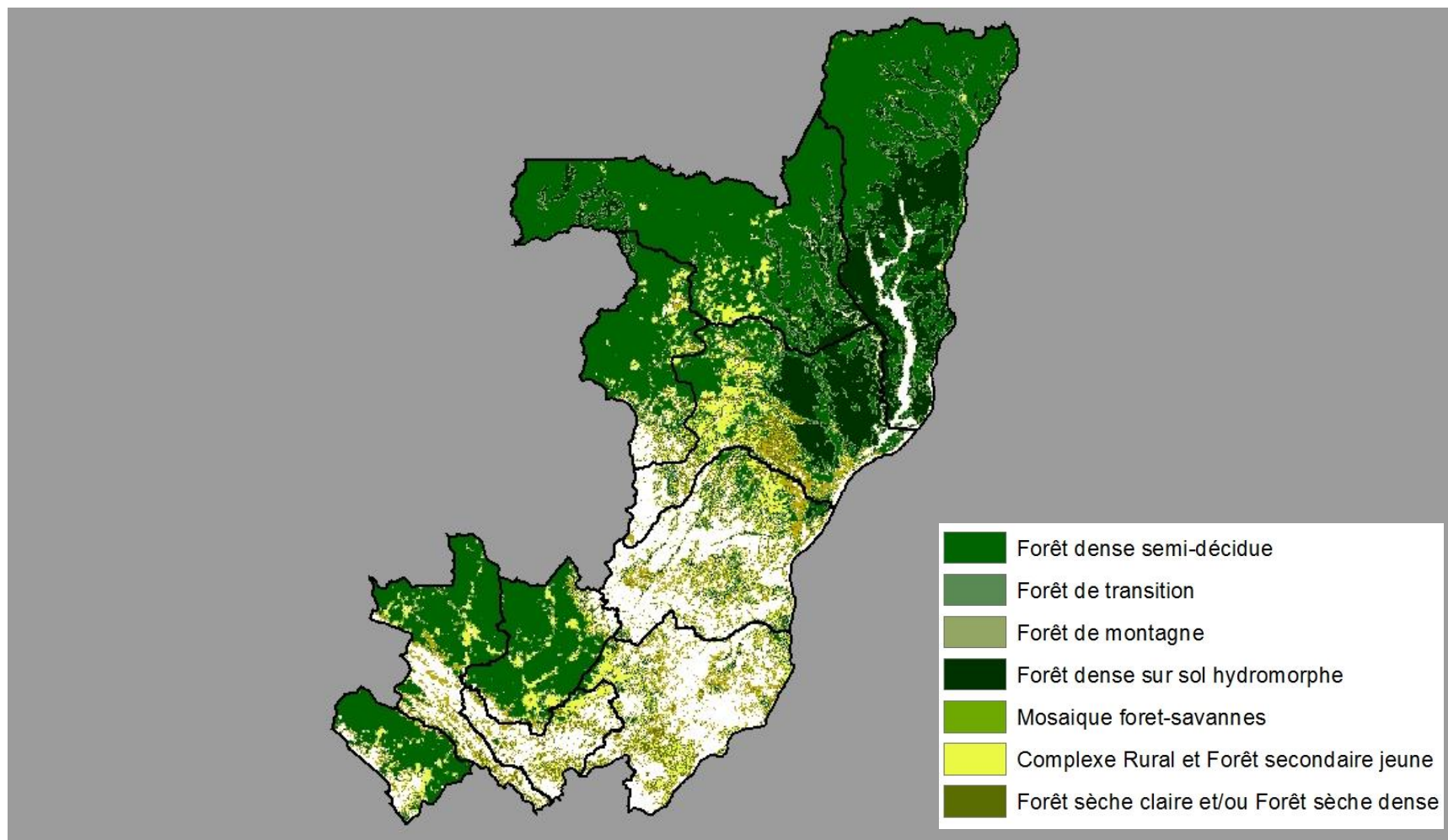
The selected maps below, presented at project workshops in 2015, demonstrate such spatial analyses and some of the major challenges and opportunities related to land use planning in the Republic of Congo and in the forest landscapes of the interzone between Gabon, Cameroon, and the Congo.

2.2.1 Optimize sector investments and safeguard the country's natural capital

Land use planning is needed to identify suitable areas for agriculture, mining, and forest production and balance them with efforts to safeguard biodiversity, carbon stocks, and ecosystems services. Forest ecosystems still cover the majority of the country (Figure 1). They represent ROC's natural capital from which the forest, agriculture, tourism, and low-carbon economy can derive economic returns.

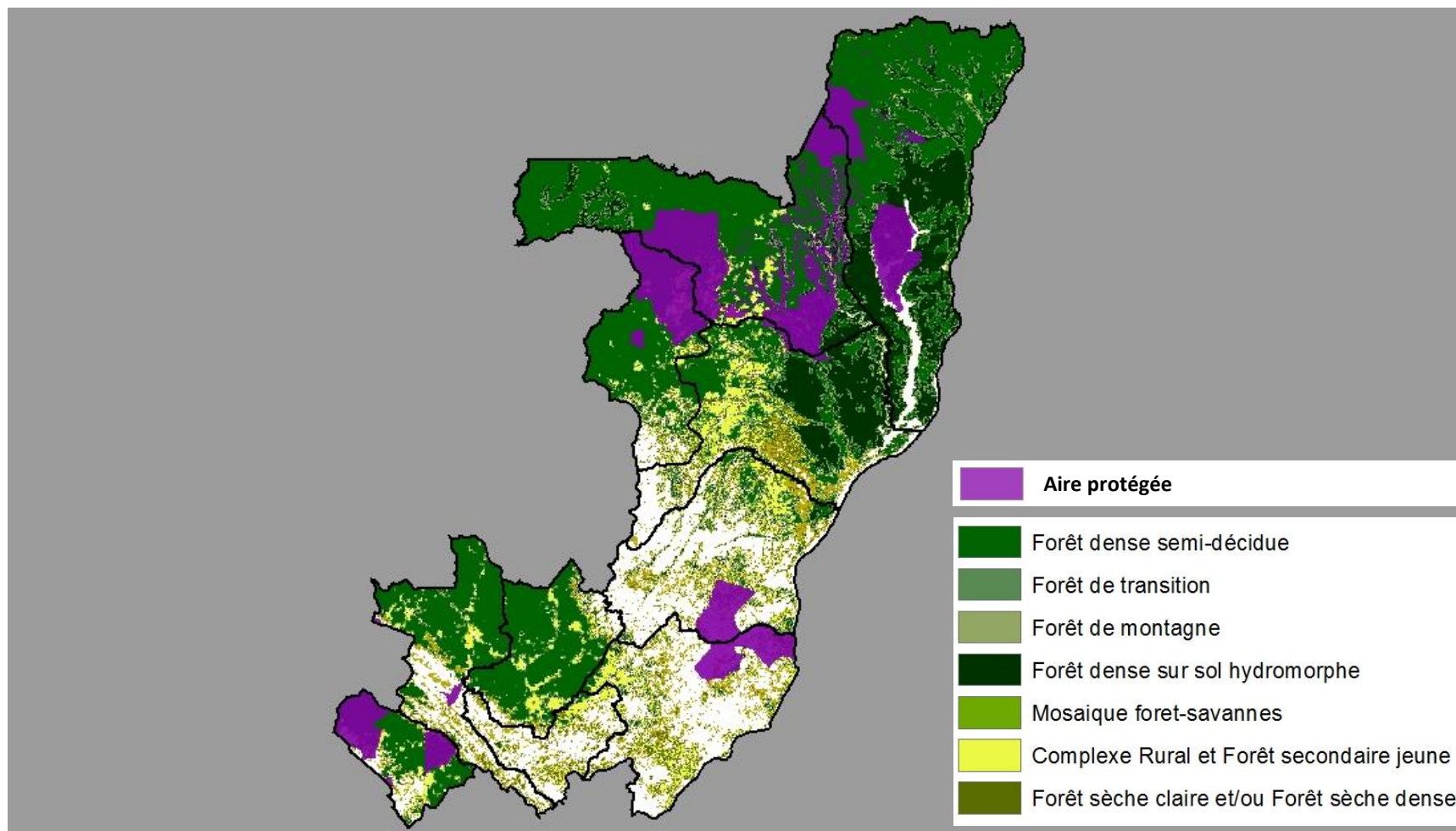
The country is committed to safeguard wildlife, biodiversity, and ecosystem services provided by forests and savannah ecosystems, which is reflected in the distribution of national parks and other protected areas (Figure 2). This is also echoed in the way sectoral planning is being carried out. For example, the macro-zoning applied in a long-term plan for the agriculture sector (*Plan de Développement du Secteur Agricole - PDSA*) tried to avoid closed forests for future expansion. Similarly, allocation of forest concessions and management plan requirements seek to protect environmentally sensitive areas such as riparian buffers or zones prohibiting community hunting.

Figure 1 Forest cover, 2012



Forest ecosystems cover about 70 percent of the country (23.9 million hectares). Agro-ecosystems, savannah and grassland ecosystems, coastal ecosystems, and urban ecosystems are concentrated on the remaining 30 percent. All these ecosystems contribute to livelihoods and economic development. While non-forest ecosystems are important for food production, energy supply, and housing, they are also essential for biodiversity conservation and the supply of ecosystem services such as clean drinking water, recreation, and carbon storage.

Figure 2 Protected areas, 2013



The country has established national parks and other protected areas for the preservation of wildlife, biodiversity, and ecosystem services. The majority of these areas are in the forest zone. In addition to the areas shown on the map, environmental sensitive areas are being set aside within forest concessions, and new ecological reserves are being proposed. A national systematic assessment of priority areas for biodiversity conservation and ecosystem services outside of the protected area network would strengthen biodiversity and ecosystem management planning and establish a foundation for better macro-zoning in national land use planning.

2.2.2 Overcome the current lack of coordination between sector planning

A quick comparison of the concessions for forest production (Figure 3) and mining (Figure 4) and the land envisioned for agricultural expansion (Figure 5) shows close proximity of the respective land demand, and in some cases overlapping demand for the same land (Figure 6).

In addition, growth in these sectors will require new transport infrastructure, not shown on these maps. This infrastructure will connect producers to markets, allow for easier access to tourist sites, and reduce transport costs, but can also result in unplanned demographic shifts and settlement expansions with negative impacts on habitat and wildlife use.

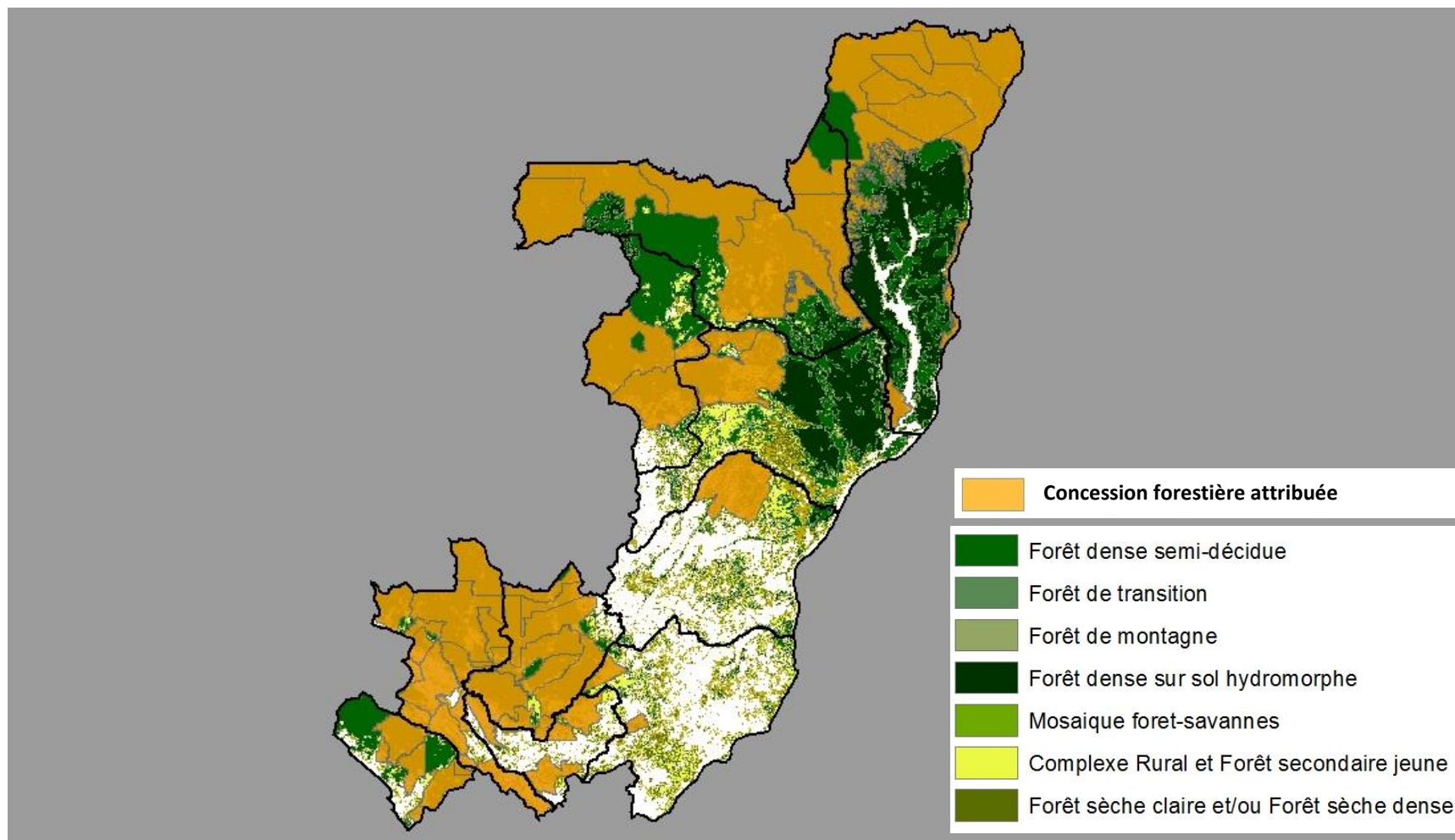
Close spatial proximity of potentially conflicting land use, as shown in Figure 6, need to be carefully planned and managed to ensure efficient use of targeted resources and reduce future conflicts. These conflicts can create costs for other land users and increase operational and reputational risks for land managers and investors. For example, palm oil plantations or mine production bordering protected areas could block wildlife corridors between protected areas or have negative effects on downstream watersheds. Harmonization of sector plans is therefore required to reduce conflicts between competing land uses and increase benefits from more compatible land use types (e.g., new palm oil plantations on degraded savannah that is not in an important biological corridor and also close to existing road network).

2.2.3 Provide a strategic perspective to infrastructure planning and reduce negative impacts

More coordinated planning of infrastructure—roads, railroads, electric powerlines, new reservoirs—can avoid or help mitigate negative impacts. A land use plan at regional scale (see Box 3) can provide a useful perspective as the following map of northwest Congo and bordering countries shows (Figure 7). The map presents the location of potential future iron ore mines and the associated energy and transport infrastructure needed in the region.

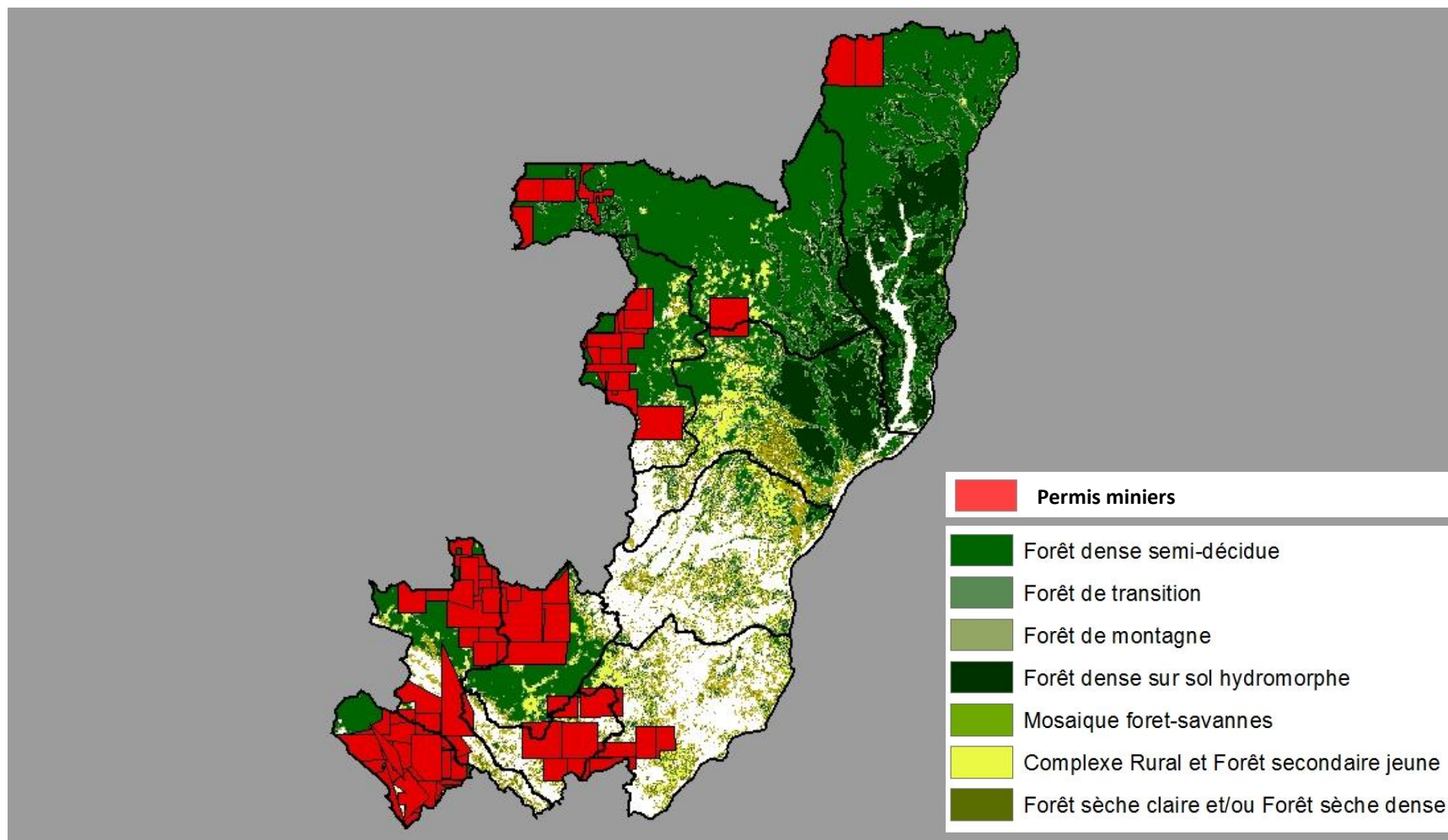
Figure 8 highlights how roads and railroad tracks to ship iron ore and access mining sites may conflict with forest areas that have been proposed as conservation and wildlife corridors or potential biodiversity offsets areas. Figure 9 points out a proposed reservoir located within an existing and proposed protected area. Figure 10 shows potential conflicts with envisioned powerlines.

Figure 3 Forest concessions, 2013



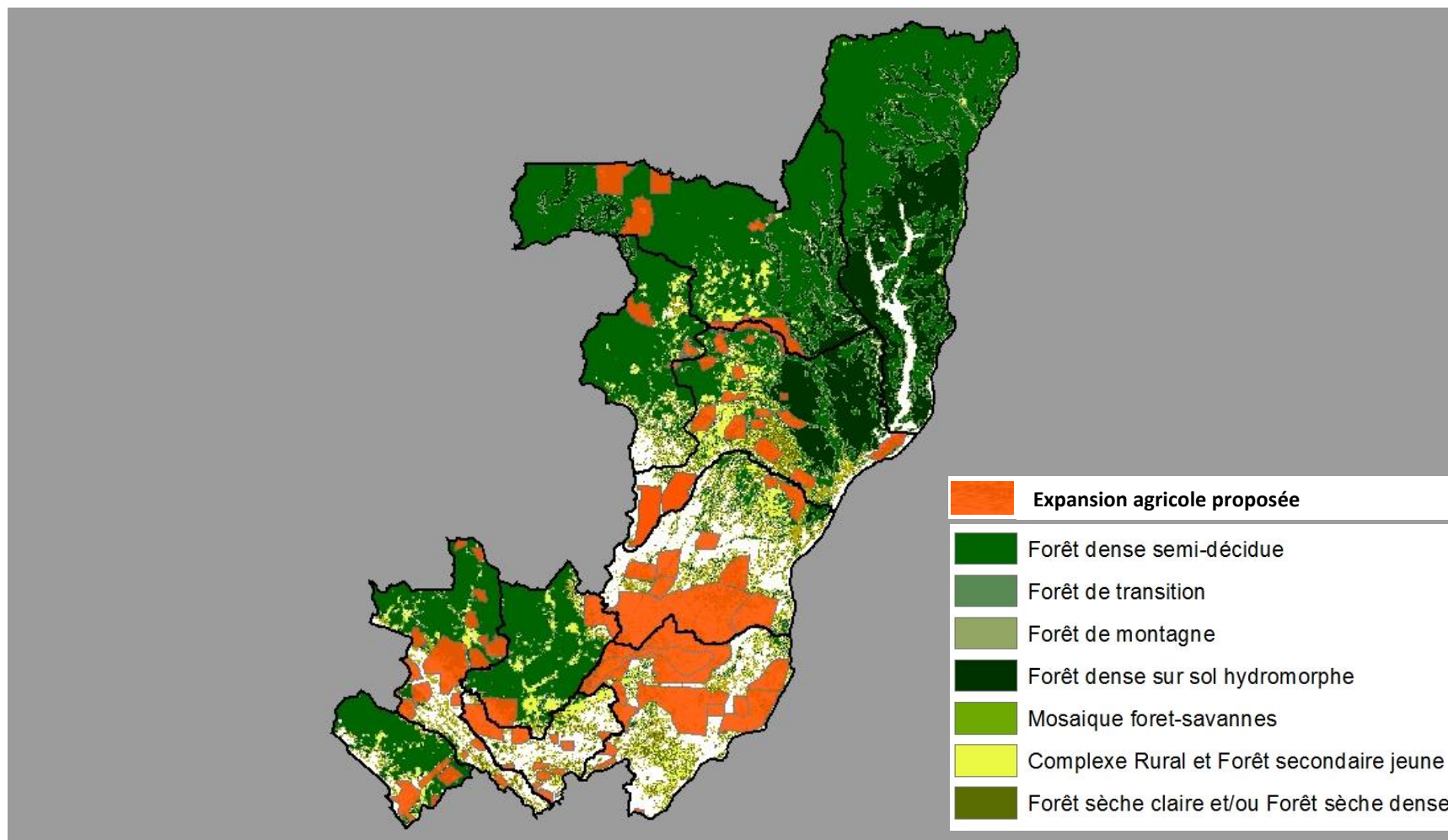
Most forests in the country (outside the swamp forests) have been allocated as logging concessions. They are part of the Permanent Forest Estate (PFE). Concession areas require a 25-year management plan with associated land use planning and zoning. In 2011, 72 percent of the forest estate belonging to the state was allocated to the PFE, and the remainder was Non-permanent Forest Estate (NPFE). Strategic planning of these different forest classes and the official zoning of PFE and NPFE areas are needed to provide a common reference that can greatly aid forest management and multi-sectoral planning.

Figure 4 Mining permits, 2013



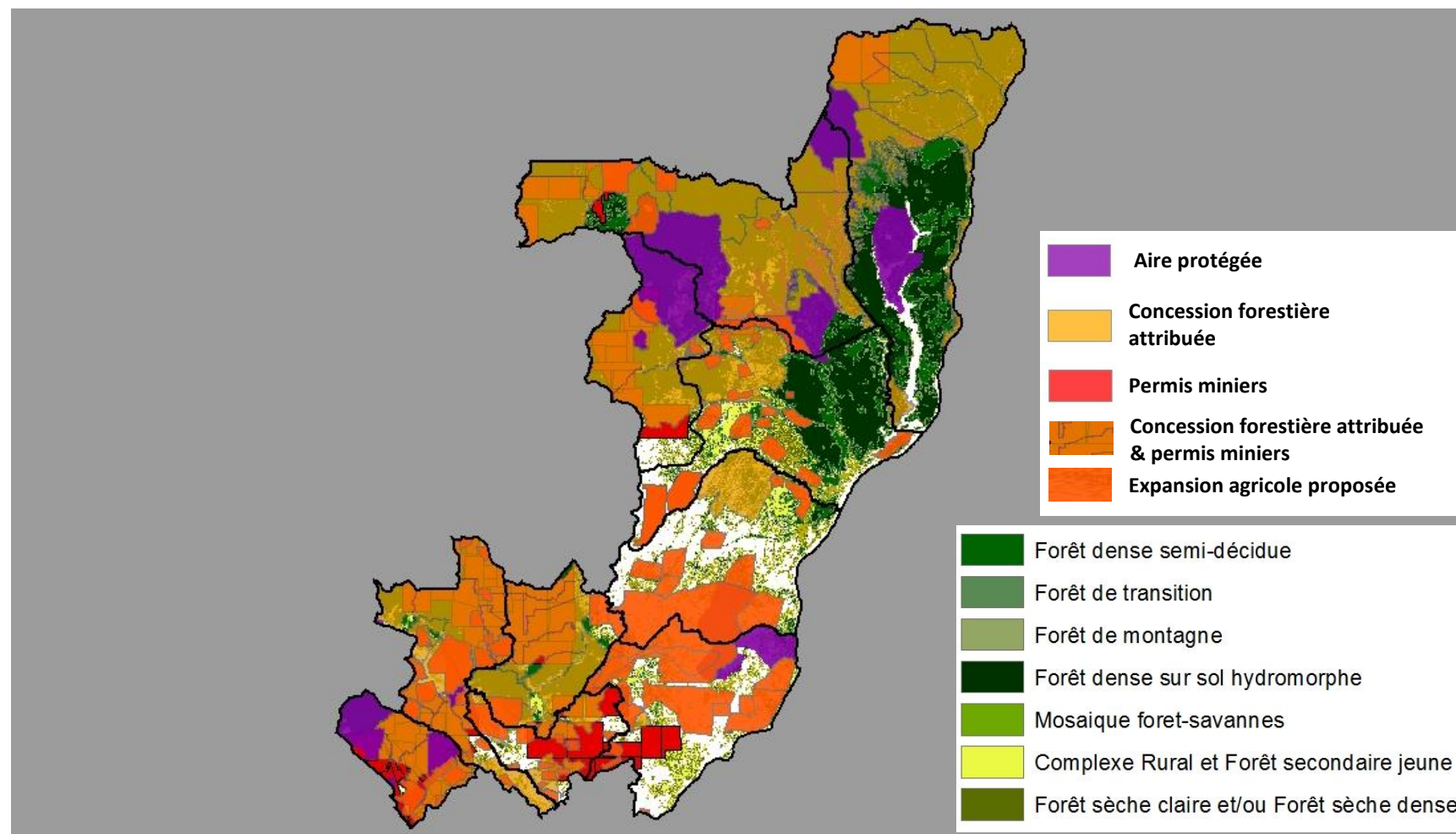
Mining licenses (operating, research, and prospecting) cover about 15 percent of the territory. The majority is in forests, and a number of potential new mining areas are in close proximity to international borders. The Republic of Congo has a great opportunity to apply a comprehensive planning perspective for mining that moves away from planning of individual sites, takes multiple potential mining sites into consideration, and strategically plans infrastructure routing and biodiversity conservation areas (potential offsets areas) in support of future mining sites.

Figure 5 Proposed agricultural expansion, 2014



Other sectors have plans for forest lands. The Ministry of Agriculture completed the *Plan de Développement du Secteur Agricole (PDSA)*, covering 2012-2035. It proposed new macro-zones for forest plantations, agroforestry, agropastoral expansion, and industrial crops. Some of these zones are in dense forest, but most of them are in the savannah. The *PDSA* envisioned to refine its plan and finalize micro-zoning of expansion areas by 2025. This effort can be aligned with implementing the new orientation law for land use planning. Industrial agriculture expansion and small-scale agriculture intensification can still be planned in a sustainable way taking multiple sectors into account.

Figure 6 Sectoral demand for land in the forest zone, 2013



An uncoordinated sector plan can result in competing claims for the same land and have negative economic and ecological impacts on other sectors and land users. To reduce conflicts and ensure long-term sustainability, plans for agricultural expansion, forest production, biodiversity conservation, new mining areas and associated transport and energy infrastructure, REDD+ areas, and other land uses need to be harmonized. This can be done by exploring land use options for an area with the help of stakeholder engagement and analytical tools examining the ecological and economic potential of forests, croplands, and other land uses.

Box 3 The Tri-National Dja-Odzala-Minkebe (TRIDOM) interzone: an opportunity for regional land use planning

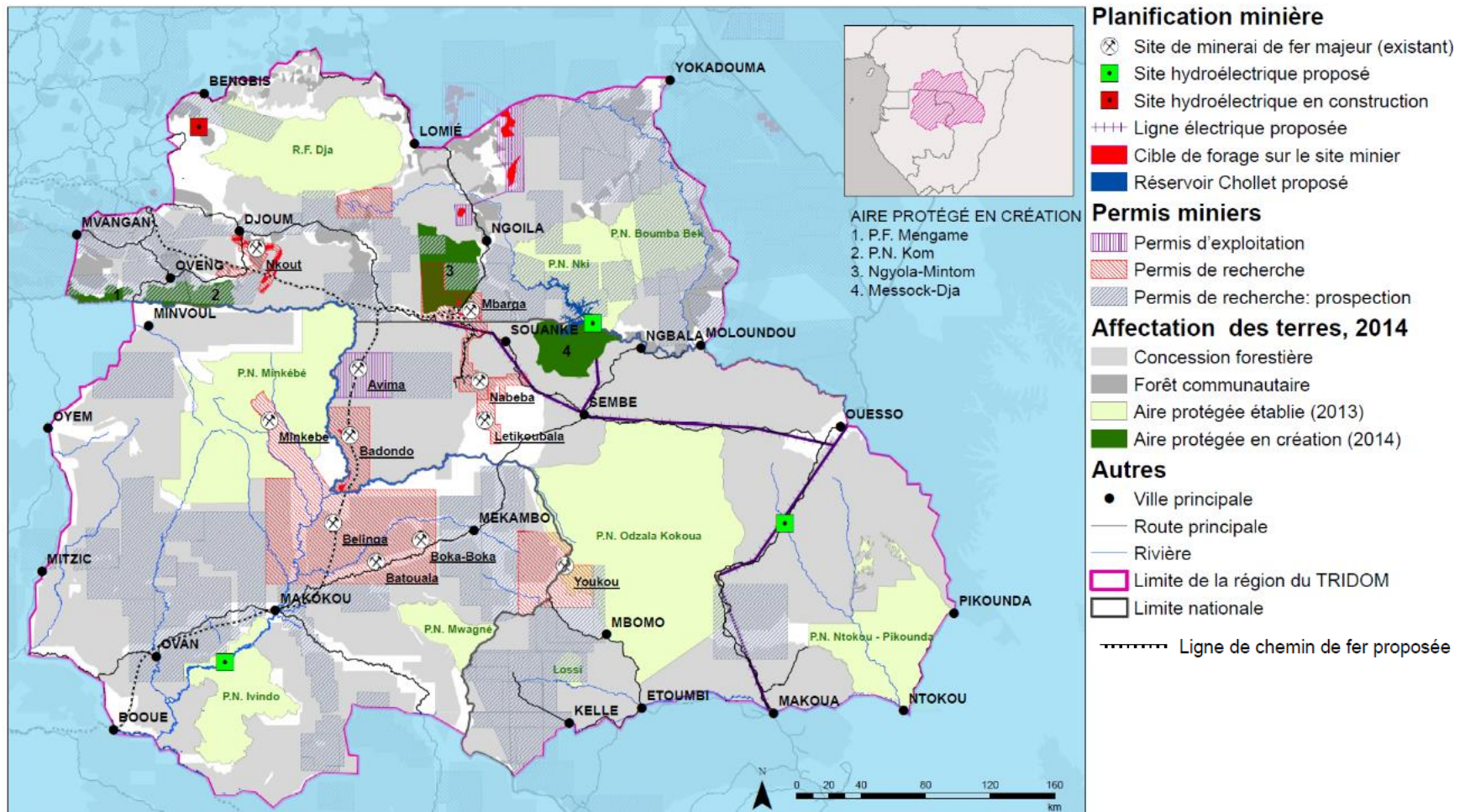
In 1999, the governments of Gabon, Cameroon, and the Republic of Congo committed to conserving the largest block of intact forest in the Congo Basin. Known as the Tri-National Dja-Odzala-Minkebe (TRIDOM), this region encompasses 7.5 percent of Central Africa's forests and is home to the largest populations of large mammals – such as elephants, gorilla's and chimpanzees - in the Congo Basin. The forest has remained intact because of low road density and low population density (typically one inhabitant per square kilometer). In addition to the Bantu groups, the area is also home to indigenous people such as the Baka and Bakola "pygmies".

The area is also rich in iron ore, cobalt, and – to a lesser extent—gold. At the height of the recent resource commodity boom, the zone was dubbed 'an emerging iron ore province' by mining operators interested in the area. The region is covered in exploration licenses, some of which are in fairly advanced stages of development. Many of these licenses overlap with either forest concessions or protected areas (or both). There is also an increased interest in growing palm oil. As a result of low iron ore prices, most large scale mining activities have come to a halt for now, but this can change once prices rise again. Although mining operations offer development opportunities for this poor region, there are also risks of negative environmental and social consequences.

Mining operations will contribute to population influx, which can exacerbate social issues and contribute to forest loss, degradation, and fragmentation. The infrastructure associated with mineral extraction and transport – moving ore out of the TRIDOM area will require the construction of a dedicated railway line to the coast – would lead to cumulative impacts such as increased logging, agricultural development as well as increased wildlife poaching and bush meat trade. As the mines, once operational, will require a high and steady energy supply, there is discussion about constructing a hydro power dam in the Dja River (Chollet reservoir), impacting both the surrounding forest and the region's watershed. Fragmentation of TRIDOM's forests would contribute to loss of intact ecosystems, which are now producing a range of environmental services that benefit both local and global populations. Loss and degradation of forest will threaten the forest based livelihoods of the Baka indigenous people and increase their marginalization. Fragmentation would also make existing protected areas more vulnerable to encroachment and degradation and contribute to the loss of unique and threatened wildlife populations that need large areas of remote forest to survive in significant populations.

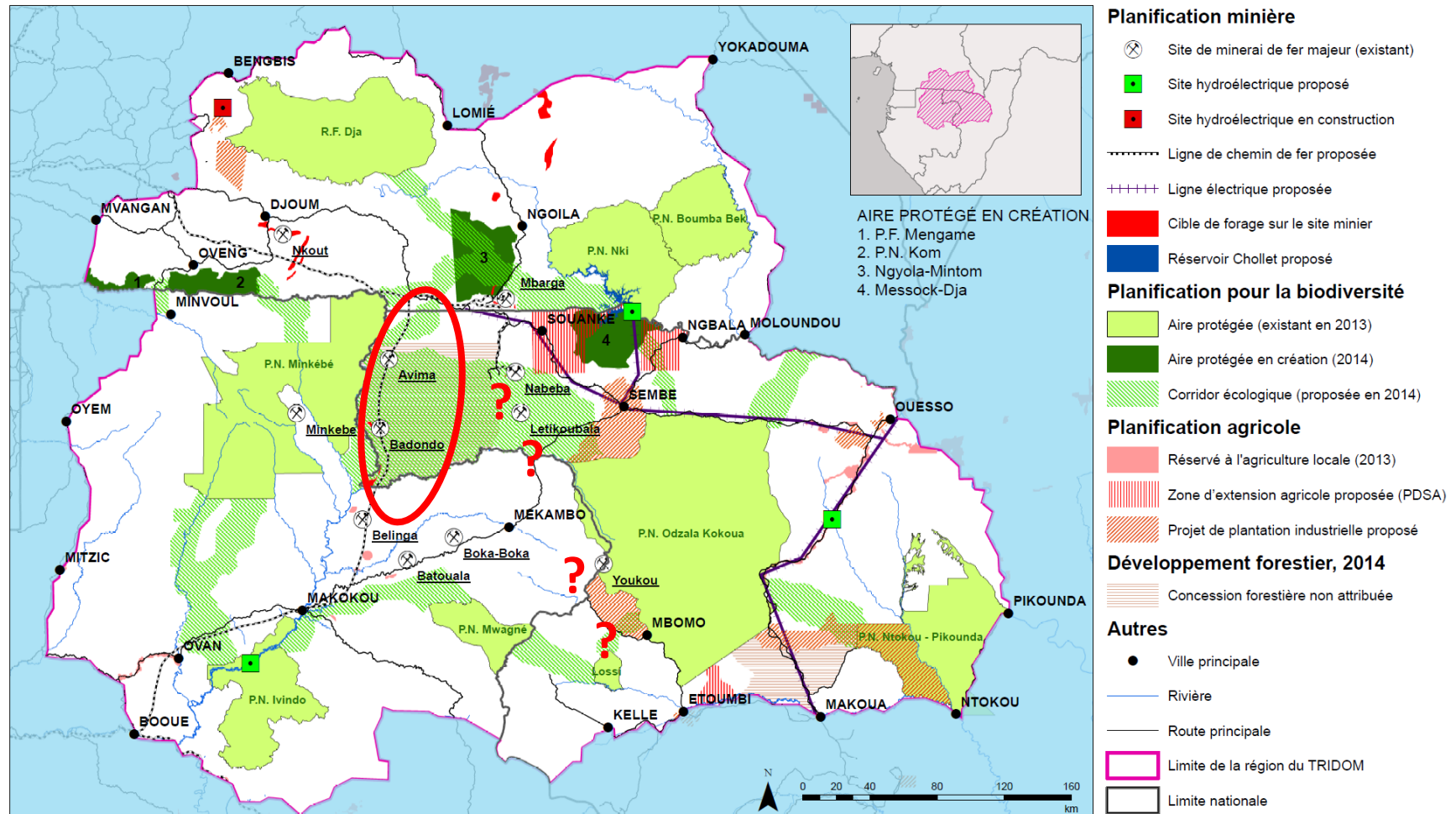
The TRIDOM area could be a useful case study where the interests of different stakeholders overlap, and where strategic planning processes could be used to consider the different tradeoffs to come to development options and scenarios. Collaboration on integrated land use planning would be a way to explore approaches to improve the potential for positive outcomes and mitigate negative outcomes

Figure 7 Envisioned mining sites for iron ore and other metals and anticipated infrastructure in the TRIDOM interzone, 2014



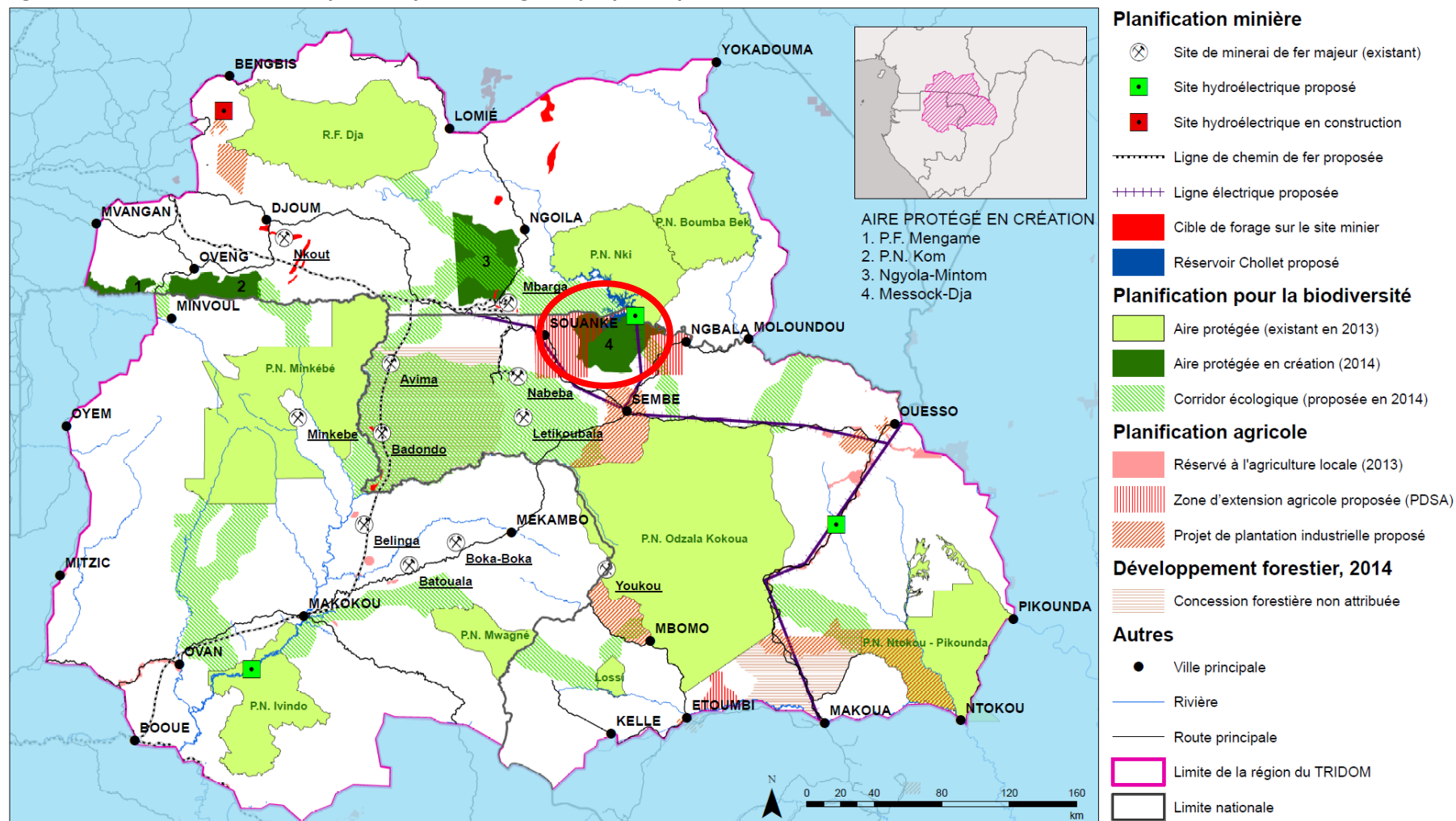
With the right economic conditions, iron and other metals can be mined profitably at multiple sites in the TRIDOM interzone. Infrastructure supporting these mines—railroads, roads, a hydropower reservoir, and electric power lines—will affect a larger land area than the ore extraction sites. Applying a cumulative impact methodology to assess future mining and infrastructure projects and planning forest management, biodiversity conservation, and other land uses with a regional perspective are essential for sustainable land management.

Figure 8 Potential conflicts between transport routes and possible biodiversity conservation areas in the TRIDOM interzone



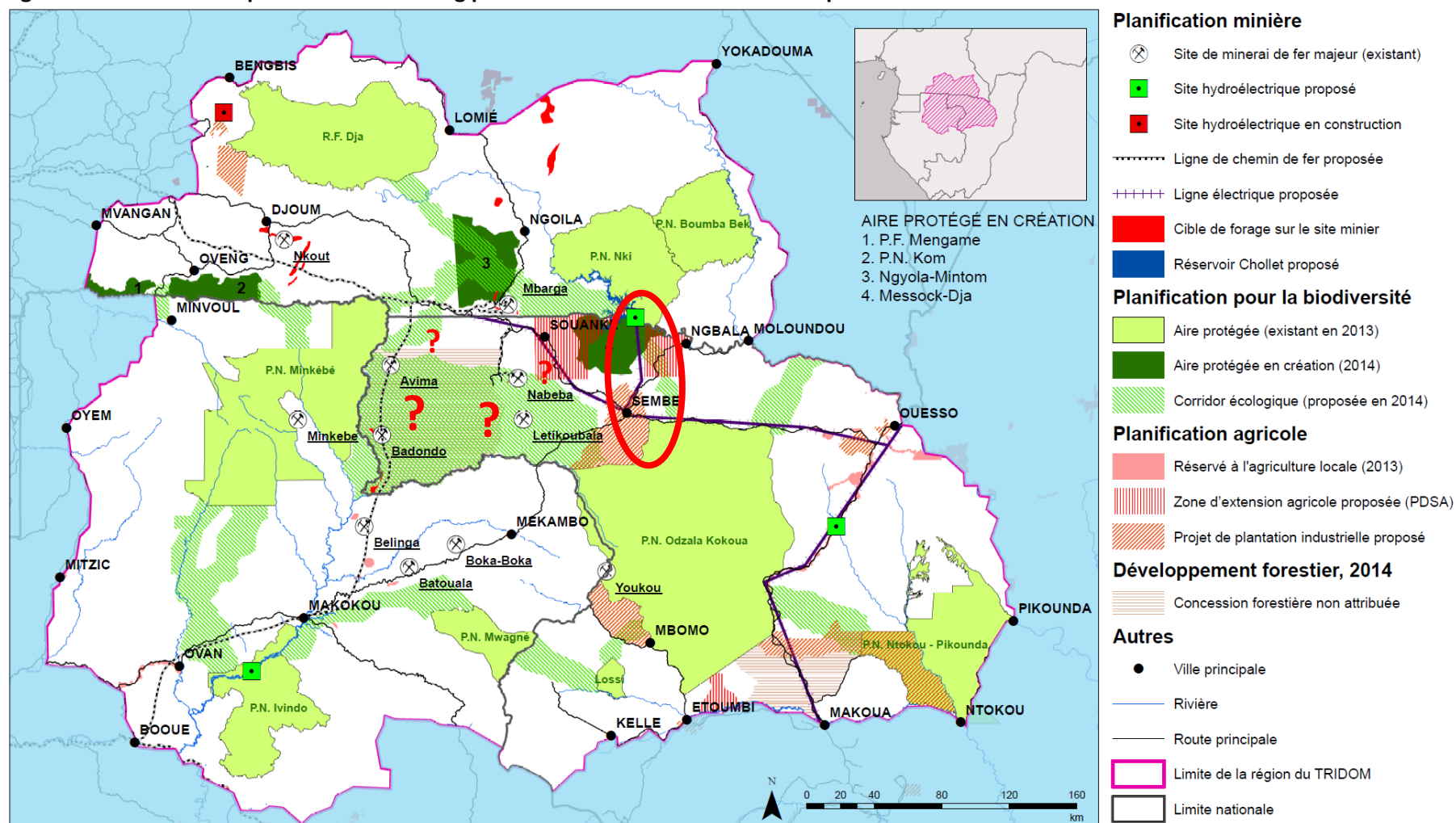
Planning of transport infrastructure for mining has to be aligned with planning in other sectors to avoid or mitigate land use conflicts. For example, the area close to the Avima, Badondo, Nabeba, and Letikoubala mining sites has been proposed as an ecological corridor connecting Minkébé National Park and Odzala Kokoua National Park. In 2014, a large part of the corridor was proposed as a forest concession. However, the associated logging roads would create greater pressure on wildlife and make the proposed ecological corridor unsuitable as biodiversity offsets for mining. Land expansion plans in a third sector—agriculture—could further contribute to cumulative impacts: industrial agriculture has been proposed on the northwestern border of the Odzala Kokoua National Park, potentially severing the corridor.

Figure 9 A new reservoir in close proximity to existing and proposed protected areas in the TRIDOM interzone



The Chollet dam has been proposed on the Dja River between Cameroon and the Republic of Congo. The reservoir, spatially extrapolated based on dam height, is expected to flood forests and affect surrounding protected areas and ecological corridors. Sectoral plans also require harmonization in this location: a new Messock-Dja protected area has been proposed, and the *PDSA 2012-2035* proposed to expand agriculture areas. The *SNAT 2005* did not include macro-zones for wildlife corridors, biodiversity, ecosystem services, and agricultural expansion for this region of the country. A revised *SNAT* could anticipate competing land uses and address them in its macro-zoning.

Figure 10 Future electric power lines traversing possible conservation corridors and protected areas in the TRIDOM interzone



The SNAT 2005 envisioned the hydropower site at Cholet and power lines transporting energy from the reservoir to major population centers such as Ouesso and Makqua. For most parts, the routing of the transmission lines followed major roads. However, the power line from the dam and to the mining sites areas will traverse possible conservation corridors and the proposed Messock-Dja protected area. Care must be taken to identify routing alternatives that minimize forest loss and do not create new access corridors into wildlife areas.

2.3 Current land allocation practices

A detailed review of current practices of land allocation and the associated legal framework in the Republic of Congo found that land allocation and permits of use in different sectors are generally issued without a reference to a previous planning document (ClientEarth, 2015). Multiple factors have contributed to this:

- Challenges within sector administrations to fully and effectively implement existing policies and laws.
- Missing map that clearly defines and officially classifies Forest Land (and associated Permanent Forest Estate and Non-permanent Forest Estate) and Non-forest Land such as Other Rural Land (covering savannah ecosystems, agricultural land, and other land cover types), Peri-urban Land, and Urban Land.
- Lack of harmonization of sectoral policies (e.g., forest, agricultural, mining, infrastructure) and lack of defined procedures concerning overlapping use.
- Absence of a national land use plan (*Plan National d'Affectation des Terres*). The only existing document is a multi-sectoral National Spatial Development Plan with macro-zoning, the *Schéma National d'Aménagement du Territoire* (SNAT). The SNAT, published in 2005, however, does not have the precision that would allow the development of a land-use allocation document that determines the use of specific lands (e.g., for forest and agriculture production) in the country.

Figure 11 summarizes examples of current practices of land allocation in the three sectors. It shows that for most parts there are no linkages to spatial prioritization in existing plans such as the National Development Plan 2012-2016 (*Plan National de Développement - PND*), sectoral strategic plans, and the multi-sectoral SNAT 2005. To promote more coordinated planning and development, future land allocations in these sectors will need to be linked to spatial prioritization (and associated zoning) established in sectoral and in multi-sectoral plans.

2.4 The new orientation law on land use planning

The new *orientation law on land use planning*, Law n°43-2014⁴, was passed in October 2014. The law establishes the main objectives and principles for sustainable land use in the country and outlines the main building blocks to strengthen sectoral planning and harmonize them with land use planning processes at national and subnational levels.

Understanding these blocks will help to provide more granularity in identifying key intervention areas and activities for the roadmap. The building blocks are as follows:

- *Schéma National d'Aménagement du Territoire* (SNAT).
- Planning and guidance for major parts of the territory, which include master plans for Congo's important resources (*schémas directeurs des parties du territoire*) and associated guidance documents (*orientation*).
- Sectoral plans providing public services (*schémas sectoriels*).
- Subnational planning including departmental and town planning.

⁴ loi n° 43-2014 d'orientation pour l'aménagement et le développement du territoire

Figure 11 Current land allocation practices and link to spatial prioritization in existing plans

Land allocation: sector example	Lead Institutions	Legal framework	Link to spatial prioritization in long-term sector plan?	Link to spatial prioritization in <i>PND 2012-2016</i> ?	Link to spatial prioritization in <i>SNAT 2005</i> ?
Agriculture Sector: Express Occupation Permit *	Ministry of Land Affairs / Ministry of Agriculture / Ministry of Finance** Council of Ministers (decree)	Law N° 25-2008 <i>Agro-land law</i> Decree 2011-515 Decree 2011-552 (<i>Atama Plantation</i>)***	NO <i>Plan de Développement du Secteur Agricole (PDSA)</i>	YES <i>PND</i> mentions Atama, has a target of 470,000 ha, and provides general location	NO <i>SNAT</i> proposed plantation areas but did not specify hectares and location for Atama plantation
Forest Sector: Forest Concession Permit	Ministry of Forest Economy Forestry Commission	Law N° 16-2000 <i>Forest code</i> <i>Various decrees</i>	NO No long-term national spatial plan	NO <i>PND</i> mentions ex- tent & distribution of existing conces- sions; a target of 600,000 ha of plan- tations; no location	YES Some linkages: <i>SNAT</i> uses forest cover map from <i>MEFDD</i> ; swamp & non-swamp forest
Mining Sector: Mining Concession	Minister of Mines: <i>prospecting license</i> Council of Ministers (decree): <i>exploration and exploitation permit</i>	Law N° 4-2005 <i>Mining code</i> <i>Various decrees</i>	NO No long-term national spatial plan	NO <i>PND</i> mentions mining areas in general; it has no spatial prioritization	NO <i>SNAT</i> did not have access to mining concession maps, but has a broad category: forest with mining potential

Notes: *SNAT* = *Schéma National d'Aménagement du Territoire*, a 20-year land use planning document published in 2005.

However, the document was never really grounded in a broader stakeholder process or policy. The new land use planning orientation law, with specific reference to such a national plan, was only established nine years later.

PND = National Development Plan 2012-2016 (*Plan National de Développement - PND*).

Long-term sector plan = The *Plan de Développement du Secteur Agricole (PDSA)* was completed in 2012 under the leadership of the Ministry of Agriculture and has a 2012-2035 time horizon.

* This example refers to land allocation for large industrial agriculture development, which is one type of land allocation for agricultural purposes. It also refers to the specific allocation of land for the Atama palm oil plantation, as summarized in the Faure and Henriot (2015) review. There are other procedures for allocating land for agriculture purpose, for example for subsistence use. The lead institutions and underlying legal framework will vary depending whether this land is within or outside forest land and within or outside of a forest concession.

** The Faure and Henriot (2015) review of the legal framework of land allocation found that the role of different ministries in issuing express occupation permits is not clearly established. In the case of the Atama plantation, the Ministry of Land Affairs and the Ministry of Agriculture had greater involvement than the Ministry of Finance. An agreement authorizing the occupation of a land reserve belonging to the state was signed between the initiator of the agricultural project and the Ministers of Agriculture, Livestock, Land Affairs, and Public Property. A presidential decree issued by the Council of Ministers approved that agreement, upon the report of the Minister of Land Affairs.

*** The express authorization process has been complex and the conditions have changed over time (IM-FLEG, 2013): On December 17, 2010, the Ministers of Agriculture and Livestock and Land Affairs and Public Domain signed on behalf of the Congolese government an express authorization contract with the Atama Plantation Company to occupy a state land reserve of 470,000 hectares. This contract was to develop an agro-industrial complex for palm oil production and covered a 30-year renewable concession. In August 2011, Presidential Decree No. 2011-552 was signed, which establishes the express permission to occupy a reduced the area of 180,000 ha with 25-year renewable concession. These new provisions overrode the scope of the original contract. The Atama Plantation Company has requested and obtained from the Ministry of Forests, a deforestation license covering an area of 5,000 hectares to launch production.

2.4.1 *Schéma National d'Aménagement du Territoire (SNAT)*

The *SNAT* is a spatial framework that guides all land use actions by state and non-state actors. It includes the major requirements that need to be put in place to achieve more coherent sectoral policies with the aim to achieve more attractive urban and rural areas, greater employment, sustainable use of above and below-ground resources, and higher private investment. *MAT-DGGT* has the technical lead to develop

the *SNAT* through a participatory process. The law proposes that the *SNAT* is a 20-year plan that will be evaluated and reviewed every five years

The *SNAT* is thus the capstone of all land use planning in the country. The law does not specify the technical approach to develop the plan and makes no reference to Congo's first *Schéma National d'Aménagement du Territoire*, which was published nine years before Law n°43-2014 was passed. This means that future revisions of the *SNAT* would have the legal space for modifications, for example in the technical approach or in way stakeholder processes are conducted.

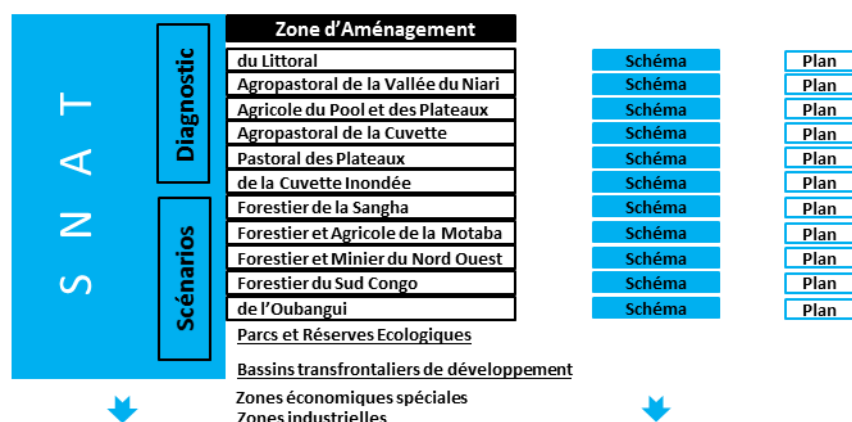
Law n°43-2014 stipulates that Congo's territory should be divided into different planning units:

- land use management zones (*zones d'aménagement du territoire*),
- transboundary basin development zones (*bassins transfrontaliers de développement*),
- special economic zones (*zones économiques spéciales*), and
- industrial zones (*zones industrielles*).

Both the number and extent of land use management zones (*zones d'aménagement du territoire*) and transboundary development zones are expected to be defined during the preparation of the *SNAT*.

According to Law n°43-2014, a land use management zone (*zone d'aménagement du territoire*) is the first fundamental planning unit for planning in the country. The delineation of each zone does not need to follow administrative boundaries and seeks to realize the economic potential of a unique combination of natural, human, and physical capital in a geographic area. Each zone would then be supported by investments in strategically placed education facilities, research and technology centers, transport, water and energy infrastructure, and other public services. In the *SNAT* 2005, for example, eleven different zones covering the whole country were defined (see more detailed description of the content and process of the *SNAT* 2005 in section 3.1.2). Law n°43-2014 states that each land use management zone (*zone d'aménagement du territoire*) must prepare an economic development strategy (*stratégie de développement économique*) and a land use plan (*plan d'aménagement*). Figure 12 summarizes the strategies (*stratégie de développement économique*) and plans (*plan d'aménagement*) expected from the *SNAT*.

Figure 12 *Schéma National d'Aménagement du Territoire (SNAT)* et les stratégies de développement économique et les plans d'aménagement

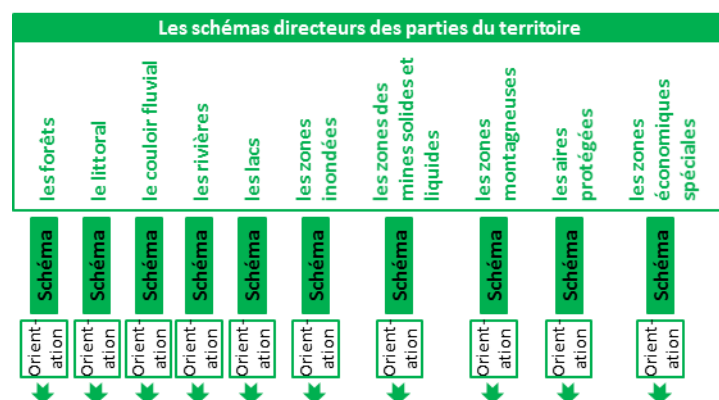


- Notes:**
- * Blue boxes with black writing refer to long-term plans (*schéma or stratégies*).
 - ** The Figure assumes that a future revision of the *SNAT* will build on the eleven non-overlapping land use management zones (shown as white boxes with black writing) outlined originally in 2005.
 - *** The *SNAT* includes other spatial units for planning such as protected areas and transboundary zones. In the *SNAT 2005*, Congo's protected areas fell outside of the non-overlapping eleven land use management zones. In the orientation law for land use planning, the issue of protected areas is expected to be addressed with the help of plans and guidance developed for major parts of the territory (*Les schémas directeurs de les parties du territoire*).
 - **** The content and technical approach of the *SNAT* is not prescribed in the law, but has been put into effect through existing practice. In 2005, it included a diagnostic of the current situation and a vision for 2025. There is no published reference that mentions scenarios of different land use options – as indicated in this Figure. Although other countries have them successfully applied in their planning.

2.4.2 Planning and guidance for major parts of the territory (*schémas directeurs des parties du territoire*)

Law n°43-2014 classifies the country into ten major parts of the territory (*parties du territoire*), representing key resources. They include both below and above-ground resources (e.g., mining, forests, wetlands, protected areas). Some of the categories overlap, for example protected areas can include most of the other types of ecosystems, and mining and economic zones could cover any type of ecosystem. Interestingly, savannah ecosystems and agricultural lands are not considered a major part of the territory. For each of these major parts, the law requires a master plan (*schéma directeur*) and a guidance document (*orientations spécifiques*). This will be the responsibility of the State, and the aim of these documents is to prepare national rules that balance development and the protection of the territory. Figure 13 lists the ten major parts and the number of required plans and guidance documents.

Figure 13 Planning and guidance for major resource sectors (*parties du territoire*)



2.4.3 The sectoral plans providing public services (*schémas sectoriels*)

Law n°43-2014 envisions a set of sectoral plans (*schémas sectoriels*) that translate the strategic ideas put forward in the *SNAT* into basic choices related to the development of priority public services. Law n°43-2014 lists 14 types of services including education, research science, culture, sport, transport, health, postal services, telecommunication services, energy, water, tourism and environment, construction, social housing, and urban development (see Figure 14). Sectoral plans are adopted by regulatory action.

Two types of envisioned guidelines for sectorial services (*schémas sectoriels*) are of particular interest from an environmental sustainability perspective. They include the transport sector (*schéma des*

transports) and the tourism and environment sector (*schéma du tourisme et de l'environnement*). The articles describing the content of the *schéma des transports* state that a master plan and an implementation plan needs to be prepared for each mode of transport. The articles describing the content of the tourism and environment guidelines reference environmental impact assessments. Law n°43-2014 states the requirement to carry out environmental impact assessments prior to launching major infrastructure work and the installation of industrial, agricultural or commercial units.

Figure 14 Sectoral plans providing public services



2.4.4 Sub-national planning including departmental planning and town planning

Sub-national planning, as specified in Law n°43-2014, will occur at two important scales (Figure 15). These plans are expected to be inspired by the *SNAT*. Likewise, other national planning documents discussed above will guide sub-national planning at these two scales.

Each of Congo's departments is required to prepare a long-term departmental spatial development plan (*schéma départemental d'aménagement du territoire*) that establishes priorities for the location of infrastructure, equipment, and services. The long-term plan (*schéma*) is valid for 20 years. Law n°43-2014 stipulates that a more specific short-term land management plan (*plan départemental d'aménagement du territoire*) is prepared every five years to implement the *schéma départemental*.

A similar town planning process is envisioned for all capitals of departments and districts in the country, following the priorities established in the *SNAT*. Each town is required to prepare a long-term master plan (*schéma directeur*) and short-term urban plan (*plan d'urbanisme*) for implementation.

Figure 15 Subnational planning including departmental planning and town planning

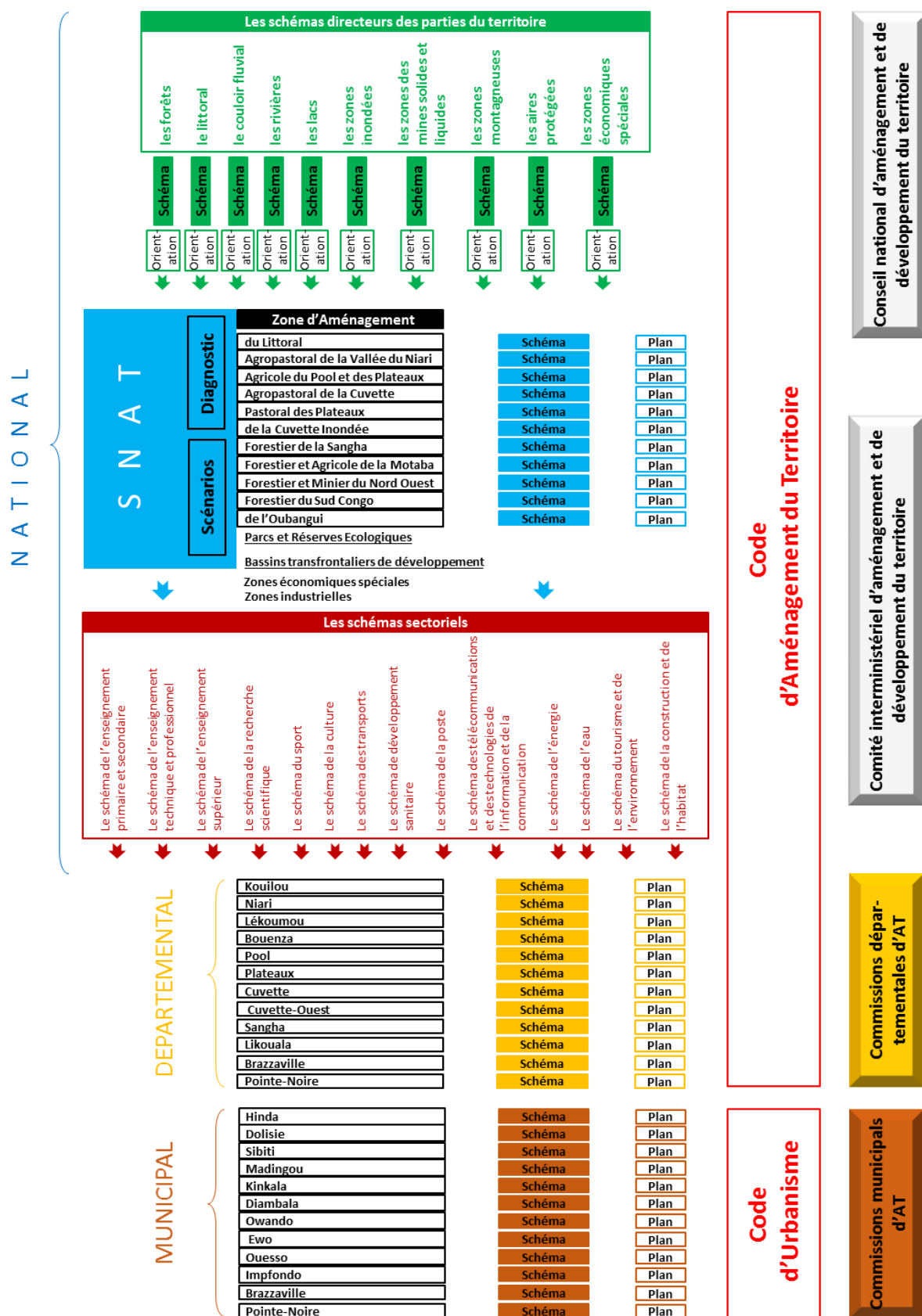
DEPARTEMENTAL	Niari	Schéma	Plan
	Lékoumou	Schéma	Plan
	Bouenza	Schéma	Plan
	Pool	Schéma	Plan
	Plateaux	Schéma	Plan
	Cuvette	Schéma	Plan
	Cuvette-Ouest	Schéma	Plan
	Sangha	Schéma	Plan
	Likouala	Schéma	Plan
	Brazzaville	Schéma	Plan
	Pointe-Noire	Schéma	Plan
MUNICIPAL	Hinda	Schéma	Plan
	Dolisie	Schéma	Plan
	Sibiti	Schéma	Plan
	Madingou	Schéma	Plan
	Kinkala	Schéma	Plan
	Diambala	Schéma	Plan
	Owando	Schéma	Plan
	Ewo	Schéma	Plan
	Ouessou	Schéma	Plan
	Impfondo	Schéma	Plan
	Brazzaville	Schéma	Plan
	Pointe-Noire	Schéma	Plan

Law n°43-2014 also stipulates that a new land use planning code (*code d'aménagement du territoire*) and a new town planning code (*code d'urbanisme*) need to be written. The former code is expected to address all land use planning issues, and the latter code aims at planning tools and processes within municipalities. These new codes are meant to put the legal framework and associated instruments in place so that the different building blocks envisioned in Law n°43-2014 operate smoothly.

In addition, Law n°43-2014 defines the general roles of new lead institutions for the law's implementation. They are responsible for coordinating land use planning at national and local levels.

Figure 16 summarizes the planning framework and the building blocks discussed above. The Figure covers most but not all the ideas put forward in Law n°43-2014. It is clear that implementation of the law will be a complex undertaking.

Figure 16 Spatial planning framework under the new land use planning law



2.5 Opportunities and challenges of the new spatial land use planning framework

The new orientation law on land use planning, Law n°43-2014, was passed in October 2014. The law, introduced in more detail in section 2.3, establishes the main objectives and principles for sustainable land use in the country and outlines the main building blocks to strengthen sectoral planning and harmonize land use planning processes at national and subnational levels. Law n°43-2014 creates the following opportunities:

- Defines a clear mandate for *MAT-DGGT* to undertake comprehensive spatial planning.
- Aims to enhance coordination across sectors and administration scales.
- Identifies principles of participation and consultation as critical to the planning process.
- Has a vision to integrate development and spatial planning.

Implementing the law, however, is going to be a complex undertaking that requires overcoming the following challenges:

- Move beyond the primary focus on development (e.g., unification of the territory, public service delivery) and sufficiently address environmental and social sustainability.
- Address the proliferation of documents and plans (e.g., *SNAT*, *schémas départementaux*, *schémas sectoriels*), which need to be prioritized, sequenced, and implemented.
- Establish a high-quality, coordinated information base to develop sectoral and multi-sectoral plans.
- Develop clear mechanisms to address issues of harmonization between existing sector laws and policies.

Coordinating the steps that need to be taken to implement the orientation law and the country's REDD+ priorities could result in considerable synergies:

- It would be consistent with component 1 of Congo's draft National REDD+ strategy, which includes developing a national land use plan and strengthening the network of protected areas.
- New land use planning coordinating institutions could enhance links between planning and REDD+ agendas.
- Coordinated information systems could serve both land use planning as well as REDD+ planning and monitoring (e.g., carbon storage, safeguards).

Despite these opportunities aligning these two processes is facing considerable challenges:

- Law n°43-2014 places limited emphasis on conservation, REDD+, or natural resource management objectives.
- There is insufficient attention to land use or zoning issues in the proposed Carbon Fund project in Northern Congo as presented in the Emission Reduction Program Idea Notes (ER-PIN)
- The role of REDD+ institutions and envisioned new coordination entities outlined in Law n°43-2014 is not clearly defined.
- Long-term planning cycles envisioned in Law n°43-2014 and decision-making cycles linked to government programs are poorly aligned.

The objective of this chapter is to provide a summary of existing planning efforts and associated capacity to support land use planning. Some of the background information underlying this summary is not widely available (e.g., *SNAT 2005*, spatial data holdings) beyond a small group of planning experts. Highlighting this information will be useful to develop ideas for activities and outputs for the envisioned roadmap to strengthen land use planning in Congo. In addition, sections of this chapter will be introduced and discussed at a workshop in Brazzaville in May 2016.

The chapter consists of four sections. The first section assesses multi-sectoral planning efforts identifying lead institutions, existing plans, and data availability. This is followed by a review of the planning efforts in three sectors—agriculture, forest, and mining. The three sectors were examined for the following reasons:

- Proposed activities in these sectors affect most of Congo's land area.
- These sectors are a high priority in the National Development Plan 2012-2016 (*Plan National de Développement - PND 2012-2016*).
- Better spatial planning in these sectors and alignment of these plans with multi-sector land use planning will be essential to achieve more sustainable land management in the country.

3.1 Multi-sector planning

This section discusses first the institutional underpinning for multi-sectoral planning by highlighting the spatial planning capacity of *MAT-DGGT* and associated institutions. A review of multi-sectoral plans and how spatial plans have been carried out follows. Next is an examination of the use of spatial data and maps in these plans and other ongoing projects, to learn more about areas where possible investment in data and analytical capacity could be made. The final section includes a set of promising areas to develop specific outputs and activities that will be considered when developing a roadmap and implementation plan.

3.1.1 Institutional setup for multi-sectoral spatial planning

The 2014 orientation law on land use planning makes *MAT-DGGT* the lead ministry for multi-sectoral plans and the coordinator of spatial plans by sectoral ministries. Presently, there is no specialized technical unit within government focusing on multi-sectoral land use planning, especially one that can deliver consolidated spatial databases, produce new analytical maps, perform spatial land use analyses, and develop options of different land use scenarios that take the interests of all economic sectors into account.

MAT-DGGT, however, is in the process of obtaining the political clearance for a land use planning (*Direction de la Géomatique*). The terms of reference outlining its specific objectives and envisioned scope of technical and human resources were not yet available for preparing this report.

In addition, *MAT-DGGT* is currently carrying out a project to establish a National Cadaster (starting with urban areas) and a National Geomatics Center (*Projet Etablissement du Cadastre National / Centre National Géomatique*). The Ministry is receiving technical support from two research firms (AFECI and AECOM). In support of this project, *MAT-DGGT* employs 3 coordinators and 4 additional staff (EO International, 2014).

MAT-DGGT has the hardware and software to produce maps and analyze spatial data (e.g., a 2014 review identified 6 ArcGIS licenses, 6 computers, and 1 plotter). This equipment supports the ministry's other projects such as developing master plans for cities experiencing rapid urbanization, determining compensation for citizens affected by the arms depot explosion of 2012, and mapping areas to be expropriated for public works (EO international, 2014).

MAT-DGGT's GIS equipment and map making skills can support land use planning. *MAT-DGGT* would benefit from greater technical skills related to land use planning, for example on carrying out spatial land use analysis. Some of these skills may be obtained by hiring new staff for the envisioned land use planning unit. Or they could be obtained with the help of additional training on remote sensing analysis, land use planning, economic modeling, and land use scenario development.

Since the orientation law on land use planning has been passed so recently, there has been no practical experience yet with conducting multi-sectoral land use planning that follow the law's objectives and principles. *MAT-DGGT* skills to organize and manage a multi-sectoral planning process can be strengthened, for example by learning about efficient and effective approaches to involve stakeholders within and outside of government that balance a sufficient level of participation, high planning speed, and acceptable costs.

3.1.2 Existence and scope of current multi-sectoral spatial plans

MAT-DGGT is in charge of two multi-sectoral plans: the National Land Use Plan (*Plan National d'Affectation des Terres - PNAT*) and the National Spatial Development Plan (*Schéma National d'Aménagement du Territoire - SNAT*). The underlying technical work for the *PNAT*, originally conceived as an output of the National Forest Inventory (*Inventaire Forestier National – IFN*; see section 3.2.4), has been carried out by *CNIAF (MEFDD)*. However, multiple factors have delayed the *PNAT*. In July 2015, the lead assignment for the *PNAT* was officially transferred from *MEFDD* to *MAT-DGGT*, which then took the first steps to set up an inter-ministerial working group to advance the *PNAT*. *MAT-DGGT's* mandate for the *SNAT* comes from the orientation law on land use planning.

The objectives of and relationship between these two plans will be discussed first. A more detailed description of the process and content of the *SNAT 2005* follows.

PNAT and SNAT objectives and interlinkages

A *PNAT* concerns itself with land allocation and land use options. Its objective is to achieve a balance between different uses of land and avoid conflicts resulting from multiple assignments of the same land for incompatible uses. A *PNAT* typically seeks to create synergies between broad type of land uses, for example between biodiversity conservation, carbon storage, safeguarding drinking water supplies, and eco-tourism. In cases where one land use results in negative impacts (e.g., cropland expansion in natural habitats), different strategies are applied to either avoid an impact on most sensitive areas (e.g., no large-scale expansion into intact, carbon-rich forests) or mitigate the impacts (e.g., encourage only small-scale cropping combined with agro-forestry in certain areas). A robust *PNAT* would explore different land use scenarios for certain locations, solicit stakeholder input, and balance economic, environmental, and social criteria to prioritize specific land use options.

A *SNAT* addresses spatial development and land management more broadly (i.e., it covers more than land use and land allocation issues). A *SNAT* is a long-term plan that seeks to ensure a balanced distribution of people, activities, equipment, and infrastructure throughout the territory. A *SNAT* focuses on reducing

spatial disparities across the country by investing in major infrastructure and government services that could help achieve sustainable use of above and below ground resources and diversify and grow the economy. Depending on the respective objectives and the scale of a country's *SNAT*, its supporting maps may provide general long-term strategic guidance to prioritize infrastructure and land use for macro-zones, but be not precise enough to support routing of infrastructure or serve as a reference to allocate land for concessions. A robust *SNAT* would explore various development scenarios that take different demographic, labor, investment, and land use options into account. Comprehensive stakeholder engagement and spatial prioritization of investments that balance economic, environmental, and social criteria, all contribute to a stronger *SNAT*.

The technical work supporting a *PNAT* and *SNAT* is interlinked. Both start out with maps of current land cover and use. Subsequent analyses for a *PNAT* typically examine how current and future land allocation for different sectors result in overlapping land use claims (e.g., *République Gabonaise, Le Plan National d'Affectation du Territoire*) and then seek to develop maps showing options of future land use and associated zoning. Likewise, a *SNAT* would rely on maps of current land cover and use to define land use management zones (*zones d'aménagement du territoire*) and associated macro-zoning within each management zone. The process and criteria applied in determining future land use options for a *PNAT* overlap considerably with those applied in delineating the type and location of macro-zones for a *SNAT*.

The orientation law on land use planning does not stipulate the technical method for the *SNAT* and does not reference a *PNAT* and its specific technical approach. The law only mentions that policies on land use and land allocation need to balance the interests of multiple sectors (« *L'Etat met en œuvre une politique d'affectation des terres qui garantit le développement concomitant des différents secteurs d'activités et respecte les différentes formes de propriétés foncières* »).

It is not clear at this point in time how *MAT-DGGT* intends to prioritize and harmonize the work on the *PNAT* and the *SNAT*. The maps supporting the planned *PNAT* resulting from the *IFN* project (see 3.2.3) have not been completed yet. The *SNAT 2005* was published before the orientation law on land use planning was passed in 2014. A revision of the *SNAT* following the new law can be aligned with efforts to complete the *PNAT*. If the maps supporting the *PNAT* are of high quality and progress quickly, they can become an important foundation to define land management zones (*zones d'aménagement du territoire*) and associated macro-zoning in Congo's revised *SNAT*.

SNAT 2005: process and content

In August 2005, the *Ministère du Plan, de l'Aménagement du Territoire, de l'Intégration Economique et du NEPAD* released the National Spatial Development Plan or *Schéma National d'Aménagement du Territoire (SNAT)*. The *SNAT* is a 20-year plan that determines spatial priorities for the country. This section summarizes the process of preparing the *SNAT 2005*, highlights some of its content, and describes the zoning approaches used. The analysis will help to identify lessons learned and identify opportunities for improvements that can inform the outputs and activities in the envisioned roadmap to strengthen land use planning.

Process

Technical work: A consultant carried out the technical work under the leadership of the Ministry.

Participation and consultation: From the published document, it is not clear how different sectoral agencies and actors outside of government contributed to this process technically. There is no reference that would indicate widespread consultation, participation of government and non-government actors,

or dissemination of the report, findings, and the maps (and underlying spatial data). Based on the available information, it is assumed that there was no clear participatory process to consult on or validate the final product. The new orientation law on land use planning requires *MAT-DGGT* to use a participatory approach (however, without specifying which state or non-state actors should participate).

Principles of sustainability: The *SNAT 2005* refers to balancing economic and environmental criteria. The document makes reference to the importance of safeguarding protected areas and ecologically sensitive areas.

Implementation: The review of long-term planning documents and discussion with sector experts could not find an example of use of the *SNAT 2005*:

- It was not referred to in the long-term agriculture sector plan (*PDSA*) or mentioned by experts in the sector ministries as a reference for mid- or short-term planning.
- It was not referred to in the *PND 2012-2016*.

The *SNAT 2005* was completed before the release of the new orientation law. The *SNAT 2005* lacked a strong incentive for implementation, monitoring, and evaluation. This should change with the new orientation law on land use planning, which has made the preparation of the *SNAT* an essential building block of spatial planning. With this new legal and institutional legitimacy, a strong foundation is in place to implement the *SNAT* in Congo's planning processes.

Diagnostic of the current and the future situation

The *SNAT 2005* diagnosed the country's current economic and spatial development situation. Different sections examined the economy, natural resources endowment, population growth, urban and rural settlement patterns, and existing infrastructure. The *SNAT 2005* envisioned a future Congo in 2025 assuming harmonious development that would derive economic returns from the country's natural, human, and physical capital. The document emphasized the need for large investments, because of the country's high transport and communications costs and energy challenges. Low population density in parts of the country were seen as an opportunity to safeguard rich ecosystems and obtain economic returns, for example through tourism development.

To accelerate economic growth, the *SNAT 2005* previews the main pillars emphasized years later in the *PND 2012-2016* including food production, forest production, development of mining resources, and the tourism sector. The document also made clear that the state has to augment human capital, especially with investments in health, education, and professional training. There was no reference in the document that discussed different land use scenarios and associated economic development pathways for the country as a whole or for a sub-region.

Zoning of the country

An important section in the *SNAT 2005* is the proposed zoning of the country. To identify priorities for economic development, carry out the analysis of resource endowments and future infrastructure investments, and to produce maps, the document relied on the following spatial units:

- Five large non-overlapping regions covering the whole country.
- Eleven, smaller non-overlapping land use management zones (*zones d'aménagement du territoire*) covering the whole country.
- Within each land use management zone, macro-zoning that specified land use priorities for agriculture, forestry, and mining.

Some of these approaches used could be instructive, when revising a future *SNAT*, but also could be applied and modified when discussing ways to delineate permanent and non-permanent forest estate, define rural areas, or determine different categories of agriculture use specified in the existing legal framework (e.g., Law n° 25-2008 - agro-land regime law).

Non-overlapping regions covering the whole country

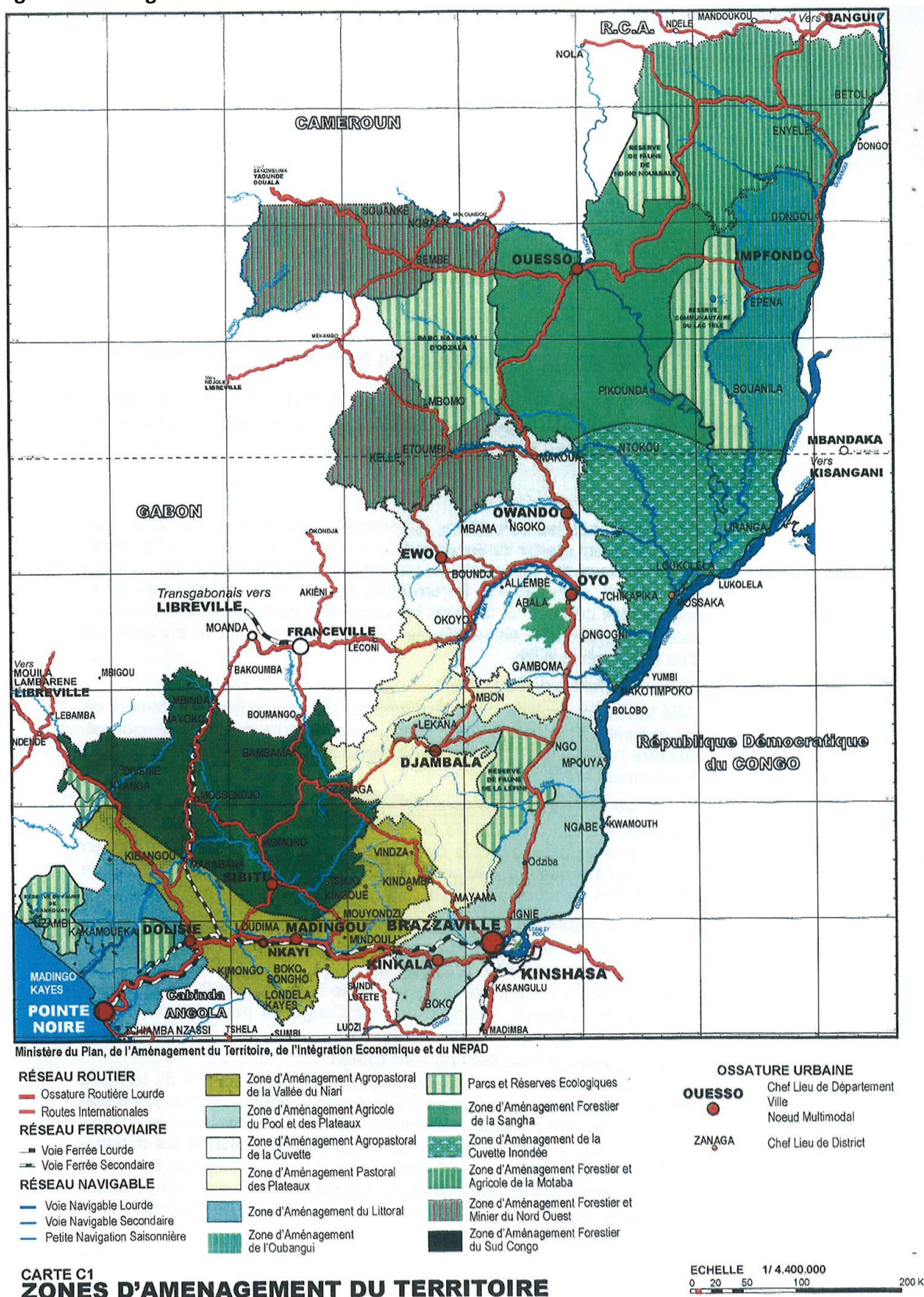
For planning purposes, the country is grouped in five non-overlapping land use regions (*grandes ensembles naturels*) that include: parks and ecological reserves; forest area; agriculture area; livestock area; and coastal area. The *SNAT* also groups the country in twelve zones with eleven of them being new land use management zones (*zones d'aménagement du territoire*) and the twelfth zone being land reserved for protected areas and ecological reserves (Figure 21). These zones were delineated on a national map at 1:4,400,000 scale and are also grouped into three larger economic production zones: integrated (multiple use) zone, zones intended for food production, and zones intended for forest production.

Land use in the large zones is not exclusively earmarked for single use, for example the *SNAT 2005* envisions multiple land uses, for example forestry and mining in the *Zone d'Aménagement Forestier et Minier du Nord Ouest*, forestry and agriculture in the *Zone d'Aménagement Forestier et Agricole de la Motaba*, and aquaculture and other agricultural production in the forests of the *Zone d'Aménagement de la Cuvette Inondée*. All of these areas provide also biodiversity benefits and other ecosystem services such as carbon storage. However, these benefits were not explicitly mentioned in the *SNAT* document.

Land use management zones (*zones d'aménagement du territoire*)

The land use management zones are not delineated by department or district boundaries. Figure 17 shows the map with the location of the eleven land use management zones and the land area dedicated for protected areas and ecological reserves.

Figure 17 Management zones in the SNAT 2005

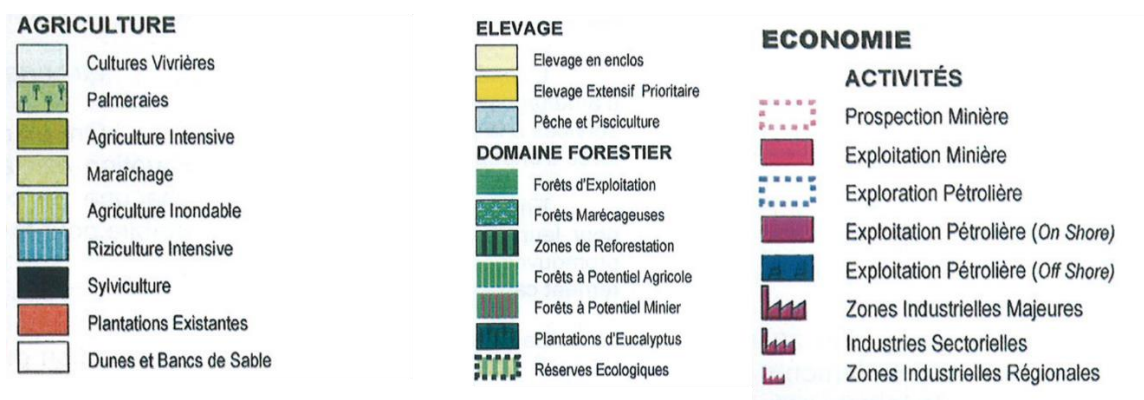


Specific macro-zoning of land use options for agriculture, forestry, and mining within each land use management zone

Figure 18, summarizing the type of land use options within in each land use management zone, can help to identify missing land use classifications to strengthen future macro-zoning. For each land use management zone, the *SNAT* 2005 presented a map at 1:1,500,000 scale. Each map delineates specific types of land uses for important economic sectors agriculture (eight different types of cropping systems), livestock (three different types of livestock systems), and forestry (which includes plantations, reforestation areas and forests with agricultural potential and forests with mining potential). Mining activities (prospecting and exploitation) are indicated on some maps. In addition, each land use management zone displays promising areas for industrial zones nearby urban centers. Likewise, energy infrastructure (e.g., sites with hydroelectric potential, potential wind power sites, high energy transmission routes) and transport infrastructure (ports, railroads, roads, and navigable rivers) are shown within each land use management zone.

The text describing each land use management zone first discusses current land use and then outlines major land use options shown on the maps such as forestry, agriculture, mining, tourism, and other uses. In addition, the *SNAT* includes a chapter on the potential of Congo's major sectors such as forest and agriculture. This chapter provides area estimates of land available for timber production and the potential area available for future agricultural expansion (in hectares). The latter estimates are based on an analysis carried out for Congo's first five-year plan and a soil map from the 1980s. However, a spatial delineation of these potential forest and agricultural areas, for example with more detailed macro-zoning, was not shown on the published maps.

Figure 18 Planning within land use management zones: options for agriculture, forestry and mining



3.1.3 Data and analysis used in multi-sectoral spatial planning

Up-to-date maps and associated spatial data are essential for good land use planning. To determine the need for such data, their use in existing planning efforts and mapping platforms were analyzed. This section looks first at the use of spatial data in the *SNAT 2005* and the envisioned layers of the *PNAT*. The next section reviews spatial baseline data available on the Congo Forest Atlas platform, which are relevant for multi-sectoral plans such as the *PNAT* and the *SNAT*. The section concludes with a discussion of ongoing efforts to build new data sets and suggestions for additional data and maps to strengthen land use planning.

Spatial data used in the SNAT 2005 and possibly available from the PNAT

The *SNAT 2005* was published more than a decade ago. The underlying spatial and socio-economic data are quite dated. For example, the maps and associated tabular data relied on Landsat imagery from 2002, a soil map from 1982 at 1:500,000 scale, a 2002 administrative census, and the 1984 population census. More recent spatial data for multi-sectoral land use planning are available now, for example a 2007 population census and the spatial data layers on the Congo forest atlas platform (see next section).

The maps supporting the *PNAT* have not been published yet. Some of the potential data and map layers that could be obtained from the *IFN* project are discussed in the data review for the forest and agriculture sector (see 3.2.4 and 3.3.4). Ultimately, a comprehensive inventory and gap analysis is needed to create a stronger spatial data foundation for a *SNAT* revision.

Baseline layers available for sectoral and multi-sectoral planning

Over the past ten years, MEFDD and WRI collaborated to compile and create spatial data supporting three versions of the Congo Forest Atlas made available online for public use. Selected layers from the underlying spatial data base have been applied in planning or land allocation decisions in the forest, agriculture, and mining sector. Table 1 highlights the layers most relevant for land use planning.

Table 1 Baseline layers from the Congo Forest Atlas used in planning and land allocation

Land cover category and examples of land use layer	Year	Sources and comments
Végétation : Carte de la végétation de l'Afrique Selected layers such as: Forêts dense, Forêts dégradées, Forêts galeries, Plantation, Savanes et sols nus	2000	SDSU, UCL, JRC, OFAC, 2008
Conservation : Aires protégées	2011	Projet OIBT (WRI-CNIAF)
Hydrographie : Rivière principale, Iles rivière principale, Rivières secondaires, Rivières tertiaires, Iles, Fleuve, Océan	2010	Projet OIBT (WRI-CNIAF)
Infrastructure : Chemin de fer, Infrastructures de transport (routes publiques et routes forestières)	2010	Projet OIBT (WRI-CNIAF)
Localités : Villes principales et autres localités	2011	Données originales numérisées sur la base des images Landsat, documentées sur la base des cartes topographiques (IGN, CERGEC) et fusionnées aux données de CARPE—University of Maryland
Limites administratives : Pays voisins, Frontière nationale, Departments		Carte numérique du monde for international layers; IGN maps

Source: WRI, 2012

Ongoing national efforts to build fundamental spatial data sets that can support land use planning

As part of the National Cadaster project, *MAT-DGGT* is working with consultants (Maps Geosystems and E.O International) to inventory its data holdings. They include photogrammetry and ortho-photos for large urban areas, satellite images, cadastral plans, address registry, socio-economic surveys, property archives, administrative boundaries, and maps of *MAT-DGGT* infrastructure projects.

Congo has no national repository yet that compiles all sector and multi-sector land use plans (and associated maps). Such a repository ideally would be in the form of an online platform that can be continually updated and accessed by analysts and decision makers within and outside government. The platform could be supported by the envisioned National Geomatics Center (*Centre National Géomatique*) or the land use planning unit within *MAT-DGGT*.

A review of a spatial data inventory prepared in support of Congo's process to establish a National Geomatics Center (*Centre National Géomatique*) and a National Cadaster (E.O International, 2014) did not mention any ongoing large effort to build new baseline data sets for the country. Additional research,

however, is required to ensure that no other large project investment is being made to expand geospatial data relevant for improved land use planning. These include an improved geodetic control network, new rectified aerial and satellite imagery for parts or the whole country, reference layers covering hypsography and hydrography, digitized boundaries of administrative units, delineated land management units at various scales, and updated maps of transport infrastructure and utilities.

Additional baseline layers that would strengthen land use planning

Spatial planning in the Congo is currently relying on baseline layers that combine topographic maps, regional land cover maps, and recent remote sensing products (see Table 1). Ultimately it will be necessary to harmonize these existing and any proposed new layers to create complete consistent geospatial data sets for the country at the appropriate level of disaggregation. It will also be necessary to support institutions, tools, and mechanisms to make these data available for planning and other purposes (e.g., by establishing and providing long-term budget support for a National Geomatics Center or a land use planning unit within *MAT-DGGT*). Making progress in building such a national spatial data infrastructure is essential for better land management.

The following baseline layers would be useful for both sectoral and multi-sectoral land use planning:

- Boundaries of lower-level administrative units and of land use planning zones as shown in the *SNAT* and sector plans.
- Lands occupied and claimed by forest-dependent communities including indigenous peoples.
- Data layers showing population distribution by administrative area, urban and rural settlement types, and land use planning zones. This will require aligning boundaries for the enumeration areas of the national population census with these base maps.

To strengthen multi-sectoral land use planning, building spatial baseline layers will not suffice. Earmarking resources to produce analytical maps that rely on multiple spatial data sets (often from multiple sectors) are needed to support land allocation and land use zoning decisions.

Potential zoning maps may be required as a common reference to implement a law, define macro-zoning for the *SNAT*, guide agricultural investments, or strengthen biodiversity and ecosystem management. An evidence-based land use planning would take advantage of analytical maps combining the potential of forests and other ecosystems, agricultural potential, mining potential, and other land use options.

Analytical maps can support sectoral plans (see sections 3.2.4, 3.3.4 and 3.4.4) and multi-sectoral plans. For the latter, they can be helpful to implement key legislation related to land use planning or develop macro-zoning for a revised *SNAT*.

For example, Law n° 10-2004 (outlining general principles to be applied to the state and land regimes) indicates that land use planning must take into account allocation of land into three main areas: urban areas (allocated for housing, commercial and industrial activities; peri-urban areas (allocated for various crops) and rural areas (with three categories agriculture, forests/forestry, or mining). A national map of major land use zones that clearly defines categories outlined in this law would facilitate land use planning processes and multi-sectoral coordination.

Likewise, it is worthwhile to consider preparing analytical maps that explore new ways of macro-zoning for the *SNAT* and go beyond the land use categories applied in the Republic of Congo's first *SNAT* (it included categories for eight land use classes for agriculture production, three land use classes for livestock production, and seven forest-related land uses under the forest production domain). This could

raise the awareness of decision-makers that new types of investments and government services are needed to support these zones, for example to support land managers in areas important for wildlife corridors, the supply of ecosystem services, and tourism development (all of them outside of national parks and other highly protected areas).

For example, much can be learned from Brazil's zoning approach at state level, which has evolved over many years. It combines both ecological and economic criteria, and takes land for indigenous peoples into considerations. This has resulted in macro-zoning that clearly identifies possible agricultural expansion zones, areas of agricultural intensification and consolidation of crop and pasture lands, buffer zones for rural settlements, areas for sustainable natural resource management (both in forest and savannah ecosystems), space for potential future conservation areas and protected areas, and fragile ecosystems that are outside of the protected area system.

Such a new type of zoning could then influence, for example the routing of the transport network to service new iron mining sites. Or it could provide guidance on the type of desired mining operation encouraged in close proximity to high conservation areas and wildlife corridors, for example an "offshore approach" of housing staff that discourages establishing new permanent settlements and driving unplanned land use changes nearby the mining concession.

3.1.4 Suggestions for strengthening multi-sector spatial planning

The following suggestions are intended to build on efforts to strengthen sectoral planning (see sections 3.2, 3.3 and 3.4). This section discusses first ideas to strengthen a future *SNAT*. The suggestions are detailed, since the *SNAT* is a key component of the orientation law on land use planning, and activities in this area are a high priority for *MAT-DGGT*. This section concludes with a set of bullets summarizing other possible efforts to strengthen multi-sectoral planning.

Suggestions for strengthening a future SNAT

A review of the *SNAT 2005* and examples from other spatial planning documents (e.g., Ghana, Morocco, Algeria) are the foundation for the following suggestions. A revision of the *SNAT* in the next few years, as envisioned under the orientation law on land use planning, could result in a more environmentally robust and more broadly supported national plan, if it would address the following four points:

1. Advance sustainability

- ***Make sustainability more explicit in developing the revised SNAT***
 - Use similar language on sustainability in a revised document as was used in the Republic of Congo's orientation law for land use planning.
 - Refer to specific principles that support sustainability and include them when delineating areas for macro-zoning. For example, the country's National Agriculture Development Plan (*PDSA*) proposed no expansion of new agricultural land into primary forest, protection of riparian buffer, and other criteria ensuring more sustainable agricultural production. Explore whether these principles can be applied in the analysis and maps for the revised *SNAT*. Explore whether new criteria for zoning can be proposed: for example, new road infrastructure that seeks to balance increased accessibility, greater territorial integration, reduction in transport costs, and minimized negative environmental impacts such as habitat fragmentation and biodiversity loss.
 - Have a specific objective in the revised *SNAT* that commits the country to a "sustainable territory", which was proposed for example in the Algeria *SNAT*. Such a specific objective

could be supported by actions that promote new innovative spatial initiatives such as building “green infrastructure” outside of protected areas that support wildlife conservation, ecotourism, and supply of ecosystem services.

2. *Integrate more environmental and social issues into the SNAT revision process*

- *Add important sectoral issues in the SNAT analysis, scenario development, and macro-zoning*
The *SNAT 2005* delineated areas for specific land use such as cropping, livestock, reforestation, and plantations. The following land uses are important for economic development and environmental sustainability and could be considered in any mapping and macro-zoning:

- Areas important for wildlife corridors (these are areas outside of protected areas, for example in forest and mining concessions).
- Areas important for the supply of ecosystem services such as carbon storage (REDD+), safeguarding of drinking water supplies, shore line protection (e.g., mangroves), and cultural ecosystem services (e.g., areas important for spiritual, religious, and aesthetic values).
- Areas important for tourism development.

- *Make the SNAT more coherent with sector plans*

Since the publication of the *SNAT 2005*, new sector plans have been published. Zoning efforts in sector planning has to be aligned and reflected in the revised *SNAT* macro-zoning and include:

- Macro-zoning from National Agricultural Development Plan (*PDSA*).
- Zoning proposed in forest areas from forest concession planning (e.g., local development areas, riparian areas, hunting areas).

- *Encourage and build on sector plans or new studies that take sustainability into account*

It is not clear from the published *SNAT 2005* how some macro-zones for agriculture (e.g., palm oil plantations) or the forest sector (e.g., restoration/reforestation, wood plantation for energy supply) have been delineated. The *SNAT* revision could take advantage of more advanced spatial mapping tools and ways to define suitable areas for specific land uses in these sectors (e.g., as was done in the recent study by CIRAD (2015) on palm oil potential).

3. *Reflect community and indigenous lands in macro-zoning*

The maps showing macro-zoning in the *SNAT 2005* did not include specific areas earmarked for local development or community and indigenous lands. It may be possible to explicitly delineate lands used by forest-dependent communities such as cropping, fuelwood production, hunting, and fishing areas. A revised *SNAT* that delineates land important for local development would send a strong message that community and indigenous lands are an important building block of the country’s economic and spatial development strategy. For example, Cameroon’s land cover map shows a clear spatial setback of forest concessions from major roads. This creates a zone in which more detailed land use plans for local communities can be developed. Similarly, the macro-zoning for the *PDSA* created buffers around villages that reflected average spatial use patterns expected to be occupied by farmers in the future.

4. *Modify the SNAT process to strengthen analysis and stakeholder engagement*

- *Consider analyzing different spatial development scenarios*

The *SNAT 2005* presented a single final macro-zoning for the country. However, for many areas in the country often multiple land use options exist, some of them creating complementary benefits and some of them creating negative trade-offs between different

land use options. The analytical process for the revised *SNAT* could be modified and allow for the preparation of alternative land use scenarios for the whole country or important sub-regions. This revised analytical step could then be combined with a revised consultation process that would allow both stakeholders within and outside government to identify a preferred scenario. For example, Algeria's *SNAT* proposed four scenarios. Similarly, the process for the Ghana National Spatial Development Framework required the preparation of land use scenarios in the process to develop this framework. The country also reserved time to engage stakeholders to identify alternative scenarios for development and establish a preferred option for the future.

- *Develop innovative spatial initiatives*
The Ghana National Spatial Development Framework proposed specific spatial development initiatives such as a green infrastructure network, urban food sheds, and an agricultural growth corridor. The Republic of Congo could discuss similar initiatives, for example a mining region that prioritizes mining, wildlife conservation, and carbon storage (REDD+) or areas suitable for sustainable oil palm production.
- *Develop consultation, participation, and partnerships when preparing the SNAT*
Many plans have difficulties in their implementation if key stakeholders within and outside government are not part of the process in developing the plan. For example, the Ghana National Spatial Development Framework required a minimum of three rounds of consultation: (1) after data collection and during analysis stage when trends and issues are identified; (2) when determining the preferred scenario option for development; and (3) when considering the draft final plan.

Other suggestions for strengthening multi-sector spatial planning

In addition to revising the *SNAT*, multi-sectoral land use planning can be strengthened by investing in new institutions, spatial data and analytical maps, completion of multi-sectoral plans, and revisions of the legal framework. The following are five promising areas:

- *Establish a center for land use and spatial development planning.* This effort needs to be aligned with plans for a National Geomatics Center and a land use planning unit within *MAT-DGGT*. A land use planning center could be linked to a single institution or serve as a shared center among multiple agencies. Over the long-term, such a center would be in charge of the Republic of Congo's reference maps and online atlases related to land use and spatial development planning. Such a center could also supply analytical and mapping services for subnational planning, especially in the case where such capacity has not been established yet locally or where such centralization can be more cost effective and faster in product delivery.
- *Set up key national coordinating units,* as envisioned under the orientation law for land use planning. This includes the *Conseil National d'Aménagement du Territoire* and the *Comité Interministériel d'Aménagement du Territoire*.
- *Invest in baseline data and analytical mapping capacity.* This will require a systematic assessment of ongoing spatial data investments in key sectors and raising awareness about the benefits of new types of macro-zones.
- *Harmonize multi-sectoral land use planning efforts and complete PNAT and SNAT.* Align work on the *PNAT* with plans to revise the *SNAT* (taking some of the suggestions discussed above on board).
- *Align legal codes for land use and spatial development planning.* This includes reviewing and harmonizing legal codes for land allocation and zoning in key sectors such as agriculture, forest,

and mining and developing a new spatial development code (*Code d'Aménagement du Territoire*).

3.2 Forest sector

This section first identifies the drivers of deforestation and the link to land use planning, then moves to an overview of the leading forest institutions and programs, a summary of planning efforts, and an assessment of data and map availability to determine important planning and information needs. The forest section concludes with suggestions to fill some of these needs.

3.2.1 Forest resources and drivers of deforestation

The Republic of Congo is home to a globally important level of forest cover, estimated at 23.9 million hectares, about seventy percent of the national territory (MEFDD/CNIAF, 2015). Almost all (97 percent) is humid tropical forests, and more than 80 percent is state forest. Forest cover is not uniform across the country: the departments of Likouala, Sangha, and Lékoumou are dominated by dense forests, while the departments of Pool, Bouenza, and Plateaux are dominated by savannah. The departments of Cuvette, Cuvette-Ouest, Niari, and Kouilou are characterized by scattered forests. Brazzaville and Pointe-Noire are mainly urbanized with little dense forest.

The country is now developing a national program for Reduced Emissions from Deforestation and Forest Degradation (REDD+) to address major drivers of deforestation. REDD+ is a global initiative that aims to provide economic incentives that encourage changing practices and reducing pressure on forests.

Though the deforestation rate is now low (less than 0.1 percent per year), it is likely to accelerate without proper planning and control. Deforestation in Congo is driven directly by shifting agriculture (slash and burn), production and consumption of wood energy, unsustainable or illegal logging, mining development, the development of infrastructure in urban areas, and the construction of roads. Indirect drivers such as global demand for timber and other commodities reinforce these direct drivers.⁵ Pressure on forests and the ecosystem services they provide is expected to remain significant at the national level due to the combination of large infrastructure development in previously remote areas, a lack of oversight capacity and enforcement of environmental laws, a lack of land use planning, and overall weaknesses in policy coordination. Rural poverty, inefficient production and use of charcoal, and a lack of alternative energy supplies also contribute to local deforestation and degradation.

The Republic of Congo has set up institutions and programs to manage its forest resources, which in turn have invested in mapping and spatial planning. If spatial planning for the forest sector is further strengthened and becomes well embedded in multi-sectoral land use planning, it carries the promise that some of these pressures on forest resources can be avoided or reduced.

3.2.2 Institutional setup for spatial planning in the forest sector

In the forest sector, the technical capacity to support land use planning can be found in the National Centre for Forest Resources and Fauna Inventory (*Centre National d'Inventaire et d'Aménagement des Ressources Forestières et Fauniques - CNIAF*), the Service for Forest Inventories and Management (*Service des Inventaires et Aménagement Forestier - SIAF*), and the Directorate of Studies and Planning (*Directions*

⁵ Results of a national workshop in 2014 validating the spatial factors of deforestation and cited in the draft National REDD+ strategy.

des Etudes et de la Planification - DEP). These institutions or units are associated with the Ministry of Forest Economy and Sustainable Development (*Ministère de l'Economie Forestière et du Développement Durable - MEFDD*).

The *CNIAF*, a public institution with financial autonomy, is under the direct authority of the Cabinet of the *MEFDD*. *CNIAF* was established in 2000 to support sustainable resources management by filling data gaps on forest resources, updating national forest maps, and managing other forest related projects (e.g., the country's multi-resources inventory - *IFN*). *SIAP* is responsible for processing information related to the creation and modification of forest concessions. The Service archives all relevant information related to forest concessions. The Directorate of Studies and Planning (*Directions des Etudes et de la Planification - DEP*) within *MEFDD* has a planning mandate with a Statistical Service and a Planning Service. The Statistical Service compiles and analyzes statistical data for the forest sector. The Planning Service develops and coordinates *MEFDD* development plans and programs within the country's medium-term public expenditure framework.

In addition, other government efforts in the forest sector are relevant to land use planning. These include the Information System for Forest Management and Sustainable Development (*Système d'Information pour la Gestion Forestière et de la Développement Durable - SIFODD*) and the National Program on Afforestation and Reforestation (*Programme National d'Afforestation et de Reboisement - PRONAR*).

SIFODD was launched in February 2014, a joint project by *MEFDD* and the United Nations Development Programme—UNDP (FAOLEX, 2014). *SIFODD* is a national register of projects implementing the REDD+ process. *SIFODD* is receiving technical and financial support to strengthen database management and computer systems in the forest sector, create online platforms, and boost map making (Panapress, 2015).

PRONAR, launched in 2011, seeks to establish a million hectares of forest and agroforestry plantations during 2011-2020 relying on restoration of dense forests and planting of fast-growing exotic and local tree species. The program engages private, public, and local partners (pronarcongo.org, 2016) and aims to achieve its objectives with the help of industrial plantations (about 700,000 hectares led by the private sector), state plantations (about 200,000 hectares led by Congo's National Reforestation Service), and village or community plantations (about 100,000 hectares). About half of the plantations planned are in the center of the country in the departments of Pool and Plateaux (Oyono et al., 2014). The overall budget is about 1.1 billion CFAs (Agence d'Information d'Afrique Centrale, 2015).

Both *SIFODD* and *PRONAR* have received government and donor-funded support including vehicles, computers, and office equipment. These two projects have compiled and analyzed resource information, for example maps showing GPS points and boundaries of afforestation blocks and reports synthesizing socio-economic and forest information for selected regions.

Ideally, the establishment of new plantations would be aligned with multi-sectoral land use planning and associated macro-zoning. Vice versa the area targets of the strategy document behind the *PRONAR* program can be incorporated in the development of Congo's National Land Use Plan (*Plan National d'Affectations des Terres*) and a revision of the *SNAT*.

Project-financed support for *CNIAF*, which had a technical unit of 15 forestry and water engineers in 2011 (BAD/CBFF, 2011), has built capacity of the staff and the institution over the past years. This includes, for example strengthening of digital mapping skills, acquiring remote sensing and GIS tools, procuring

technical data collection and processing equipment for field surveys, and gaining experience with the multi-resources forest inventory.

Of the examined forest sector institutions, *CNIAF* has the strongest cartographic and GIS skills. All forest sector institutions would benefit from greater experience related to applying analytical tools to determine priorities for the forest sector, delineate priorities for different types of forest use, and apply these skills in multi-sectoral land use planning.

3.2.3 Existence and scope of current spatial plans in the forest sector

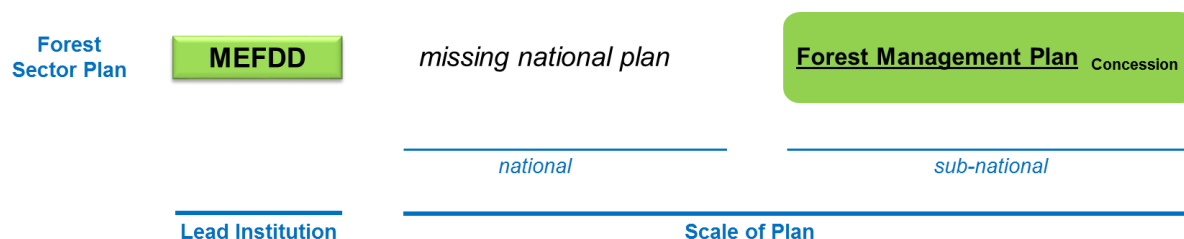
This review of spatial planning efforts in the forest sector is asking the following questions:

- Is there long-term (more than ten years) sectoral planning at national level that provides a vision for the sector? If yes, to what degree does that planning process establish spatial priorities (e.g., macro-zones on maps, quantitative area targets)?
- Is there similar long-term sectoral planning at subnational level and to what degree does that planning process establish spatial priorities?
- Does the National Development Plan 2012-2016 (*PND 2012-2016*), a macro-economic, medium term plan, have any spatial prioritization for the forest sector and how is this linked to long-term spatial plans?

Existing long-term plans with spatial prioritization in the forest sector

The forest sector does not have a long-term strategic spatial plan at national scale that defines land use, macro-zoning, and other spatial priorities. The sector, however, has established long-term spatial planning at the sub-national level (see Figure 19).

Figure 19 Existing long-term plans with spatial prioritization in the forest sector



Notes: MEFDD = Ministère de l'Economie Forestière et du Développement Durable

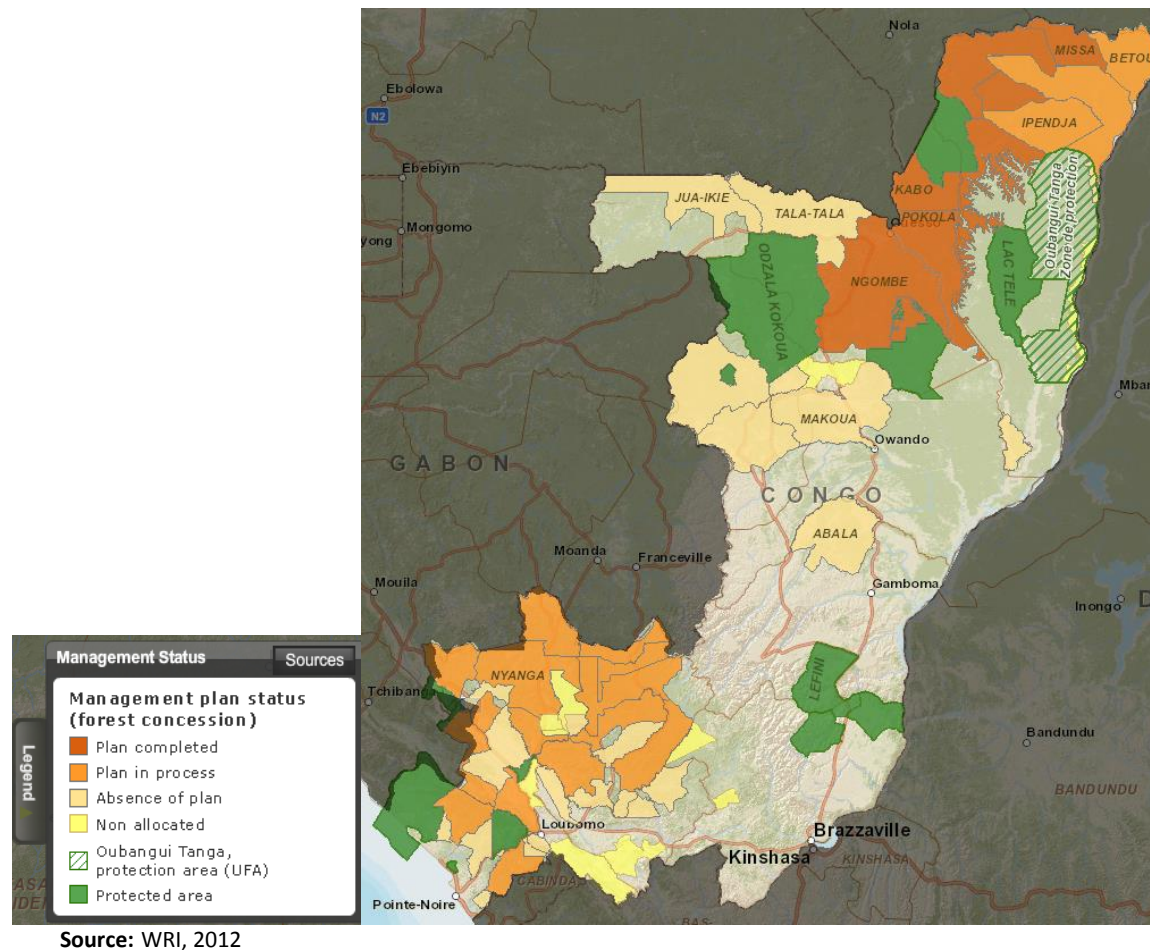
See Figure 20, which shows the extent of these concessions and the associated forest management units.

Sub-national spatial planning in the forest sector is linked to the government process to attribute land for forest production (in the Permanent Forest Domain) and allocate forest concessions to companies. For each forest concession, companies are required to prepare a 25-year management plan. Each plan includes maps that define different non-overlapping land use zones.

Not all forested areas in the country have been attributed for forest production yet. Similarly, most allocated concessions do not yet have completed management plans with the associated land use zones (see Figure 20), which are demanded by the forest law to operate legally. Those which have management plans are mostly foreign owned with FSC certification. For example, the boundaries of forest concessions for most of Likouala department are now known, and management plans have been prepared or are being

prepared. This is not the case for selected concessions in the central and southern part of the country which are mostly owned by Chinese and national companies.

Figure 20 Forest concessions and status of management plans, 2011



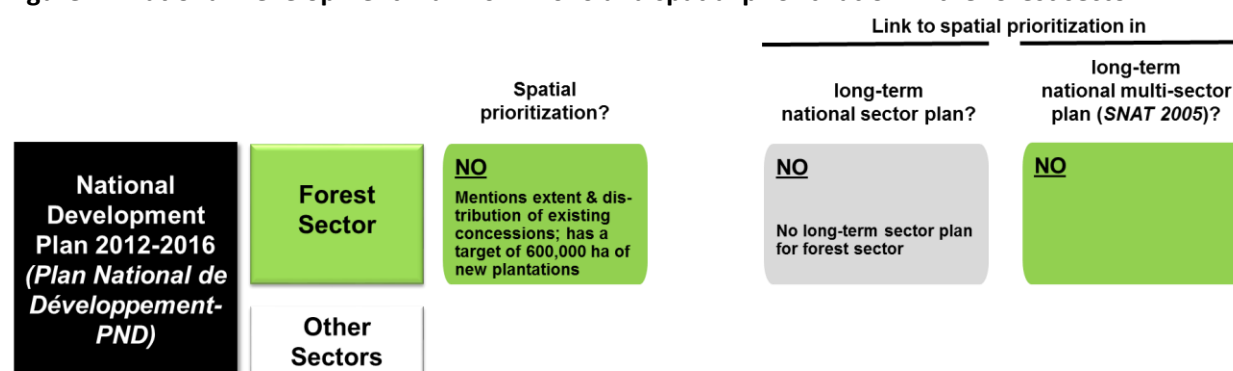
National Development Plan 2012-2016 and spatial prioritization for the forest sector

Interviews with sector experts pointed toward the National Development Plan (*PND*) as the most referred to medium-term planning document. The *PND* is a multi-sector, economic development plan. The most recent version covered 2012-2016, and the process to develop the next five-year plan is just being launched.

The forest sector is an important priority for economic diversification in the *PND 2012-2016*. However, spatial prioritization that establishes quantitative area targets for and highlights the location of new investments is very limited within the *PND* for all sectors. For the forest sector, the *PND 2012-2016* makes spatial references when describing baseline conditions: 9.5 million hectares of production forest, the share of fully (27 percent) and partially (47 percent) approved forest concessions, and the total area under FSC certification. The *PND* mentions a target of 600,000 hectares for reforestation and regeneration of forestry resources (*PRONAR* project) and a target of 3.7 million hectares of parks and protected areas, but no spatial priorities are provided for these targets or for other new forest investments (see Figure 21).

In principle, the *PND* should be congruent with long-term spatial development plans in the forest sector and the country's multi-sectoral spatial development framework such as the *SNAT*. However, as Figure 21 indicates, such linkages between plans were not expressed in the *PND 2012-2016*. It does not reference the *SNAT 2005* for any sector-specific spatial priorities. Likewise, the *PND* could not refer to a long-term national spatial plan for the forest sector, because it has not been prepared yet.

Figure 21 National Development Plan 2012-2016 and spatial prioritization in the forest sector



Note: *SNAT* = *Schéma National d'Aménagement du Territoire*, a 20-year land use planning document published in 2005.

3.2.4 Data and analysis used in support of spatial planning in the forest sector

Up-to-date maps and associated spatial data are essential for good land use planning. To determine the need for such data, existing planning efforts were analyzed and experts at government agencies were interviewed. For the sectoral analysis, the approach to collect information has been organized in the following categories:

- *Baseline layers available and used.*
- *Documented maps and data layers used in sector-specific planning documents or land allocation decisions.*
- *Ongoing efforts to build new spatial data sets, for example supported by international development cooperation projects or national budget allocation.*
- *New data layers and maps needed as prioritized in selected strategies (e.g., PND), suggested in interviews with key experts in the ministry, or based on a gap analysis comparing the Republic of Congo's available data with a list of spatial data used in land use planning in other countries.*

Baseline layers available and used in the forest sector and other sectors

The forest sector is relying on a combination of historic topographic maps, regional land cover maps, and recent remote sensing products (see discussion of baseline layers in section 3.1.3).

Sector-specific data used in spatial planning for the forest sector

By May 2016, no exhaustive forest resource inventory with spatial data that could support land use planning had been published yet (see next section discussing ongoing work). The only spatial data and maps used for planning are the management plans for concessions that have completed them, and each plan includes maps that define different non-overlapping land use zones. The following types of land uses have been delineated (and the underlying spatial data and maps are in principle available for land use planning):

- forest production,
- forest areas dedicated to silvicultural research and biodiversity conservation,
- protection of environmentally sensitive areas (e.g., riparian buffers),
- and community use (e.g., agriculture and other livelihoods).

In addition, each plan delineates village hunting areas (including areas where hunting is prohibited) and road infrastructure to extract timber resources.

These forest management and land use plans do not cover all forest lands in the country, because not all forested areas have been attributed for forest production, and not all allocated concessions have completed management plans (see Figure 20). There is no complete consolidated national database yet that contains all the land use zoning from the forest concessions.

Ongoing national efforts to build spatial data sets for the forest sector

Between 2005 and 2010, *CNIAF* and *FAO* completed the pilot phase for a national forest resource inventory (*FAO*, 2007). The effort relied on 42 topographic maps (ING; 1:200,000), collected 109 biophysical and socioeconomic indicators for 130 sample points, and developed an assessment manual. This pilot was succeeded by the National Forest Inventory (*Inventaire Forestier National - IFN*).

The *IFN* project is a multi-resources inventory and covers the whole country and all ecosystems. The project includes a component to develop a National Land Use Plan (*Plan National d’Affectation des Terres - PNAT*). The National Center for Inventory and Planning of Forest and Wildlife (*CNIAF*) is carrying out the *IFN*. The project, approved in 2010 and planned to be completed in 2.5 years, has been extended until June 2016. The Congo Basin Forest Fund provided 2.5 million Euros, and *CNIAF* contributed 0.5 million Euros. At the writing of this report, biophysical and socio-economic field data collection and data entry have been completed. The analysis phase, including data base and map development, is currently scheduled to end in June 2016.

The final outputs of this project are expected to boost the supply of data and maps needed for better forest management and land use planning (*BAD/CBFF*, 2011) and include:

- Database representing the national forest inventory including 459 data collection points of biophysical and socio-economic data.
- Forest carbon stock database.
- Map of forest potential by type of forest resource and map of resource potential by sector of activity.
- Map showing National Land Use Plan (*Plan d’Affectation des Terres – PNAT*). (See more detailed discussion of the *PNAT* and its role in multi-sectoral planning in section 3.5)

These *IFN* outputs will help to map and define the Permanent Forest Estate and Non-permanent Forest Estate. So far, there has been no “official” spatial delineation of the two forest estate classes that is harmonized with land use in other sectors such as agriculture.

The *IFN* databases with biophysical (e.g., forest stocks, carbon stocks) and socio-economic indicators can be used to build models of timber and non-timber-based forest products that can help to define economic development and land use priorities. In addition, baseline levels for carbon stocks can be established and an appropriate measurement, reporting and verification (MRV) system for planned REDD+ activities can be set up.

The preparation of a *PNAT* envisioned for the *IFN* (and the associated establishment of a consultative working group) should help improve managing land use conflicts. However, multiple factors have delayed the delivery of *IFN* outputs including the *PNAT*. In July 2015, the lead assignment for the *PNAT* was officially transferred from *CNIAF (MEFDD)* to *MAT-DGGT*, which then took the first steps to set up an inter-ministerial working group to advance the *PNAT*. At the writing of this report, there was no detailed information available yet as to what exactly would be required to complete the *PNAT*.

A second source of spatial data for further land use planning is the *Project Appui à la Gestion Durable des Forêts du Congo (PAGEF)*, which was completed in 2015 by *CNIAF* and partners. The five-year, 13.1 million Euro project sought to improve management of forest concessions in southern Congo. The project increased information for nearly 6 million hectares of forests by completing detailed forest inventories, carrying out ecological and socio-economic studies, mapping forest stands and land use, and identifying priority areas for wildlife and biodiversity conservation.

Additional data and maps needed to strengthen spatial planning in the forest sector

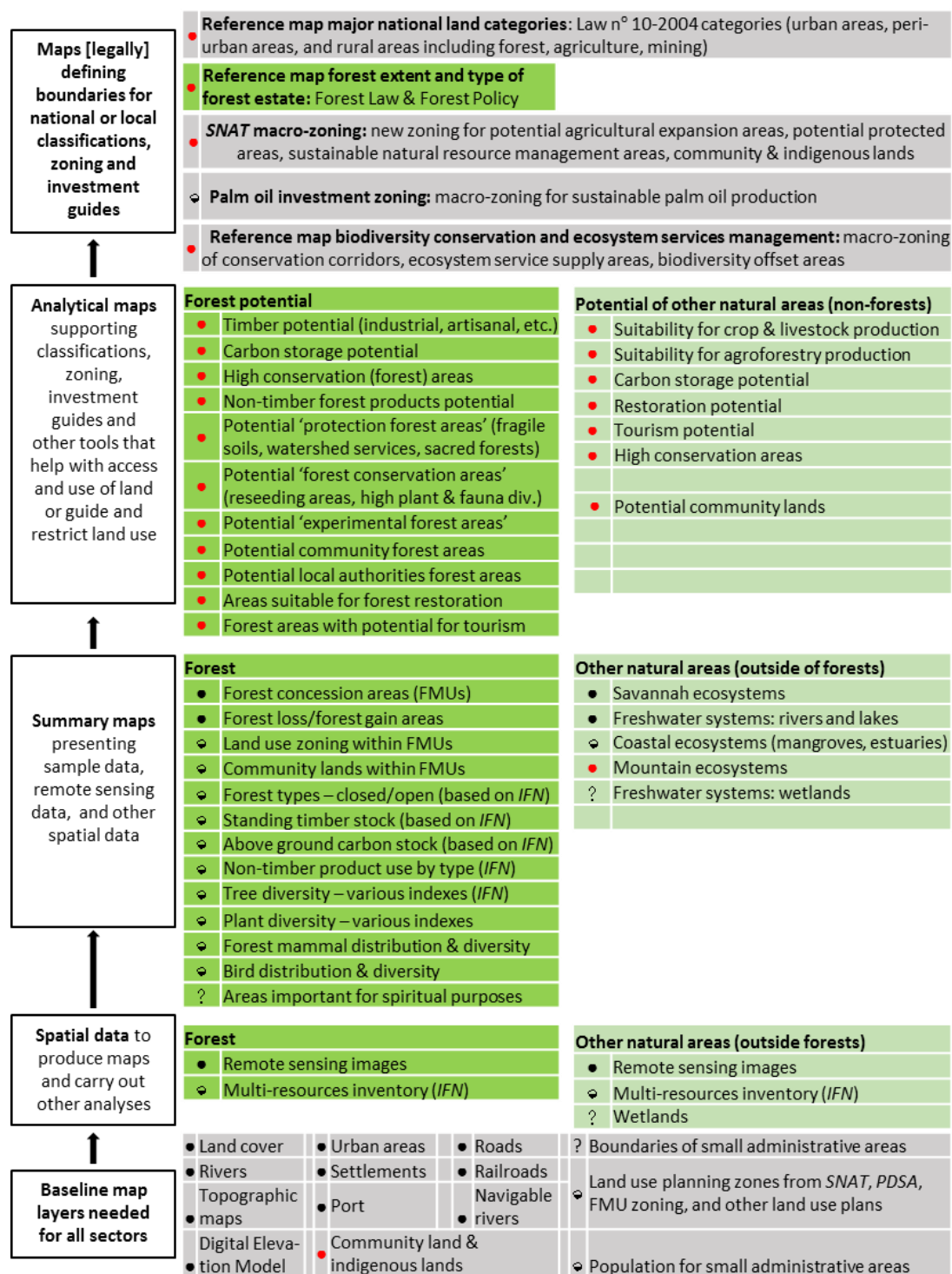
Data and maps required to strengthen spatial planning can be identified with the help of a checklist. The checklist in Figure 22 compares available data and maps against a hierarchy of information products and specific map examples within each information product.

At the bottom of the hierarchy are spatial data and baseline maps. Next are summary maps, which combine sample data, remote sensing imagery, and other spatial data, for example a map in the Congo forest atlas showing forest extent by different forest types. More complex analytical maps, the next level, rely on different spatial data sets and summary maps (often from multiple sectors) to support land allocation and land use zoning decisions. Such analytical maps answer questions important for decision making, such as where the most promising areas for forest restoration might be. At the top of the hierarchy are maps defining the boundaries for a land use classification or zoning system, which then can be endorsed by national law or local ordinance. These maps include, for example, potential zoning maps that may be required as a common reference to implement a law, define macro-zoning for the *SNAT*, guide agricultural investments, or strengthen biodiversity and ecosystem management.

Information products at the top of this hierarchy require high accuracy and greater review and stakeholder input from different government sectors and land users than products at the bottom. Evidence-based land use planning takes advantage of analytical maps that combine information on the ecological and economic potential of forests and other ecosystems, agricultural potential, mining potential, and other land use options.

Figure 22 takes the previous review of spatial data and maps and groups them into three classes: available, possibly available, and not available. The figure also gauges the depth of supply of analytical and land use zoning maps. Unavailable maps represent an important information gap in the forest sector, which a roadmap to strengthen land use planning can fill.

Figure 22 Forests and other natural areas: availability of spatial data and maps



Notes:

- = available; data or map can be obtained from national or international sources (may not be up-to-date or have complete national coverage).
- ◐ = possibly available; spatial data have been or are being compiled as part of ongoing project; map could be produced based on these data.
- = not available; represents an important information gap
- ? = availability unknown

IFN = Inventaire Forestier National FMU = Forest Management Unit

The following major pattern on data and map availability and additional information needs emerges from Figure 22:

- *Spatial data and summary maps are available, but much is expected from the IFN.* It should be possible in principle to spatially extrapolate the sample data from the IFN multi-resources survey and create summary maps (e.g., standing timber stock, forest types). No information was available yet on how many of the proposed maps in Figure 22 the IFN will and can create.
- *In principle, the IFN could be the source of information for non-forest ecosystems and other non-forest related land uses.* The survey asks about land cover and use at each sample point. Since the sample grid covered the whole country (but not all sample points were accessible, for example in swamp forests), the IFN can provide information on other ecosystems (e.g., savannah and grassland ecosystems, agro-ecosystems) and non-forest related land uses. This will require spatial extrapolation techniques and use of other remote sensing products.
- *There is a gap for analytical maps, especially on the potential of forest lands.* The types of analytical maps proposed in the checklist include maps showing areas most suitable for forest restoration and for tourism development. Most importantly, they include maps of forest types and uses that have been mentioned in the existing forest law and draft forest policy. Such analytical maps would strengthen forest management and the REDD+ process.
- *Officially designated reference maps on forests and other natural areas are missing.* The proposed reference and zoning maps supporting forest, biodiversity, and ecosystem services management and macro-zoning in a revised SNAT are not available yet. The maps from a technical study identifying suitable areas for more sustainable palm oil production (CIRAD, 2015) are available, but have not been translated into officially designated zoning and reference maps.

3.2.5 Suggestions for strengthening spatial planning for forest and biodiversity management

The following suggestions are expected to strengthen spatial planning for forest and biodiversity management and contribute to stronger multi-sectoral land use planning:

- *Consolidate spatial data for the forest sector and create new summary maps from the IFN.* It would be useful to combine the land use zoning and planned road infrastructure data from all allocated forest concessions. Such a consolidated national database of FMU zoning could support both national macro-zoning and sub-national planning at the department level.

Carry out a systematic assessment at the end of the IFN project to gauge the scope and feasibility of summary maps discussed above. Take full advantage of the data collected in the IFN project to fill data and information gaps for land use planning. If needed, provide additional resources for modeling and remote sensing products to create maps showing land use patterns and the extent of forests and other ecosystems.

- *Consolidate biodiversity and habitat data and create summary maps.* CNIAF, companies preparing forest management plans, and international conservation organizations, all have compiled spatial data on habitats, wildlife, and legal and illegal use of natural resources. These spatial data can be consolidated to support analytical tools that can help to determine conservation priorities and delineate possible macro-zones for ecosystem services management and biodiversity offsets.

- *Over the long-term, formalize regular land cover and use mapping.* The intent of the IFN project has been to establish a baseline of forest data and prepare maps supporting the PNAT. Over the long-term, a process needs to be in place for a country-wide land cover and use map that supports land use planning. Regular updates and long-term budget support for this map are needed (perhaps as part of building a National Geomatics Centre).
- *Prepare analytical studies on forest potential and spatial priorities of forest use.* Analytical maps suggested in Figure 22 will be needed to support prospective zoning and classifications of the forest estate. The study and associated maps can help to develop a national strategy for all forest lands, support decision-making to allocate logging concessions and other land uses within forest lands, and create new information that can support national biodiversity and conservation planning and determine tourism potential.
- *Prepare analytical study of biodiversity conservation and conservation priorities.* This study would have a country-wide perspective and identify possible conservation corridors and important ecosystem services supply areas, all outside of the existing protected area network. The study would provide the analytical foundation to delineate biodiversity offsets for mining and other land use changes causing habitat and biodiversity loss.
- *Strengthen (official) zoning and classification of the forest estate and create reference map.* Agreed upon zoning and official classification of the forest estate create greater certainty for land managers within government (e.g., other sectors) and outside government (e.g., private companies interested in investing in new type of land uses in the forest-savannah transition zone; local communities seeking to establish community forests or other natural-resource-based enterprises).

In other tropical forest countries, planners of different agencies are often facing the challenge of relying on multiple forest maps, resulting in misaligned maps of land use priorities and land use concessions. This is the reason why Indonesia's president launched the "One Map" project, a comprehensive effort to establish a standardized base map, create new thematic maps, build a national geo-portal, and other efforts to strengthen its geo-spatial data infrastructure. Investing upfront in a reference map of the country's forest estate and current forest extent can avoid the costly mistake of multiple maps.

The spatial delineation of permanent forest and non-permanent forest estate and creating a reference map are a technical and political process. It will require stakeholder engagement.

- *Propose new macro-zoning for biodiversity conservation, ecosystem services management, and biodiversity offsets areas and create reference map.* Such macro-zoning would provide greater certainty for managing biodiversity and ecosystem services in the country and create an opportunity to introduce new types of zoning in the PNAT and the SNAT, for example priority areas for sustainable natural resources management, potential future conservation areas, and potential future areas for biodiversity offsets. Developing a proposal for new macro-zoning and creating a reference map will require stakeholder validation.

3.3 Agriculture sector

This section discusses first how livelihoods and economic development in the agriculture sector are linked to forests, REDD+, and land use planning. Next are an overview of the leading agriculture institutions with planning and mapping experience, a summary of spatial planning efforts in the sector, and an assessment of data and map availability to determine important planning and information needs. The agriculture section concludes with suggestions to fill some of these needs.

3.3.1 Agriculture: the livelihoods, forests, REDD+, and land use planning linkages

Agriculture and forest landscapes in the Republic of Congo are strongly linked through complex dynamics involving subsistence livelihoods, household energy needs, industrial agriculture, and development of plantation and tree crops. Each of these activities has effects on livelihoods and the wider economy, as well as effects on forest loss and degradation.

Agriculture and livelihoods

In the Republic of Congo, the agricultural sector employs about 40 percent of the population and contributes 6.8 percent to GDP and 1-2 percent to exports (2012). The sector is based on smallholder agriculture (80 percent of cultivated land and 90 percent of output), as large commercial farms previously owned by the state have disappeared. However, smallholder productivity is low compared to international and even Sub-Saharan African standards.

More than a quarter of the population lives in households with the head working in agriculture, which is the dominant activity in most villages. In general, households practice extensive agriculture with little use of purchased inputs and are oriented toward subsistence needs. Despite good agricultural potential with an estimated 10 million hectares of arable land, less than 10 percent is farmed. The most common crops are cassava and some maize, though households also rely on forest foods. In the two northern, most forested, departments of the country, household cultivation areas are very limited (less than 0.5 hectare per family), which limits earnings.

The agriculture sector is unable to cover the country's food needs making it increasingly dependent on imports. Numerous farmer associations exist but they are only weakly organized and do not provide processing and marketing services. Agricultural productivity increases and improved rural living conditions are needed. Currently, outmigration from rural areas to urban centers contributes to the further decline of the sector and continued import dependence.

Before the 1980s, agricultural production was able to cover 75 percent of the population's food needs. During the period of 1990-2010, the state disengaged from the production and marketing functions, the work force declined because of rural-urban migration, and private sector investments were insufficient to replace public investments in the sector. As a consequence, agricultural production declined dramatically. The main challenges for the sector are:

- weak asset base of farm households and rural producers and low degree of mechanization;
- inadequate market infrastructure and services;
- inadequate rural road infrastructure;
- ineffective sector policies and insufficient resources allocation to the agricultural sector (the budget for agriculture is less than 1 percent of the total government budget);
- very weak supporting institutions for agriculture (research and extension); and
- weak implementation capacity of public institutions.

The Republic of Congo is working with the World Bank and other partners on projects to improve the livelihoods of communities and provide alternative sources of income through investing in tree crops, promoting outgrower schemes, and introducing conservation agriculture (cassava, maize) to increase agricultural productivity and crop diversification in degraded areas.

Agriculture, forests, REDD+, and land use planning

The Republic of Congo's National Development Plan (*PND*) includes ambitious targets for promoting agricultural commodities and plantation crops – coffee, cocoa, rubber and palm oil – that will need space to expand. At the same time, the Government is using the REDD+ process to assist in identifying the right trade-offs between development and forest conservation.

The REDD+ process is seen as a means to foster cross sectoral discussions toward more balanced land use planning. The REDD+ process aims to address forest loss or degradation by:

- engaging forest concessionaires in reduced impact logging and forest protection (set aside areas);
- avoiding the conversion of forests with high conservation value in oil palm plantations (through contractual agreements and by promoting certification under the Roundtable for Sustainable Palm Oil standard); and
- encouraging mining concessions to practice reduced impact planning of mine sites and supporting infrastructure.

The Government has initiated efforts to manage land resources more efficiently and reduce negative impacts from unplanned agricultural intensification and expansion. These include:

- Capacity building and value chain development for agroforestry products through public-private partnership agreements, for example to promote a more sustainable cocoa sector;
- Discussions on a commitment to orient the industrial oil palm sector towards savannah areas;
- Discussions on promoting land use planning at local and national levels within the context of implementing the REDD+ process and the new orientation law on land use planning.

Moreover, the agriculture sector has developed a long-term plan, the *Plan de Développement du Secteur Agricole (PDSA)*, which has proposed macro-zones for future expansion areas applying criteria to avoid forest loss. The *PDSA* also envisioned a refinement of its spatial plan and develop micro-zoning of expansion areas by 2025 that could be used for land allocations. This zoning can be aligned with implementing the new orientation law for land use planning.

Industrial agriculture expansion and small-scale agriculture intensification can still be planned in a sustainable way taking multiple sectors into account. If spatial planning for the agriculture sector is further strengthened and becomes well embedded in multi-sectoral land use planning, and the plans are implemented, they can avoid or reduce the pressures on forest resources.

3.3.2 Institutional setup for spatial planning in the agriculture sector

In the agriculture sector, the technical and analytical capacity to support land use planning resides in the technical directorates of the Ministry of Agriculture and Livestock. The Ministry also has a planning unit that deals with budget planning and statistical services, the *Directions des Etudes et de la Planification – DEP*.

The technical directorates in the Ministry of Agriculture and Livestock have received training on database management under the *PDSA* project. Its completion report indicates two new computerized databases within these directorates. At the writing of this report, no detailed information was available on the current status of these databases and how they could contribute best to spatial planning.

In regards to mapping and spatial analysis, the collected information for this report is patchy. For the 2012 *PDSA*, the Ministry of Agriculture and Livestock subcontracted the spatial database development and map preparation. A 2014 spatial data inventory prepared in support of Congo's process to establish a National Geomatics Center (*Centre National Géomatique*) and a National Cadaster (E.O International, 2014) mentioned that the Ministry used base maps from the *Centre de la Recherche Géographique et de la Production Cartographique (CERGECE)*. The inventory also highlighted the work of the *Centre National des Etudes des Sols (CNES)*, which is associated with the Ministry. *CNES* had a 15-person team (mostly soil specialists) and has produced maps of bio-climates and of soil provinces (*cartes des bioclimats et des provinces pédologiques*). It was unclear what technologies were used for cartographic production (E.O International, 2014).

Based on this partial information, it appears that cartographic and GIS skills in the agriculture sector are more limited than in the forest sector. It is most likely that the agriculture sector would also benefit from greater experience related to applying analytical tools to determine priorities for the agriculture sector and apply these skills in multi-sectoral land use planning.

3.3.3 Existence and scope of current spatial plans in the agriculture sector

This review of spatial planning efforts in the agriculture sector is asking the same questions as for the forest sector:

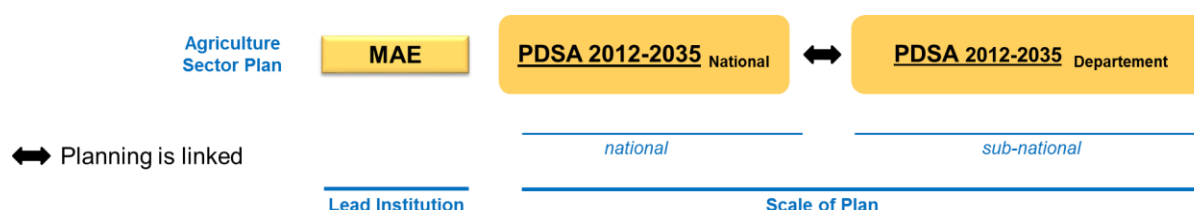
- Is there long-term (more than ten years) sectoral planning at national level that provides a vision for the sector? If yes, to what degree does that planning process establish spatial priorities (e.g., macro-zones on maps, quantitative area targets)?
- Is there similar long-term sectoral planning at subnational level and to what degree does that planning process establish spatial priorities?
- Does the National Development Plan 2012-2016 (*PND 2012-2016*), a macro-economic, medium term plan, have any spatial prioritization for the forest sector and how is this linked to long-term spatial plans?

Existing long-term plans with spatial prioritization: Plan de Développement du Secteur Agricole (PDSA)

The agricultural sector has published a long-term plan with spatial prioritization at national and sub-national level. The *Plan de Développement du Secteur Agricole (PDSA)* was completed in 2012 under the leadership of the Ministry of Agriculture and has a 2012-2035-time horizon. The project cost US\$ 1.2 million and had a duration of 45 months.

For each of Congo's twelve departments, the *PDSA* delineated large blocks of land that could be assigned for future agricultural production. The maps show five different types of macro-zones including agriculture, livestock, reforestation, agriculture/livestock, and agriculture/reforestation. In addition, the *PDSA* delineates the potential expansion of village lands for subsistence agriculture and other local land use. The plan assumes a 5-kilometer buffer surrounding each village (about 8,000 hectares per village). All the *PDSA* maps were presented in stakeholder consultation workshops at national and department level. Figure 23 summarizes the current status of existing long-term plans with spatial prioritization in the agriculture sector.

Figure 23 Existing long-term plans with spatial prioritization in the agriculture sector



Notes: MAE = Ministère de l'Agriculture et de l'Elevage PDSA = Plan de Développement du Secteur Agricole (PDSA)

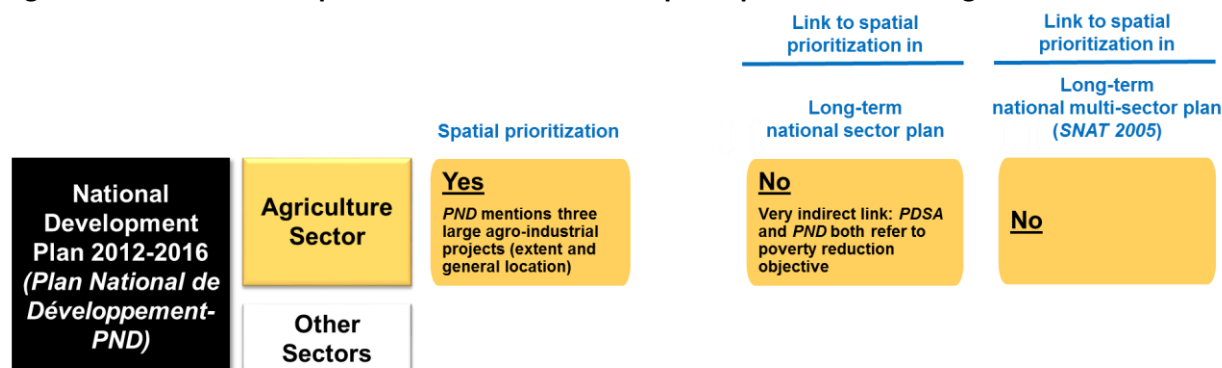
National Development Plan 2012-2016 and spatial prioritization for agriculture

Interviews with agriculture sector experts pointed toward the National Development Plan (*PND*) as the most referred to medium-term planning document. The *PND* is a multi-sector, economic development plan. The agriculture, forest, and mining sectors are important priorities for economic diversification, as are the tourism, hydro-carbon, and construction sectors. The *PND*'s most recent version covered 2012-2016, and the process to develop the next five-year plan is just being launched.

The *PND* chapter on agriculture refers to more than 10 million hectares of potential arable land (of which 90 percent are available for farming). An important objective of the *PND*'s agriculture strategy is regulating the access and development of land by developing a soil map, adopting an agricultural land policy, and strengthening cadaster activities in rural areas. The chapter also provides information on the extent and the general location of three large agro-industrial projects (470,000 hectares for palm oil, 80,000 ha for livestock/cash/fruit crops; 19,500 hectares for cassava and maize). For other *PND* priorities such as local agriculture production, food production, and agro-pastoral production, no information is provided on their extent and location.

In principle, the *PND* should be congruent with long-term spatial development plans in the agriculture sector and the country's multi-sectoral spatial development framework such as the *SNAT*. However, as Figure 24 indicates, such linkages between plans were not expressed directly in the *PND 2012-2016*. It does not reference the *SNAT 2005* on spatial priorities related specifically to agriculture (although the *PND* mentions four important special economic zones – Oyo-Ollombo, Ouessou, Pointe-Noire, and Brazzaville – which overlap with some macro-zones in the *SNAT 2005*). Likewise, the *PND* only has a very indirect link to the agriculture sector's long-term plan, the *PDSA*.

Figure 24 National Development Plan 2012-2016 and spatial prioritization for agriculture



Note: *SNAT* = Schéma National d'Aménagement du Territoire, a 20-year land use planning document published in 2005.

3.3.4 Data and analysis used in support of spatial planning in the agriculture sector

Up-to-date maps and associated spatial data are essential for good land use planning. To determine the need for such data, existing planning efforts were analyzed and experts at government agencies were interviewed. For the sectoral analysis, the approach to collect information has been organized in the following categories:

- *Baseline layers available and used;*
- *Documented maps and data layers used in sector-specific planning documents or land allocation decisions;*
- *Ongoing efforts to build new spatial data sets, for example supported by international development cooperation projects or national budget allocation.\;*
- *New data layers and maps needed as prioritized in selected strategies (e.g., PND), suggested in interviews with key experts in the ministry, or based on a gap analysis comparing the Republic of Congo's available data with a list of spatial data used in land use planning in other countries.*

Baseline layers used in sectoral planning and land allocation efforts for the agriculture sector

The *PDSA* relied on baseline data (e.g., forest extent, settlements, and transport infrastructure) from the Congo Forest Atlas (see detailed list in Table 1, section 3.1.3). During the preparation of this report, no information was readily available on which maps and baselines layers have been used for the most recent allocations of agricultural land.

Data used in spatial planning for the agriculture sector

The *PDSA* delineated five different types of macro-zones for each department, and boundary files for the following macro-zones are available: agriculture, livestock, reforestation, agriculture / livestock, and agriculture / reforestation. The maps also include potential expansion of village lands for subsistence agriculture, a 5-kilometer buffer surrounding each village in the country.

In addition, the *PDSA* estimated the total length of constructing new agriculture roads and rehabilitating existing rural roads for each department. The published maps and planning documents did not indicate the specific location of these roads.

The *PDSA* also projected demand for 15 food commodities (crops, fish, and livestock) from 2010 to 2035 making certain assumptions on per capita demand and the level of expected imports and domestic production. The projections for most commodities were in quantities (except for sugar cane, oil palm, and maize, which provided both area and quantities). The *PDSA* document did not indicate whether it crosschecked the land requirements for these projections with the land assigned for agriculture production in the macro-zoning maps.

Ongoing national efforts to build spatial data sets for the agriculture sector

Readily available information about efforts to update and expand agricultural data was sparse during preparation of this report. FAO, through its 2013-2016 Country Programming Framework, has provided US\$ 7.7 million to update the country's national agricultural, livestock and fisheries statistics (FAO, 2015), because no general agricultural and livestock census had been carried out for nearly three decades. Additional inquiries are needed to determine the progress made on new soil information and a rural cadaster, as suggested by the *PND* and *PDSA*, and on micro-zoning maps for agricultural expansion areas, as envisioned under the *PDSA*.

Additional map data needed to strengthen spatial planning in the agriculture sector

As in the forest section, a checklist of information products and specific map examples can help identify data and map needs to strengthen spatial planning. Figure 25 groups the previous review of spatial data and maps into three classes: available, possibly available, and not available. Unavailable data and maps represent an important information gap in the agriculture sector, which a roadmap to strengthen land use planning can fill.

Figure 25 shows the following pattern on data and map availability and on information needs:

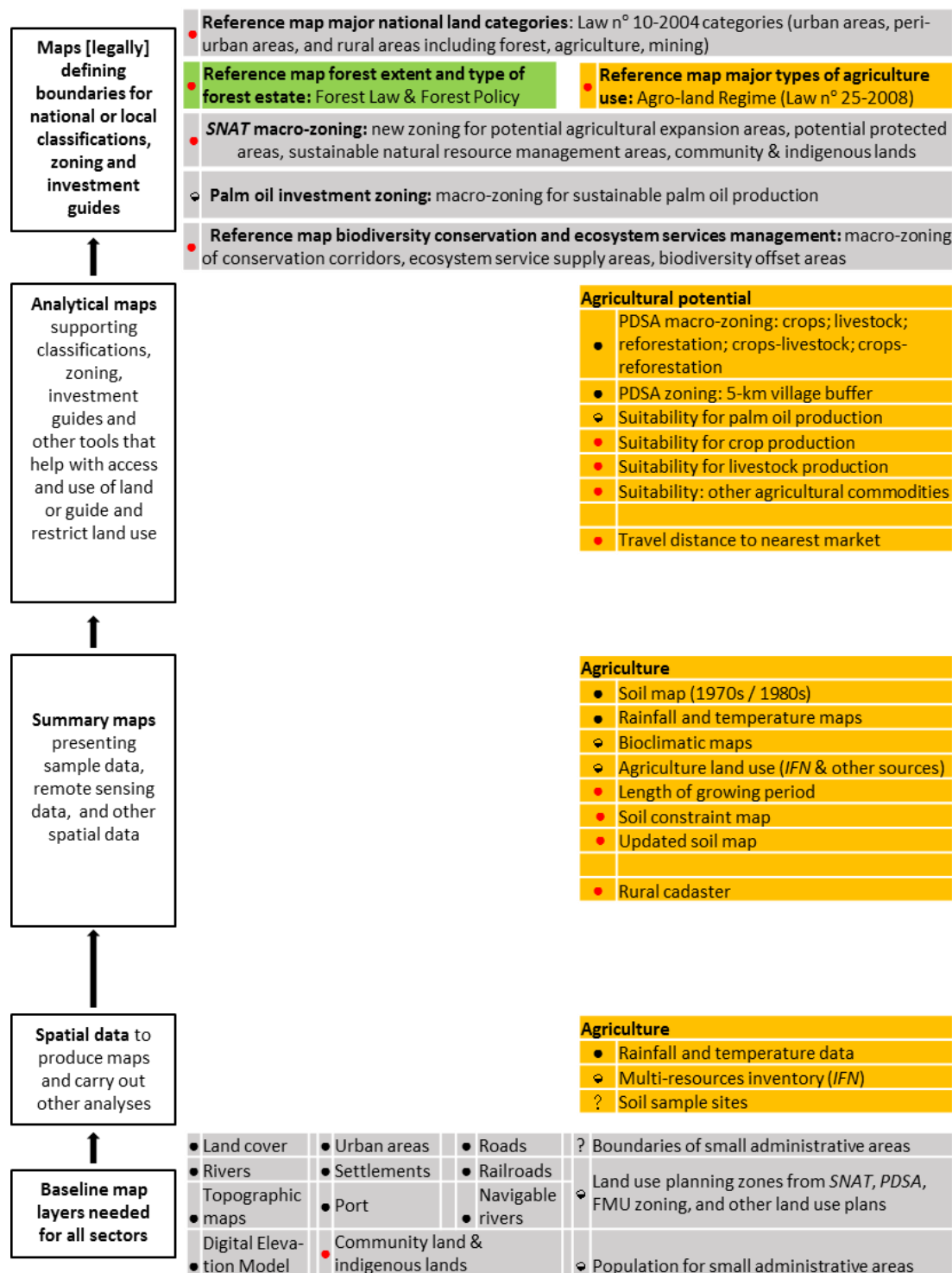
- *Existing and ongoing mapping efforts can fill some gaps on agricultural land use information.* The land use mapping for forest concessions in southern Congo (see section 3.24, *PAGEF*) and for forest concessions with completed management plans in the rest of the country hold useful information on local land use. Likewise, spatial extrapolation from the multi-resources inventory of the *IFN* is a possible source of agriculture land use information.
- *Up-to-date, detailed soil maps for micro-zoning are unavailable, and cadaster activities in rural areas would increase precision of planning, especially at local level.* The *SNAT 2005* relied on a 1981 soil map, and other analytical studies have used various soil maps from the 1970s and 1980s (*ORSTOM*) at 1:500,000 and 1:200,000 scale. An updated soil map can help delineate high potential areas for agricultural production and identify soil constraints that need to be overcome to boost yields. Both the *PDSA* and the *PND 2012-2016* refer to a needed soil map.

The *PND 2012-2016* highlighted investing in cadaster activities in rural areas as a priority. Building a cadaster will call for considerable resources and time, because of two challenges: improving the geodetic control network and topographic base maps, so that they conform with international standards and GPS use, requires substantial investments over the short and medium-term (Ortega, 2014); and communal and individual land rights need to be documented and land tenure laws strengthened.

- *There is a gap of analytical maps to determine agricultural potential of a geographic area.* The checklist proposes maps of agricultural potential for selected crops (which would include land unsuitable for agricultural development). Such maps can combine a soil map with other biophysical data (e.g., rainfall, elevation, slope, soil drainage) and economic data (e.g., distance to markets and demand centers, transport costs).

Maps of agricultural potential can cover a group of agricultural commodities or select high-value crops such as oil palm. For the latter, the analysis can be further advanced by combining biophysical suitability maps with maps of environmental and social criteria (for example those put forward by the Roundtable on Sustainable Palm Oil). Such an approach will reduce the total suitable area from the theoretically possible growing area, which is most of the country. *CIRAD* (2015) has demonstrated an approach that outlined areas that would avoid environmental harm (e.g., steep slopes, riparian areas, swamp forests), as well as areas that would match certain economic criteria, such as areas suitable for industrial production and for small-scale farm enterprises.

Figure 25 Agriculture: availability of spatial data and maps



Notes:

- = available; data or map can be obtained from national or international sources (may not be up-to-date or have complete national coverage).
- ◐ = possibly available; spatial data have been or are being compiled as part of ongoing project; map could be produced based on these data.
- = not available; represents an important information gap
- ? = availability unknown

IFN = Inventaire Forestier National PDSA = Plan de Développement du Secteur Agricole (PDSA)

- *Maps that guide agriculture use and allocation of land for sustainable industrial agriculture are not available.* The maps from a technical study identifying suitable areas for more sustainable palm oil production (CIRAD, 2015) have been presented but have not been translated into country-wide maps and designated zoning. A reference map for major types of agriculture use (e.g., intensive cropping, subsistence farming, mixed production systems such as agroforestry and silvipastoral production) is unavailable. Such a map could guide the implementation of the agro-land regime law (law n° 25-2008). New macro-zoning in a revised *SNAT* that intends to move beyond the crop and livestock production classes of the *SNAT 2005* will require new information to define future agricultural expansion areas.

3.3.5 Suggestions for strengthening spatial planning in the agriculture sector

The following suggestions can strengthen spatial planning in the agriculture sector and contribute to stronger multi-sectoral land use planning:

- *Consolidate existing land use data.* Existing data on agricultural land use and community lands (e.g., from the *IFN*, land use zoning in forest concessions) can be compiled and combined with other remote sensing information to create new baseline information of agricultural land use and community lands.
- *Explore options to delineate community lands.* Community lands for agriculture, forestry, and other natural resource use are essential for local livelihoods and a foundation for economic development. The importance of such lands in the country's economic and spatial development strategy can be acknowledged in the macro-zoning of a *PNAT* and the *SNAT*. This will require an analytical study, maps, and engagement process to define community lands. The study could focus on crop, livestock, and agroforestry-related uses or it could be wider in scope and include community lands for indigenous peoples in forest and savannah ecosystems.
- *Fill important soil information gaps.* Future micro-zoning for agricultural land and agricultural support to strengthen soil and nutrient management requires updated soil information. (At the writing of this document, the information about ongoing spatial data investments in the agriculture sector was incomplete—it could be possible that such an update is already underway.) Two different products are conceivable:
 - One map, at coarser resolution and requiring less time to prepare, could link with Africa-wide efforts to update soil maps using a combination of remote sensing imagery and sampling sites. Such a map can improve country-wide agricultural priority setting and zoning.
 - A second, more detailed soil map would support micro-zoning and planning at more local scales, but require more time to prepare.
- *Prepare analytical studies on agriculture potential.* A soil map can be combined with other data layers to produce a more detailed map of agricultural potential, which could focus on specific crops or production systems. This information can then be applied for new macro-zoning in the *PNAT* and the *SNAT*, for example to delineate future agricultural expansion areas.
- *Consolidate existing information to delineate the most suitable areas for sustainable palm oil production and prepare an investment guide.* The palm oil suitability map would build on existing studies such as CIRAD's and can incorporate lessons learned from other countries (e.g., mapping efforts to grow oil palm on degraded lands in Indonesia, maps of potential palm oil areas for

Gabon's *Plan d'Affectation des Terres*). The investment guide for palm oil production would include maps with zones highlighting the suitability of land for sustainable oil palm production, both for large-scale industrial and small-scale farm enterprises.

- *Create reference maps to prioritize agriculture use and guide allocation of land for sustainable industrial agriculture.* Having reference maps that identify the most promising areas for certain agricultural production systems or guide investments towards lands with fewer negative environmental impacts would facilitate spatial planning across sectors and help to lower transaction costs to allocate land. The following types of zoning maps can help to create greater certainty about the status of the land and the associated rules of use:
 - Clearly defined forest and agricultural production zones. To implement the *PDSA*, the plan envisions more harmonized forest and agriculture plans, especially in savannah systems, which are suitable for both agricultural purposes and forest restoration efforts. New maps and data layers will need to be created so that zoning for agricultural and forest purposes is clearly delineated and available for land-use allocations, both for industrial agriculture concessions and for village land use. The *PDSA* envisioned completion of agricultural macro-zoning by 2015 and of micro-zoning by 2025.
 - National maps delineating major land use and agriculture use zones. Such maps can help to implement key legislation related to land use planning. For example, Law n° 25-2008 (agro-land regime) classifies agricultural land into three categories: 1st category land (subsistence farming; fallow land, grazing land and paths); 2nd category land (intended for intensive farming of food crops, farming, or livestock cooperatives; land for commercial or industrial use of perennial crop plantations); 3rd category land (land reserved specifically for forestry or mining). Similarly, Law n° 10-2004 (outlining general principles to be applied to the state and land regimes) indicates that land use planning must take into account allocation of land into four main areas: urban areas (allocated for housing, commercial and industrial activities); peri-urban areas (allocated for various crops) and rural areas (with three categories agriculture, forests/forestry, or mining).

3.4 Mining sector

This section provides first an overview of the relationship between, mining, land use changes, and spatial planning. This is followed by a summary of the key mining institutions with planning and mapping experience, a summary of spatial planning efforts in the sector, and an assessment of data and map availability to determine important planning and information needs. Suggestions to fill some of these needs conclude this mining section.

3.4.1 Mining, land use change, and implications for spatial planning

Mining operations can have a range of effects on forests and other ecosystems, including direct, indirect, induced, and cumulative impacts (see Box 5). These effects occur at each stage of the operations: exploration, exploitation, and closure. Even where a mine site is relatively compact, associated infrastructure developments – roads, railways, and dams for hydroelectric power – represent the greater threat, through physical incursion into forests and disruption of ecosystems. In particular, roads can open access to formerly remote forest areas, allowing further incursion for agriculture, hunting, artisanal and small-scale mining and other activities that contribute to forest loss and degradation. Large-scale mines, in particular of bulk-minerals like iron ore, also have considerable energy and water requirements, which may result in the construction of dams, pipelines, and power lines. Reclamation after mine closure is an opportunity to re-establish productive forests on otherwise unused and non-productive mined lands, to generate economic value for landowners and communities, and to enhance environmental quality by accelerating restoration of ecosystem services. During operations, mining companies can positively impact forest by protecting certain areas as biodiversity offsets. Biodiversity offsets are “measurable conservation outcomes of actions designed to compensate for significant residual adverse biodiversity impacts arising from project development [after appropriate prevention and mitigation measures have been taken](http://bbop.forest-trends.org/pages/biodiversity_offsets). The goal of biodiversity offsets is: “to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people’s use and cultural values associated with biodiversity”⁶. Several mining companies active in the ROC have developed potential offsets projects; planning to protect significant forested areas.

The environmental, social, and economic impacts of mining are typically assessed in impact assessments for new proposed mining projects. But existing and future mining projects and their potential offsets can also be included in regular land use planning processes (euromines, 2011). In fact, effective land use planning can create greater certainty for new mining investments and speed up environmental impact assessments, if existing land use plans have already identified potential opportunities and threats associated with specific types of mineral extractions. For example, an assessment of evidence and lessons learned from Latin America found that Colombia with established land use planning systems witnessed greater growth in foreign direct investments and speedier impact assessments for extractive industries than other Latin American countries (GRADE and Practical Action Consulting, no year).

To include existing mining activities in a land use planning process is relatively straightforward and part of identifying all current land users and involving mining interests in a comprehensive stakeholder engagement process. However, this becomes more challenging when, as is the case in the ROC, limited exploration has taken place, and the precise location or even existence of valuable minerals is unknown and their value has not been determined yet. The latter information is especially important because it

⁶ http://bbop.forest-trends.org/pages/biodiversity_offsets (May 2016)

determines the break-even point and economic viability of a new mining project and allows to compare expected revenues from new mines with other land use options.

A map showing areas where certain minerals are present in sufficient quantities to show potential for exploration and possible mineral extraction in the future is an important piece of information to anticipate future land demand and associated transport and energy infrastructure needs. Creating such a map requires considerable investments and expertise in geological data collection, modelling, and map production. Generating and accessing such minerals information is often further complicated by the proprietary nature of minerals data. Including future mining projects into land use planning therefore requires strengthening the national geological service, building a minerals information system, and providing access to minerals data and summary maps to land use planners. And even then, one needs to remember that the presence of prospective geo-data does not necessarily mean that there will be mines opening in an area. It only means that there is a large potential for exploration activities, of which only very few will result in actual mines.

Geological data indicating the presence of mineral resources and actual mining operations can be included in land use plans at two scales:

- *Local land use planning.* This planning mostly focuses on direct mining impacts and covers site planning with the help of detailed topographic maps and land use information. Such planning looks carefully at air, water and noise pollution, visual amenities, biodiversity conservation, settlements, areas of important cultural value, and other environmental and social impacts. The plans generally determine the best siting for required mine buildings, processing facilities, waste storage, management of overburden and mine tailings, water and energy supply facilities, and transport infrastructure.
- *Landscape and regional-scale land use planning.* Planning at this scale can try to capture indirect impacts related to infrastructure development (e.g., roads, railways, ports, dams), induced impacts (e.g., demographic shifts, agriculture expansion, bushmeat hunting, logging), and cumulative impacts. It can also consider possible offset sites. An integrated landscape-level planning approach is needed to consider the region-wide and long-term consequences of mining development on people, forests, and other ecosystems.

Such regional-scale plans can take different forms. For example, it could be in the form of a strategic environmental assessment, as was done for a uranium mining region in Namibia (Ministry of Mines and Energy, Geological Survey of Namibia, 2011). Or it could be a strategic regional land use plan (see Box 4), as was done for the Upper Hunter region in the state of New South Wales in Australia, a region with competing land uses for coal mining, coal seam gas extraction, agricultural production, forest lands, and national parks (State of New South Wales, 2012).

Since the expansion of the mining industry and value-added processing is an essential pillar in the Republic of Congo's vision of the future, it makes sense to create a supportive policy framework for long-term sustainability. This framework would encourage transparent and evidence-based planning and decision making in the mining sector, make sustainable mining and associated good industry practices a top priority, and link to the country's effort to advance multi-sectoral land use planning.

Box 4 The strategic regional land use plan in New South Wales

The strategic regional land use plan in New South Wales aimed a continuation of the mining industry and sought to safeguard important areas for agriculture production and other land uses. The plan invested in compiling spatial data and maps to carry out a strategic biodiversity assessment, identify strategically important agricultural land (e.g., critical agriculture industry clusters, land with unique natural characteristics relevant for long-term sustainability of agriculture), and determine important landforms representing Aboriginal heritage conservation areas. To prepare the land use plan and a subsequent action plan for implementation, a cumulative impact methodology for mining and coal seam gas applications was developed (Franks et al. 2010). Likewise, the plan looked at the regional and cumulative impacts of future mining projects on infrastructure and sought to protect biodiversity with a regional perspective (which included developing a national database to delineate areas suitable for biodiversity offsets). The plan also set up a panel of independent experts and a rigorous assessment process for future mining projects requiring cost-benefit analysis and other assessment tools.

For the latter point, this will require a more comprehensive inclusion of possible future mining projects and associated infrastructure and offsets sites in the *PNAT* and the *SNAT*. Such an approach would greatly increase transparency about future mining areas, let local stakeholders articulate their interests, and help to delineate nationally important areas for biodiversity and other land uses (which would represent either no-go areas for mining or for which specific extraction and processing approaches would be required).

3.4.2 Institutional setup for spatial planning in the mining sector

In the mining sector, different directorates in the Ministry of Mines and Geology (*Ministère des Mines et de la Géologie - MMG*) and the Geological and Mining Research Center (*Centre de Recherches Géologiques et Minières - CRGM*) can play a role as institutional focal points to support spatial planning in the mining sector and land use planning more broadly.

The Directorate for Studies and Planning (*Direction des Etudes et de la Planification - DEP*), is responsible for developing strategies, conducting economic and financial studies for mining projects, and compiling and analyzing statistics for the sector. The *DEP* includes three services (*Service des Etudes, Service Statistique, Service de la Planification*) that cover studies, statistical services, and planning, respectively (Cole Baker Associates, 2013). An assessment of training needs (Cole Baker Associates, 2013) did not identify any mapping and land use planning expertise within *DEP*. The assessment recommended filling staffing gaps (e.g., engineers, economists, lawyers) to enhance project evaluation and management capacity. It also encouraged participation in workshops on legislation, taxes, mining economics, mine planning, environmental and social impacts, and artisanal mining.

The General Directorate of Geology (*Direction Générale de la Géologie - DGG*) includes four directorates with broad mandates including geological research, mapping and prospecting, and exploration of geo-materials. A number of these responsibilities have been transferred to the *CRGM* (Cole Baker Associates, 2013).

The Directorate for Geological Research (*Direction de la Recherche Géologique - DRG*) under the *DGG*, takes care of mining permits. The *DRG* verifies the boundaries of mining concessions and manages mining concession information. A 2014 diagnostic of mining concession permits found a functioning system in place relying on basic mapping software (MapInfo). The system could not provide important contextual information to visualize the polygon boundaries of the permit area such as current satellite imagery of land cover or maps showing land use zones. The diagnostic recommended to strengthen *DRG's* capacity including a stronger GIS platform (e.g., ArcGIS), provision of contextual map information in the concession GIS, and regular Internet access (Ortega, 2014). The diagnostic also identified fundamental challenges

with the availability of topographic maps and the geodetic network making the use of GPS and existing topographic maps impractical—the difference in accuracy between these two sources can be hundreds of meters, which is too imprecise for a mining cadaster (but probably ok for regional land use planning).

A 2013 assessment of training needs for *DRG* (before some of *MMG*'s functions on exploration services, mapping, and laboratory service were transferred to *CRGM*) mentioned the availability of two large plotters to print maps. The assessment highlighted training needs in ArcGIS and MapInfo (Cole Baker Associates, 2013).

The *CGRM* is an independent technical center (but associated with the *MMG*) to advance geological and mining research and information. It was legally established in 2012 to increase the country's competence on geological mapping and mineral prospecting with specific focus on geological studies, mine engineering information, environmental and natural hazards assessments, and other scientific and technical Information related to mining. In 2014, the *CRGM* begun to work on inventorying and digitizing existing map holdings in support of updating the country's mineral and geologic maps. No detailed assessment of *CGRM*'s mapping and planning capacity has been prepared as part of this report.

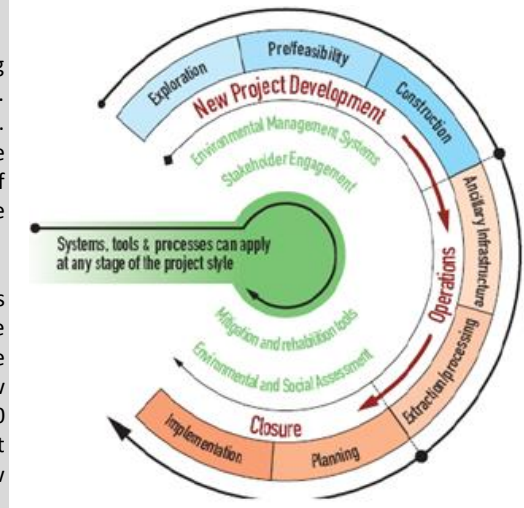
Box 5 Direct, indirect, induced, and cumulative impacts of mining

Mining operations can have a range of effects on forests and other ecosystems, including direct, indirect, induced and cumulative impacts. These effects occur at each stage of the operations: exploration, exploitation, and closure.

Direct impacts at different stages of large-scale mining operations

Three major phases can be distinguished in the lifetime of a mining project: (i) New Project Development, (ii) Operations and (iii) Closure. Adverse impacts on the environment can occur at any of these phases. While much of the attention has thus far been given to the second phase “Operations”, it is clear that activities under the phase (i) and lack of actions under the phase (iii) can also be very detrimental to the environmental equilibrium and the forest ecosystems.

Exploration activities: Exploration, a high-risk, high-reward activity, has the goal of discovery of economically viable mineral deposits; i.e. those that can be mined at a profit. It takes time and great effort, often in remote areas (to humans) and is seldom successful. The chances of bringing a raw prospect into production have been estimated at 1 in 5,000-10,000 (Mining Journal, 2012). Furthermore, following a promising discovery it can take up to 10 years to get to the production stage of starting a new mine.



Exploration, or the search for viable ore bodies, can be broken down into *greenfields* and *brownfields* exploration. *Greenfields*, as its name implies looks to find ore bodies in new areas, or areas that have historically shown good results. *Brownfields* on the other hand typically refers to exploration activities on the existing ore body or mine complex or relatively close to it such that it would be mined as part of the established infrastructure of the mine. The explorations process can broadly be broken down into the following stages with the social and environmental impacts generally becoming more notable as the project continues to progress:

- Exploration initially involves aerial surveys and the use of satellite imagery and remote sensing to determine the potential for mineral deposits. If these initial activities prove promising, on-the-ground surveying and core testing are conducted to determine the presence and economic viability of the deposit. Although early exploration is relatively benign with respect to environmental impacts, later stages in the exploration process can cause significant disruption to terrestrial and aquatic ecosystems if exploration activities are executed without proper environmental safeguards.
- The late exploration phase may include the use of drill rigs and construction of underground tunnels for detailed drilling and mapping. This stage can notably cause habitat fragmentation resulting from land clearing for roads, trenches, and other access routes used to transport heavy machinery. These access routes often serve as conduits for human immigration and new settlement and can lead to very significant disruption affecting large areas: agriculture, hunting/poaching over large distances and can have a permanent character (new settlements in previously uninhabited forest that become permanent).

Mine site construction: Construction typically includes the following activities (Government of Canada, 2006): site preparation; clearing and initial preparation for mining (i.e., overburden removal); construction of accommodations; construction of process and site facilities (i.e., mills, offices); and building roads and airstrips (installation of power lines and railway).

Ore extraction: At the site itself, the degree of disturbance is a function of both the ore grade, and the type of mine operation (e.g. strip mine vs. underground). Typically, open-pit and strip mining operations create the greatest level of land disturbance, especially in areas where the ores are deposited slightly deeper. Accordingly, from an intensity basis, diamonds and gold have overburden and waste rock values that are orders of magnitude larger than other commodities, while base metals (copper, zinc, lead, nickel) and aluminum account for the largest footprint on an absolute basis.

Mine site construction and ore extraction requires vegetation and topsoil removal. Land-clearing for site construction and mineral excavation carries with it the potential for significant soil erosion and sedimentation. If topsoil is not set aside and conserved for the reclamation phase, restoration of the forest ecosystem will be difficult, if not impossible to achieve. In addition, soils that are not conserved can be washed away into nearby rivers and streams, causing sedimentation that may destroy aquatic habitat and result in a decline in fish species.

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Primary processing: Primary processing generally occurs at the mine site and consists of chemical, electric, or physical methods to separate the mineral from the ore body. The main concern at this stage is chemical and waste management. Small-scale operations often discharge processing waste directly onto the ground or in waterways. Large-scale operations process high volumes of ore in a processing facility that may use significant quantities of water and energy. Effluents are typically discharged into artificially created holding ponds (known as tailings impoundments). The effluent may contain trace amounts of mercury, cyanide, the target mineral, and other processing reagents. Disruptions in water cycles and water quality can lead to forest degradation with changes in species composition and structure and loss of biodiversity.

Closure and rehabilitation: Mine closure and site rehabilitation takes place when all economically viable minerals have been extracted. In theory, planning for closure and rehabilitation needs to happen before or during the exploration phase. But this is not always the case. Closure and site rehabilitation typically involve capping waste rock dumps to prevent acid mine drainage and other toxic effluents, replacing topsoil, recontouring the landscape, and revegetation or reforestation. The site should be returned to a state that is deemed useful for the region's population, if not equivalent to the original landscape.

In less responsibly mined sites, closure and site rehabilitation may be given short-shrift and, if funds are not available, little to no rehabilitation may be conducted. Funding for closure and rehabilitation is a key requirement, and not all companies set aside sufficient funds for this stage of the process. Because the mine is no longer economically profitable and the closure process can be costly, smaller companies and individual miners have less incentive to properly close the site and return it to valuable use for local communities. The lack of capacity of governments of the Congo basin to manage post mining site rehabilitation will further aggravate this situation.

In general, the most serious, direct environmental impacts resulting from large-scale mining are associated with decreased water quality and potential loss of aquatic habitat and species. While loss of terrestrial habitat and species can be severe per unit area—especially resulting from associated human activities, such as logging and hunting—mining typically contributes very little directly to deforestation or forest degradation compared to other, more land-use intense activities, such as agriculture.

Poorly-run mines are likely to have a greater direct impact on forests than those that are operated according to international best practices. This is one of the reasons why the impacts of, mainly non-regulated, artisanal mining can be so devastating. Best practice environmental management that is implemented according to the mitigation hierarchy (avoid-minimize-mitigate-compensate) requires companies to have set aside sufficient capital, a challenge for many of the junior companies.

Indirect impacts of mining related to associated infrastructure development

One of the biggest challenges for the development of the mineral extraction in most forest-dense developing countries is the lack or poor quality of infrastructure. Early mining development in a region typically requires large physical infrastructure investments. There will be a need to improve or develop roads or railroads in order to transport the minerals to the port or neighboring countries. This increases the overall costs of production. With the improvement or introduction of new infrastructure, a percentage of the mineral endowment economically translates into commercially viable mines. In short: the availability, or potential to develop, infrastructure is a deciding factor for the development of a mine.

Infrastructure developments represent also the most important threat to ecosystems; through physical incursion into forests and disruption of the ecosystems. **Road and railway development** could be particularly harmful. Building a new road drives direct deforestation through tree cutting but this impact is generally limited. Most importantly, roads are the major vehicle for forest degradation through further incursion into forest areas for agriculture, hunting, artisanal mining and other potentially harmful activities. Road building can also affect local wildlife populations through habitat fragmentation. Roads can become a barrier that some species are unable to cross, effectively reducing their available habitat. This barrier effect will become much more severe when settlement occurs along these new roads and the forest effectively becomes fragmented.

Dams – hydropower plants. A large-scale mine has considerable energy requirements, especially during the processing phase. Energy requirements are typically highest for bauxite and aluminum production, iron ore, copper, diamonds, and gold. In the Congo Basin, these energy requirements will most likely be met via hydropower. Indeed, large-scale mining will not be possible without significantly increasing the regional power grid.

Construction of new dams or increasing the capacity of existing ones will have a significant impact on aquatic species and, to a lesser degree, on forests, depending upon the size of the reservoir built. Construction of power lines could also result in fragmentation of forest habitat, especially if access roads accompany the construction of new power lines. On the other hand, hydropower results in a lower greenhouse gas footprint than the usual energy sources (e.g., coal, natural gas). Potential dam

[Box 5 continues next page]

[Box 5 continued from previous page]

development around waterfalls and rapids in protected areas in Gabon and Congo Brazzaville have recently caused unrest with conservationists.

Induced impacts

Mining operations are usually accompanied by a large influx of people looking for job opportunities. This induces additional socio-economic activities, such as subsistence agriculture and poaching, with potentially significant harm to forests.

Agricultural expansion: An influx of workers to mining sites tends to directly increase pressures on natural forests through clearing for agriculture uses (along with energy needs). In addition, new roads tend to drastically change the economic equation in a specific area and can make unprofitable activities become profitable, through better access to markets as well as inputs (cf. fertilizers).

Bushmeat hunting: Bushmeat hunting is a serious threat to wildlife and contributes to resource degradation in areas that have been opened to extractive practices, oil and other mineral development, or logging. Roads associated with mining operations (as well as logging operations) restrict wildlife movement and encourage the use of animals for consumption. Disruption in wildlife can eventually lead to ecosystem disturbance. Road opening up remote areas makes commercial hunting (and fishing) in these areas economically attractive and allows for the bushmeat to be transported to far away urban markets. Therefore, if mine development leads to the opening of previously remote, difficult to access ecosystems, then very specific measures need to be taken to avoid widespread degradation of these ecosystems.

Logging: To the extent that previously inaccessible high-value forests are opened up, poorly planned mining can induce illegal logging. In this sense, roads (and potentially railway lines) are the primary driver linking mining and logging.

Cumulative impacts

Of greatest concern in most forest-rich countries is the lack of land-use planning and coordination in place to ensure sustainable development in the region, especially with respect to the (often conflicting) allocation of logging and mining concessions, the development of associated infrastructure, the potential for agricultural expansion, and the lack of control over the bushmeat trade and human settlement. Numerous conflicts have been noted between and among conservation priorities, mining and logging concessions, infrastructure development and livelihoods of the local populations.

These combined impacts of one or more activities on the environment, economy, and society are referred to as cumulative impacts. These impacts may interact with each other, have positive and negative effects, and may vary across space and time. Franks et al. (2020) highlight the following mining-specific aspects:

"In the mining context, cumulative impacts can arise from compounding activities of a single operation or multiple mining and processing operations, as well as the aggregation and interaction of mining impacts with other past, current and future activities that may not be related to mining. The nature and scale of cumulative impacts can vary considerably depending on such factors as the type of mining activity, the proximity of the mines to each other, the extent of other contributing activities, and the characteristics of the surrounding natural, social, and economic environments. The compounding effects of multiple mine closures (a kind of 'reverse' cumulative impact where impacts are generated by the cessation of activities) can be as challenging for regional communities and economies."

3.4.3 Existence and scope of current spatial plans in the mining sector

As for the forest and the agriculture sectors, this review of spatial planning efforts in the mining sector is asking the following questions:

- Is there long-term (more than ten years) sectoral planning at national level that provides a vision for the sector? If yes, to what degree does that planning process establish spatial priorities (e.g., macro-zones on maps, quantitative area targets)?
- Is there similar long-term sectoral planning at subnational level and to what degree does that planning process establish spatial priorities?
- Does the National Development Plan 2012-2016 (*PND 2012-2016*), a macro-economic, medium term plan, have any spatial prioritization for the mining sector and how is this linked to long-term spatial plans?

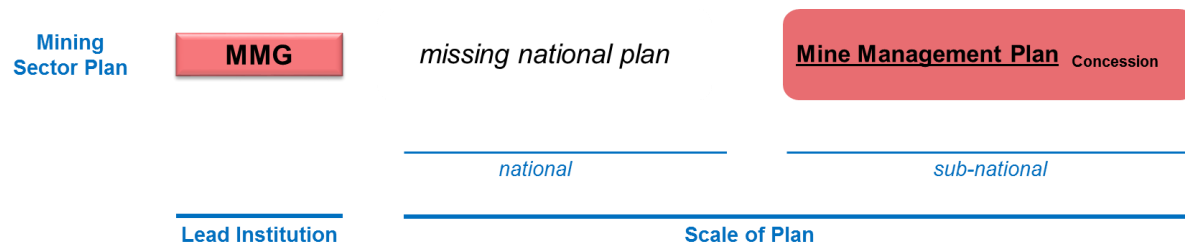
Existing long-term plans with spatial prioritization in the mining sector

At the completion of this draft report, there was no long-term strategy for the mining sector that reflected important spatial planning aspects such as harmonized infrastructure development or regional planning of biodiversity offsets.

Sub-national spatial planning in the mining sector is relying on companies, which are required to prepare long-term mine management plans for all exploitation concessions. This includes delineating the location of roads, excavation area, waste disposal and other land use zones within the concession area. At the writing of this report, most mining permits in Congo were for prospecting and exploration. Only a few mining sites are in or close to the exploitation stage. These sites close to exploitation have prepared detailed plans (e.g., proposed Mbalam-Nabeba Iron Ore Project in Sangha department). Even these projects are however currently frozen, due to the very low iron ore prices.

Figure 26 summarizes the current status of existing long-term plans with spatial prioritization.

Figure 26 Existing long-term plans with spatial prioritization for the mining sector



Note: MMG = Ministère des Mines et de la Géologie

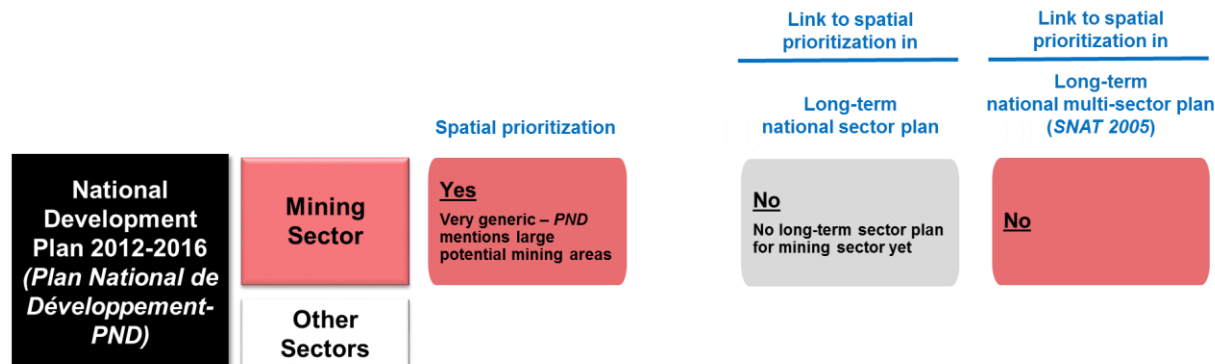
National Development Plan 2012-2016 and spatial prioritization in the mining sector

The National Development Plan (*PND*) is the most referred to medium-term planning document, when sector experts were queried about existing plans. The *PND*, a multi-sector, economic development plan, covers 2012-2016. The process to develop the next five-year plan is just being launched.

The mining sector is highlighted as an important priority for economic diversification in the *PND 2012-2016*. However, spatial prioritization that establishes quantitative area targets for and highlights the location of new investments is very limited within the *PND* for all sectors. The *PND 2012-2016*'s discussion on mining investments makes very generic references to mining—it mentions the names of large potential mining areas or sites (see Figure 27).

In principle, the *PND* should be congruent with long-term spatial development plans in the mining sector and the country's multi-sectoral spatial development framework such as the *SNAT*. However, as Figure 27 indicates, such linkages between plans were not expressed in the *PND 2012-2016*. It does not reference any spatial priorities identified in the *SNAT 2005*, which was difficult to make: the information on mining in the *SNAT* was broad (it included a broad land use category called forest/mining zone) and incomplete (the author did not have access to detailed mining maps and concession information). Likewise, the *PND* could not refer to a long-term national spatial plan for the mining sector, because it has not been prepared yet.

Figure 27 National Development Plan 2012-2016 and spatial prioritization in the mining sector



Note: SNAT = *Schéma National d'Aménagement du Territoire*, a 20-year land use planning document published in 2005.

3.4.4 Data and analysis used in support of spatial planning in the mining sector

Up-to-date maps and associated spatial data are essential for good land use planning. To determine the need for such data, existing planning efforts were analyzed and experts at government agencies were interviewed. For the sectoral analysis, the approach to collect information has been organized in the following categories:

- *Documented maps and data layers* used in sector-specific planning documents or land allocation decisions.
- *Ongoing efforts to build new spatial data sets*, for example supported by international development cooperation projects or national budget allocation.
- *New data layers and maps needed* as prioritized in selected strategies (e.g., PND), suggested in interviews with key experts in the ministry, or based on a gap analysis comparing the Republic of Congo's available data with a list of spatial data used in land use planning in other countries.

Baseline layers used in sectoral planning and land allocation efforts

During preparation of this report, no information was readily available on which maps and baselines layers have been used for delineating mining concession areas. Although a 2014 diagnostic indicated limitations in the contextual map information displayed in the database system used to manage concession information (Ortega, 2014).

Sector-specific data used in spatial planning for the mining sector

The World Bank Mining Sector Review pointed out the limited knowledge about the country's mineral resources. The last national geologic map at 1:1,000,000 is from 1993, and a 1:500,000 version for the southern part of the country was completed in 1969. The Review recommended to improve geological cartography and invest in geo-scientific information management (see next section of ongoing work).

Technical work to develop a functioning mining cadaster has just started. There is no fully functioning GIS database yet within the Ministry of Mines and Geology that combines mining permits with appropriate baseline layers on geology and current land use (Ortega, 2014).

Mining companies with exploration permits are compiling new data and map layers as part of their reporting to the Mining Research and Prospection Service of the Ministry of Mines and Geology. So far

the data and map layers with unconfidential geological and mining data have not been combined in a national database and are not available for dissemination and land use planning purposes.

Ongoing national efforts to build spatial data sets for the mining sector

To close some of the data and mapping gaps in the mining sector, the Congo 2012 Budget Law earmarked 86 million CFCAs earmarked to carry out an airborne geophysics survey campaign, produce more detailed geological maps, and strengthen geo-scientific information management. The airborne geophysics survey was launched in August 2012 under the leadership of *MAT-DGGT* and in collaboration with *MMG* and other agencies. A 2014 review on the status of geospatial data in the Republic of Congo mentioned that new geologic maps were in the process of being created by *ASPERBRAS* in the north and by *TOTAL* in the south of the country. *TOTAL* commissioned the study from the French Geological Survey (*BRGM*), which is expected to produce seven 1:200,000 geological maps and one 1:100,000 map over three years, covering selected parts of the country.

Box 6 Coordinating mining conservation efforts in Liberia

Liberia emerged from the civil war in 2003 as one of the poorest countries in the world with unemployment estimated to be 86 percent. Although Liberia has made progress, access to basic services continues to be limited and almost two-thirds of Liberians live below the poverty line. In addition to these challenging circumstances, the Liberian economy has been dealt a devastating blow by the recent Ebola epidemic.

The Mining sector has the potential to become a significant engine for growth, reconstruction and broader-based development in Liberia. Yet, it can also be a threat to the last extensive forest areas in West Africa. The Upper Guinean Forest that runs through Liberia originally covered an estimated 1,265,000 square kilometers, but only one-tenth of the original vegetation remains. Pervasive poverty and competition for commercial land contracts for palm oil, mining and forestry are a major threat. Protecting the rich biodiversity that remains, while striking a balance between economic interests and respecting the legal and customary rights of local people is a major challenge.

A World Bank Group study entitled “A National Biodiversity Offset Scheme: A Road Map for Liberia’s Mining Sector” recommends the application of a common methodology to be used by all mining companies to assure that the conservation offsets they are implementing are mapped, planned and coordinated at the national level so their cumulative impact is greater and follows the national interest, rather than being done disjointedly on an investment by investment basis.

Liberia is already legally requiring mining companies to implement biodiversity offsets to compensate for impacts arising from project development. However, this approach could result in a number of small ad hoc offsets that do not necessarily respond to the conservation priorities in Liberia and lack the necessary protection to ensure long term sustainability. In addition, the capacity of mining companies to effectively implement offsets is often limited (Johnson, 2015).

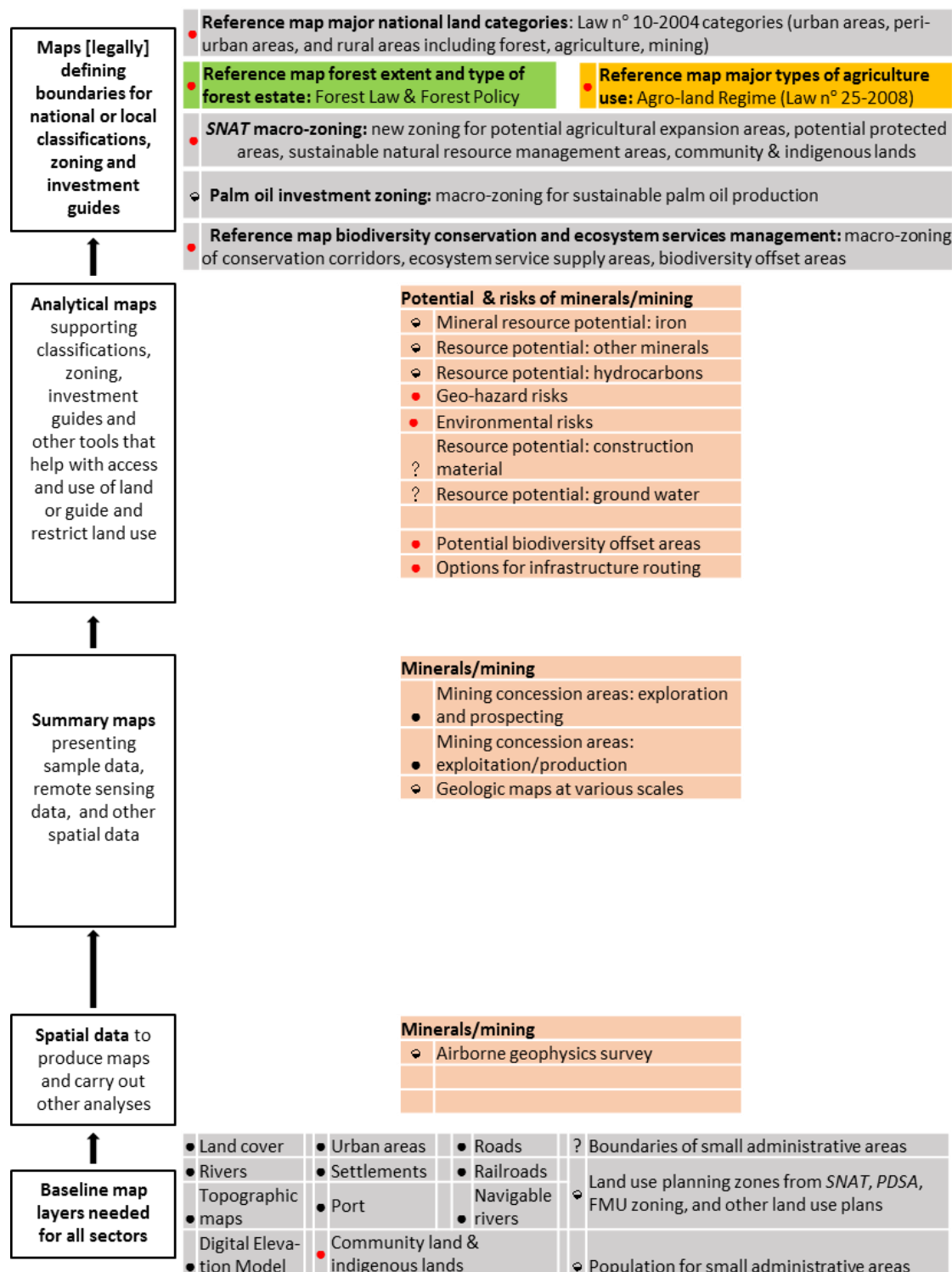
Additional map data that would strengthen land use planning in the mining sector

As in the forest and agriculture sections, data and maps required to strengthen spatial planning can be identified with the help of a checklist of information products and specific map examples within each information product. Figure 28 groups spatial data and maps into three classes: available, possibly available, and not available. Unavailable maps represent an important information gap in the mining sector, which a roadmap to strengthen land use planning can fill.

The following major pattern on data and map availability and additional information needs emerges from Figure 28:

- *Mining concession data are the only spatial data available and much is expected from the new geologic maps.* No detailed information was available yet on how many of the proposed maps in Figure 28 such as geo-hazards or environmental risks can be created from the *MMG* and *CRGM* mapping efforts.

Figure 28 Mining: availability of spatial data and maps



Notes:

- = available; data or map can be obtained from national or international sources (may not be up-to-date or have complete national coverage).
- ◐ = possibly available; spatial data have been or are being compiled as part of ongoing project; map could be produced based on these data.
- = not available; represents an important information gap
- ? = availability unknown

- *No national map of conservation value of ecosystems and potential biodiversity offset areas for mining has been completed.* Maps of biodiversity and conservation value of ecosystems could become the foundation for a national biodiversity offsets scheme for mining. Such a scheme based on solid data and zoning could make the Republic of Congo more interesting for mining companies that are committed to safeguard biodiversity in their operations.
- *No national or regional study to explore available options to route infrastructure for mining has been completed.*

3.4.5 Suggestions for strengthening spatial planning in the mining sector

The following suggestions are expected to strengthen spatial planning in the mining sector and contribute to stronger multi-sectoral land use planning:

- *Create consolidated mining concession database and associated GIS with contextual land use maps.* An up-to-date, shareable database, ideally online, would greatly facilitate planning in other sectors. *MMG, CRGM, MAT-DGGT*, and *CNIAF* can collaborate on a fully functioning land use GIS that combines mining permits with appropriate baseline layers on geology and current land use information from the multi-resource inventory (*IFN*). The GIS can also include other data and map compilations envisioned from the roadmap (e.g., infrastructure, biodiversity).
- *Consolidate public use data from exploration concessions and makes them available for land use planning.* Mining companies with exploration permits are compiling new data and map layers as part of their reporting to the Mining Research and Prospection Service of the Ministry of Mines and Geology. So far the data and map layers with unconfidential geological and mining data have not been combined in a national database and are not available for dissemination.
- *Create online platform for geologic maps being updated and mining concession maps.* The new , regional geologic maps being created by *ASPERBRAS* and *TOTAL* (French Geological Survey - *BRGM*) combined with concession boundaries can fill important data gaps and provide a reference for spatial planning.
- *Evaluate the final spatial data sets from the geological mapping effort and create relevant maps for land use planning.* Selected geological map layers could be relevant for environmental planning, hazard risk mapping, and land use planning. In other countries, for example, national geological survey institutes have prepared important information products from geological surveys. These derived map products play an important role in land use planning at various scales. They include maps that support the siting of buildings and transport systems (based on detailed topographic and geological maps) , in particular railway lines and access of minerals to ports, or identify mineral resource potential (e.g., construction materials, metals, ground water), geo-hazards (e.g., flooding, landslides), and environmental risks (e.g., acid drainage, radionuclide potential).
- *Prepare analytical study that identifies potential future mining areas and available options to route infrastructure and designate land for biodiversity offsets.* Such an effort can contribute to the *PNAT* and the *SNAT* and strengthen long-term spatial planning for the mining sector. The analysis examining the feasibility of different transport options to reduce the direct and indirect footprint of mining could answer questions such as:

- Where would it be possible to consolidate the routing of infrastructure and avoid negative impacts on habitat loss and biodiversity?
- Which areas would be most suitable for an “offshore” approach to mining and how would that affect the choice and location of transport and energy infrastructure?
- What options exist to obtain and secure land for biodiversity offsets?

The analytical study could be narrow in scope and examine a few minerals and one region, for example iron ore mining in the TRIDOM interzone (see Box 3), or alternatively be more ambitious covering multiple minerals and include a comprehensive strategic assessment for the mining sector.

4.1 Proposed roadmap to strengthen land use planning

4.1.1 Background on process

At a workshop in Brazzaville in June 2015, participants from *MAT-DGGT*, sectoral ministries, and civil society developed a first sketch of a roadmap. It identified six areas requiring support to strengthen land use planning in the Republic of Congo: (1) sectoral planning; (2) multi-sectoral planning (i.e., the *SNAT*); (3) integration of planning from national to local levels and across sectors; (4) information and analyses; (5) participation; and (6) legal framework. The roadmap suggested to assess the current planning situation in more detail and identify more specific actions (see Box 7).

Some caveats in this roadmap, however, made it difficult to identify concrete activities and outputs that could be used to develop a program to strengthen land use planning in the country:

- Sectoral planning required an assessment to identify which actions and outputs could become a priority.
- Multi-sectoral planning needed better understanding of the envisioned planning components of the orientation law for land use planning, insights on the progress of ongoing projects such as the *PNAT*, and lessons learned from the *SNAT 2005*.
- Three areas – information and analyses, participation, and legal framework – applied to both sectoral and multi-sectoral planning, making it difficult to identify specific activities and outputs.
- The approach was too general to determine how to prioritize sectoral planning vis-à-vis multi-sectoral planning efforts.

Between October 2015 and March 2016, WRI, with support from *MAT-DGGT* and sector ministries, carried out some of the envisioned assessments of the current planning situation and identified gaps and opportunities to strengthen land use planning. The following areas were covered:

- Reviewed the orientation law and identified the multitude of plans and guideline documents needed in the future.
- Inquired about the status of the *PNAT*, assessed ROC's first *SNAT*, compared these plans to international practices, and checked on data and analytical needs.
- Reviewed national plans and spatial data availability and capacity in the forest, agriculture, and the mining sector.

This work has been summarized in previous sections (see sections 3.1 to 3.4). Box 5 provides an overview of the progress made on some of the action items of the June 2015 roadmap.

To develop a more granular roadmap and identify packages of activities and outputs that could eventually be considered in the development (and costing) of a program to strengthen land use planning, a framework that systematically defines broad intervention areas is required.

Such a framework can be created with the help of a matrix that juxtaposes a set of planning components that are essential for effective land use planning with a set of sectoral and multi-sectoral planning efforts that are essential for better land management in the country. Each cell in the matrix represents a broad intervention area. A roadmap to strengthen land use planning would then select a subset of these intervention areas as a priority for further implementation.

Box 7 Sketch of a roadmap: June 2015

In June 2015, participants from MAT-DGGT, sectoral ministries, and civil society developed the following sketch of a roadmap. This table lists the proposed action items and how much progress has been made on some of these actions in preparation for this document.

OBJECTIFS ET ACTIONS PROPOSEES	SITUATION ACTUELLE
Objectifs spécifiques : plans sectoriels (2015-2016)	
1. Passer en revue les efforts de planification sectoriels (ex., forêt, agriculture) et les efforts de planification de l'infrastructure nationale (ex., les routes, chemin de fer, l'énergie).	● ¹
2. évaluer si la planification est basée sur des objectifs prospectifs clairement définis qui tiennent compte des besoins sociaux, économiques et environnementaux.	● ¹
3. évaluer si les plans ont identifié des priorités spatiales.	● ¹
4. élaborer un plan d'action visant à renforcer la planification spatiale des différents secteurs.	● ¹
Objectifs spécifiques : plans multisectoriels (2016-2017)	
1. examiner le Schéma National d'Aménagement du Territoire (SNAT) de 2005 (ex., état des lieux, la pertinence, la nécessité d'une mise à jour).	●
2. examiner d'autres lois et règles sectorielles et la Loi n° 43-2014.	◐ ²
3. identifier des lois et règles manquantes et contradictoires.	-
4. élaborer un plan d'action en vue de réviser le cadre juridique et la planification multisectorielle nationale (SNAT ou autre mécanisme).	◐ ³
Objectifs spécifiques: planification intégrée (2017)	
1. passer en revue les plans existants et proposer à l'échelle méso (par exemple, macro-zonage dans les zones d'aménagement du territoire ; les actions proposées dans la Loi n° 43-2014, Article 14 dans une zone d'aménagement : une stratégie de développement économique et de plans d'aménagement).	◐ ³
2. définir les types de planification et préciser la planification intégrée de l'utilisation des terres aux autres niveaux sous-nationaux.	-
3. définir des actions qui améliorent l'intégration verticale.	-
4. définir des actions qui améliorent l'intégration horizontale.	◐ ⁴
Objectifs spécifiques: participation (2015-2016-2017)	
1. vulgariser la Loi n° 43-2014 et le Schéma National d'Aménagement du Territoire de 2005 (ou une mise à jour).	-
2. passer en revue la nature et le niveau de participation dans la planification nationale, régionale et locale	-
3. déterminer la nature et le niveau de participation pour la planification d'utilisation des terres intégré.	-
4. Définir le niveau de la participation dans le code d'aménagement du territoire (Article 46, la Loi n° 43-2014).	-
Objectifs spécifiques: information et analyses (2015-2016)	
1. passer en revue des données, des cartes et des informations sur les conditions de base et déterminer les besoins de les mettre à jour.	● ¹
2. déterminer la capacité existante et les compétences analytiques pour intégrer les données, évaluer les coûts et avantages des différentes options et développer des scénarios.	◐ ¹
3. élaborer un plan d'action visant à combler les lacunes de données et des autres informations spatiales.	● ¹
4. élaborer un plan d'action pour la formation.	-
Objectifs spécifiques: cadre juridique (2018-2019)	
Elaborer un code d'aménagement du territoire (Article 46, la Loi n° 43-2014):	
1. harmoniser les prescriptions contenues dans les lois et règlements en matière de politique spatiale.	-
2. orienter l'élaboration des codes sectoriels.	-
3. assurer l'adaptation des dispositions réglementaires en vigueur.	-
4. définir les orientations en matière d'affectation des terres.	-

Legend and notes

- = Carried out analytical work and summarized findings in draft format for further review in this document.
- ◐ = Carried out some preliminary analytical work, which is discussed in this document.
- = Did not carry out any analytical work as part of this document.

¹ Focus on forest, agriculture, mining, and biodiversity conservation – some preliminary assessment of infrastructure planning.

² Only for the orientation law for land use planning.

³ Only for the SNAT.

⁴ Addressed indirectly in the proposed roadmap and implementation plan: selected a set of activities to strengthen zoning in key sectors that would align with revising the macro-zoning in the SNAT.

To create a roadmap of possible intervention areas and an associated draft implementation plan with more detailed outputs and activities, the following next steps are proposed:

- Develop first a systematic framework with broad intervention areas and produce a more granular roadmap that prioritizes among these intervention areas. Then discuss whether these priorities are strategic and fit with stakeholders' preferences. Such a discussion with *MAT-DGGT*, sectoral ministries, and other stakeholders of land use planning is envisioned during a planned workshop in Brazzaville in June 2016.
- As a second step, draft a proposed implementation plan for these broad intervention areas with more detailed outputs and activities. These are envisioned to be discussed as well at the June 2016 workshop to illustrate possible choices to implement the roadmap.
- Based on the feedback from the June 2016 workshop, make a final determination on the preferred broad intervention areas, outputs, and activities (and their scope, timing, and possible costs).

Section 4.1.2 will introduce the key planning components for effective land use planning, and section 4.1.3 will discuss a priority set of sectoral and multi-sectoral planning efforts. The resulting matrix of broad intervention areas and the proposed roadmap to strengthen selected planning components at sectoral and multi-sectoral level will be presented in section 4.1.4. The draft implementation plan for this roadmap will be covered in section 4.2

4.1.2 Goals, objectives, and key planning components for effective land management

The goals of this roadmap are more effective land management in the Republic of Congo and implementation of the land use orientation law (law n° 43-2014). The roadmap supports the more general objectives of integrated land use planning:

- Designate geographic areas to specific functions (e.g., farming, forestry, transport, housing, conservation) with the most sustainable uses and in line with national development priorities.
- Avoid conflicts and create synergies between different types of land uses.
- Establish a formal instrument of government to organize, regulate, and manage use of land.

Furthermore, major objectives of law n° 43-2014 underpin this roadmap:

- Establish the legal framework for a spatial planning policy in compliance with the objectives and basic principles of sustainable development.
- Provide the country with a balanced spatial organization, infrastructure networks, and structural facilities.
- Promote synergies to strengthen the foundations for growth, strengthen the competitiveness of the productive system, and protect and improve the living environment.

To achieve these goals and objectives, the roadmap needs to buttress interconnected planning components that have proven essential in practical experiences of developing and implementing strategies for sustainable local land management (GIZ, 2011). Effective land management requires information, analysis, planning, political decisions, legislation, administration, and control (GIZ, 2010). Likewise, sustainable land management requires participation of key stakeholders.

To identify suitable intervention areas and outputs for the roadmap, six planning components, representing the means for effective land use planning, have been considered. A subset of these planning components were discussed at a June 2015 stakeholder workshop in Brazzaville and have been examined in the assessment of sectoral and multi-sectoral planning in this document. The following is a description

of each planning component, the envisioned result from investing in it, and a summary from the assessment of the current situation:

- *Planning component 1: complete baseline data and information.* Examples include biophysical and socioeconomic databases, GIS data, remote sensing products, maps, and environmental and economic studies of resources and baseline conditions. The envisioned result of this planning component is: data and information about the territory are comprehensive; and data and information management capacity is strong at all levels.

The assessment of the current situation identified considerable data and information gaps, both at sectoral and at multi-sectoral level. Data and information management capacity needs to be strengthened.

- *Planning component 2: comprehensive indicative planning.* This planning step provides a prognosis of future land use. Planning relies on tools that project trends, develop scenarios of land use options, determine agricultural or biodiversity conservation potential, and examine the feasibility of investments, strategies or plans. The envisioned result of this planning component is: strategies and plans are based on analysis, are spatially explicit, and balance economic, environmental and social needs; resources are in place to support analysis.

The assessment found that not all sectors had completed such long-term strategies, or plans were not specific enough in relation to their spatial priorities. In addition, no published references could be found that indicated that land use scenarios were discussed internally by technical teams or presented in stakeholder consultations.

- *Planning component 3: strong affirmative planning.* In this planning step, a final decision needs to be made on the appropriate land use options for a geographic area. This decision generally is based on a combination of technical criteria and stakeholder priorities. Typical outputs are maps with macro-zoning, a national planning framework such as the *PNAT* and a *SNAT*, regional and local land use plans with associated rules to access and use land, and investment guides that establish spatial priorities. The following result is envisioned for this planning component: plans and guidance have defined spatial priorities and zoning by major land use categories; the documents balance economic, environmental and social needs and reflect multiple sector priorities.

The assessment found that macro-zoning had been completed at national level (e.g., *SNAT* 2005-2025, *PDSA* 2012-2035) and at sub-national level (e.g., zoning of land use by broad categories in forest concessions), or was done on an ad-hoc basis outside regular planning processes (e.g., macro-zoning for conservation and mining in Sangha department). In addition, past planning efforts have lacked a supportive legal and policy framework for such zoning and associated participatory processes. No investment guides that incorporate land use zoning with a spatial prioritization balancing economic, environmental, and social criteria for large investment projects (e.g., biofuels, mining) have been published.

- *Planning component 4: coherent legal framework.* The land use orientation law (Law n° 43-2014) establishes the broad framework for spatial planning. Zoning (e.g., protected areas, conservation corridors), guidance (e.g., investment guide where and how to establish palm oil plantations), and land use plans require legal recognition to ensure their effective implementation. Law n° 43-2014

needs to be harmonized with sectoral laws and rules affecting land allocation. The following result is envisioned for this planning component: the legal and institutional framework supporting integrated land use planning at all levels is complete and without ambiguities.

The assessment identified the need to develop more specific legislative and administrative instruments to implement the land use orientation law.

- Planning component 5: effective systems to engage stakeholders, disseminate data, and communicate information about plans and rules. Lack of stakeholder input in developing land use plans undermines their effective implementation. This is why Law n° 43-2014 has made reference to the principles of coordination, consultation, and participation and emphasized the importance of participation when developing and reviewing the Republic of Congo's *SNAT*. That is why other countries have mandated that national or subnational planning or zoning commissions rely on diverse stakeholder participation. This planning component aims for the following result: effective systems are in place that have resulted in meaningful participation in land use planning; there is high awareness about land use data, information, plans, and rules.

The analysis of the current situation found a need for establishing the administrative capacity to define and implement a transparent and inclusive land use planning process. Institutions and resources need to be in place to support practices of coordination, consultation, and participation in land use planning.

- Planning component 6: effective administration to implement, monitor, enforce, and adjudicate. The greatest challenge for land use planning is the implementation and enforcement of plans. It requires effective administration to allocate land following planning and zoning regulations. Government agencies need to have systems in place to monitor and enforce land use (e.g., through incentives and command and control measures). Mechanisms need to be in place to resolve land use conflicts quickly and fairly. This planning component aims for the following result: effective systems are in place to allocate land (e.g., issue concessions, licenses), monitor land use, enforce rules, and resolve conflicts.

Of all the sectors analyzed in the assessment, the forest sector has the strongest systems in terms of oversight and enforcement at the concession level, but still needs to overcome considerable barriers to be more effective. Agriculture, mining, and multi-sector land use planning agencies are just at the early development stage to establish more formal land use planning processes or launch relevant administrative systems.

4.1.3 Prioritizing sectoral and multi-sectoral planning efforts

It is proposed to build planning capacity at sectoral and multi-sectoral level. The following are promising areas to strengthen land use planning:

- (1) Forest (lead institution *Ministère de l'Economie Forestière et du Développement Durable - MEFDD*).
- (2) Agriculture (lead institution *Ministère de l'Agriculture et de l'Elevage - MAE*).
- (3) Mining (lead institution *Ministère des Mines et de la Géologie - MMG*).
- (4) Other sectors including biodiversity conservation (lead institutions *MEFDD*), environment and tourism (lead institution *Ministère du Tourisme et de l'Environnement- MTE*) and infrastructure (lead institution transport: *Ministère des Transports, de l'Aviation Civile et de la Marine*

Marchande - MTACMM; lead institution energy: Ministère de l’Energie et de l’Hydraulique - MEH / Société Nationale d’Electricité – SNE).

- (5) Multi-sectoral land use planning (lead institution *Ministère de l’Aménagement du Territoire et de la Délégation Générale aux Grands Travaux - MAT-DGGT*).

The rationale for this prioritization is as follows:

- *Forest sector planning.* To build land use planning capacity, it is proposed to start with the sector that covers the largest land area and that has already spatial planning experience based on its coordination of forest management plans. In addition, there is much at stake of finding the right balance between safeguarding the country’s forest capital and obtaining large economic returns from forest lands.

The forest sector also has a key role to play in filling an important information gap. Once the *IFN* project is completed, it should be able to provide information on land cover and land use based on extrapolated sample plot data. In the case of these data and information being delayed or not covering the country comprehensively, it may be necessary to initiate a process that obtains an updated land cover and use map and ensures regular updates and long-term support for this map (perhaps as part of building a National Geomatics Centre).

Finally, establishing official forest boundaries and land use zoning within forest lands, especially in the savannah region, would create greater certainty and fewer conflicts for agricultural and other land investments.

- *Agriculture sector planning.* From an area perspective and the number of people affected, agriculture is an important land use in the country. In addition, agricultural land use can be an important driver of forest loss and other ecosystem change.

Better land use planning in the sector can introduce a long-term sustainability perspective that accounts for multiple types of land uses in a landscape or region. For example, the Republic of Congo has great potential for palm oil and other agricultural crops. Without good planning and strong monitoring, land could easily be allocated using a boom-and-bust approach. There is sufficient time and land to plan industrial agriculture in sustainable way. Likewise, systematic spatial planning of small-scale agriculture intensification with associated infrastructure investments (e.g., roads, markets) represents a great opportunity. If these plans are developed with comprehensive stakeholder participation and implemented successfully, they can boost livelihood opportunities and create greater land security for farmers and local land managers.

In addition, strengthening land use planning capacity for the agriculture sector can build on the *PDSA* experience of delineating macro-zones and applying criteria to avoid forest loss. These criteria could be emulated in other sectors – some of these criteria could be further developed and applied in the new long-term master plans *schémas directeurs des parties du territoire*) and guidance (*orientation*) required under the orientation law for land use planning (e.g., for the mining sector).

The final reason to encourage spatial planning and zoning of agricultural land with a sustainability perspective in mind is the lack of a requirement to prepare a long-term master plan (*schémas directeurs des parties du territoire*) and guidance (*orientation*) for agricultural land. In the

orientation law for land use planning, agricultural land is not mentioned as an important part of the national territory (*parties du territoire*).

- *Planning for the mining sector.* The Republic of Congo has a great opportunity to apply a comprehensive planning perspective for mining that moves away from planning of individual mining sites, takes multiple potential mining sites into consideration, and strategically plans infrastructure routing and biodiversity conservation areas (potential offsets areas) in support of these future mining sites (see TRIDOM interzone example, Box 4). Such strategic spatial planning can inform the country's intended main plans covering multiple sectors: the *SNAT* and the associated *PNAT*.
- *Planning of conservation areas and biodiversity priorities.* Systematic land use planning for biodiversity and conservation priorities is a missing piece in the country's national strategies and spatial planning efforts. Such planning can take into account an approach that looks at a gradation of protections, from areas with very strict protection (e.g., national parks) to areas where different land use and land use changes are permitted (but certain management rules apply). A planning gap that needs to be closed for better land management (and for a revised *SNAT*) is the delineation of land supplying different ecosystem services, which are important for local communities and for the country as a whole. This includes areas that supply clean drinking water, deliver shoreline and flood protection, provide opportunities for recreation and spiritual enrichment, are important habitat for wildlife, native trees and other species, and store carbon.
- *Planning for the tourism sector.* Once the data for the above sectors have been compiled and the associated analyses has been completed, it would require a modest effort to synthesize this information and carry out a strategic analysis for the country's tourism sector. Such a study would examine how different natural assets are providing benefits for tourism, recreation, and spiritual enrichment and identify new areas with tourism potential. Completing such a national study would strengthen the analytical foundation for planning in the tourism sector and could help to grow the sector and help to achieve the objectives of the country's national strategy for sustainable tourism (the results of that strategy were not yet available during preparation of this report). In addition, it would create an opportunity to introduce areas important for tourism development into the macro-zoning of a revised *SNAT*. Published spatial plans and studies on tourism development that have been available for the preparation of this report, have so far concentrated mostly on tourism infrastructure and on planning at very local scale for ecotourism (e.g., zones linked to protected areas).
- *Planning of infrastructure.* Spatial data and information on transport and energy infrastructure is an essential layer for land use planning in the sectors mentioned above and for multi-sectoral plans such as the *SNAT*. At a minimum, investments need to be made to have up-to-date spatial data and maps of current and planned infrastructure. There is an opportunity to introduce a broader strategic perspective into the planning of infrastructure and go beyond the routing criteria typically applied such as travel distance, travel time, travel volume, engineering costs, and number of people served. Additional criteria could include, for example, avoiding high biodiversity areas, minimizing habitat fragmentation, or reducing the indirect and cumulative impacts of transport infrastructure such as increased logging, unplanned agricultural development, and wildlife poaching (see discussion for the mining sector above).

- *Multi-sectoral planning.* It is proposed to focus on the key components of the orientation law for land use planning and:
 - Revise the *SNAT* – including an alignment with the ongoing *PNAT* - and complete associated strategic plans and guidance for the land use management zones (*zones d'aménagement du territoire*) as generally described in the law.
 - Establish new proposed multi-sectoral planning institutions envisioned under the orientation law for land use planning.
 - Complete a new land use planning code (*code d'aménagement du territoire*) outlined in the orientation law for land use planning.
 - Strengthen technical planning skills and capacity for coordinating multi-sectoral planning processes within *MAT-DGGT*.

4.1.4 Roadmap with proposed intervention areas at sectoral and multi-sectoral level

Figure 29 shows a matrix that juxtaposes a set of essential planning components with a set of priority planning areas. Each cell in the matrix represents a broad intervention area. The figure also highlights certain intervention areas and associated levels of effort, which amounts to a roadmap of proposed intervention areas to strengthen planning components for land use planning at sectoral and multi-sectoral level. The underlying principles applied to prioritize certain intervention areas and the resulting roadmap are discussed below.

Broad intervention areas selected for the roadmap

The selection of broad intervention areas was guided by a number of principles and observations from international land use planning experiences (World Bank, 2014; GIZ, 2011; GIZ, 2010). Planning components and intervention areas for the proposed roadmap were prioritized based on the following criteria and assumptions:

- *Invest in data and information first.* Spatial data and map investments have to be made first to establish a sound footing for land use planning in the Republic of Congo (planning component 1: complete baseline data and information).
- *Invest in a few strategic planning processes and move close to implementation.* The idea is to identify strategic planning processes in key sectors, establish the data and analytical foundation for planning, and move as close as possible toward implementation of plans during the initial phase of the roadmap. The proposed sectoral planning efforts for forest, agriculture, and biodiversity conservation, and for multi-sectoral planning (i.e., the *PNAT*, *SNAT*, and associated strategic plans for land use management zones) are expected to do this by encouraging concrete land use zoning and establishing spatial priorities of use (planning component 3: strong affirmative planning). For this, systematic stakeholder involvement is strongly encouraged because it can help reduce future land use conflicts and increases the long-term prospects of land investments (planning component 5: effective systems to engage stakeholders, disseminate data, and communicate information about plans and rules).
- *Apply analytical tools to develop land use options and to facilitate understanding.* Maps and other spatial tools to visualize land use and development scenarios are being proposed for the sectoral and multi-sectoral tracts of activities (planning component 2: comprehensive indicative planning).

Figure 29 Roadmap with proposed intervention areas to strengthen planning components at sectoral and multi-sectoral level

ESSENTIAL PLANNING COMPONENTS FOR EFFECTIVE LAND MANAGEMENT							
	<u>Planning component 1:</u> complete baseline data and information	<u>Planning component 2:</u> comprehensive indicative planning	<u>Planning component 3:</u> strong affirmative planning	<u>Planning component 4:</u> coherent legal framework	<u>Planning component 5:</u> effective systems to engage stakeholders, disseminate data, and communicate information about plans and rules	<u>Planning component 6:</u> effective administration to implement, monitor, enforce, and adjudicate	
PRIORITY PLANNING AREAS	<u>Forest</u>				1	2	No outputs planned
	<u>Agriculture</u>				No outputs planned	2	No outputs planned
	<u>Mining</u>			No outputs planned	1	No outputs planned	No outputs planned
	<u>Biodiversity / Conservation</u>				1	2	No outputs planned
	<u>Tourism</u>			No outputs planned	1	No outputs planned	No outputs planned
	<u>Infrastructure</u>		No outputs planned	No outputs planned	1	No outputs planned	No outputs planned
	<u>Multi-sectoral national</u>					2	No outputs planned
	<u>Multi-sectoral sub-national</u>	No outputs planned	No outputs planned	No outputs planned	No outputs planned	No outputs planned	No outputs planned

Notes:

● = The number of bullets indicate the relative level of effort envisioned in the draft implementation plan (see 4.2). Effort has been approximated by the number of envisioned activities and outputs.

¹ = These are supporting studies to identify ambiguity and gaps in the legal code and associated instruments. The studies would propose draft language to rectify existing law, introduce new instruments within sectors where needed, and propose a new *Code d'Aménagement du Territoire* as envisioned under law n° 43-2014.

² = Mostly focused on setting up new systems to share and access data, maps, plans, and other land use information.

- *Designate a group of government conveners.* Each priority planning area at sectoral and multi-sectoral level is envisioned to designate lead institutions working in partnership with other institutions that have technical planning expertise. Moreover, *MAT-DGGT* has the strategic mandate for multi-sectoral planning and is envisioned as the co-lead for the proposed sectoral outputs and activities. *MAT-DGGT* can bring a broader perspective to land use planning that moves beyond single sectoral priorities and balances multiple sectoral interests.
- *Encourage systematic information sharing.* Both sectoral and multi-sectoral tracts seek to establish platforms to share spatial data and provide access to plans and reference maps (planning component 6: effective systems to engage stakeholders, disseminate data, and communicate information about plans and rules).
- *Focus institutional changes and legal revisions on a limited set of strategic areas.* For this roadmap, it is proposed to prioritize new institutions envisioned for national-scale planning under the orientation law for land use planning and to strengthen technical planning and coordination capacity to prepare multi-sectoral land use plans. In regards to the legal framework (planning component 4: coherent legal framework), it is proposed to harmonize land use classifications, zoning and land allocation rules for the forest, agriculture, and mining sectors and to develop the new land use planning law (*code d'aménagement du territoire*).
- *Assume a five-year time horizon and limit the time to prepare respective planning outputs.* This roadmap assumes a five-year time frame to launch spatial planning cycles at sectoral and multi-sectoral level. Within that period, multiple planning outputs with stakeholder contributions can be prepared, assuming that each output stays within a recommended 12 to 18-month limit. (Planning outputs requiring a very long preparation time carry a greater risk of becoming too complex and delaying or avoiding implementation.) Five years, however, will not be sufficient time to iterate through multiple spatial plans or allow for complete alignment of sectoral and multi-sectoral planning cycles.
- *Assume that progress for priority planning areas will proceed unevenly and launch parallel processes.* The following challenges have to be addressed to strengthen spatial planning at sectoral and multi-sectoral level:
 - Spatial planning processes are not in place.
 - Existing sectoral plans have not been linked to multi-sectoral plans (i.e., *SNAT*).
 - Spatial planning processes have not been synchronized across sectors and between sector plans and multi-sector plans.

Past country experiences with data inventories and map production also indicate a high risk of delays for such outputs.

It is therefore proposed to launch sectoral and multi-sectoral processes simultaneously. The first 12 to 18 months would focus on establishing the foundation as follows:

- At sectoral level, it would be support for data compilation, analytical maps, and possible macro-zoning.
- At multi-sectoral level, it would be support to continue the ongoing *IFN* project with the associated *PNAT* and to strengthen the technical and processing capacity of *MAT-DGGT* to coordinate multi-sectoral land use planning.

One critical junction is expected to be reached after 12 to 18 months when the envisioned analytical outputs from the sectors (e.g., proposed macro-zones for forests, agriculture and biodiversity) are intended to feed into the multi-sectoral plan, the *SNAT* revision. A possible program to strengthen land use planning in the Republic of Congo would need some flexibility at this point to assess sectoral progress and to adjust the scope and timing of the *SNAT* and other remaining outputs in the roadmap. It is possible that the delivery of sectoral data, maps, and macro-zoning may not be completely aligned with the timing envisioned for the *SNAT* revision. It may take two five-year cycles to completely align sectoral plans and revisions of the *SNAT*.

Broad intervention areas left out of this roadmap

The roadmap does not cover some broad intervention areas shown in Figure 29 (gray cells). These include activities to support sub-national planning and to strengthen the administrative capacity to implement sectoral and multi-sectoral plans (planning component 6: effective administration to implement, monitor, enforce, and adjudicate).

The justification to delay these intervention areas is that investments need to be made first into data, information, indicative and affirmative planning, and the legal framework starting at national level. Furthermore, the chosen intervention areas link to ongoing projects and priorities, build on existing planning capacity, and can be achieved within the five-year time frame.

What the roadmap does and doesn't do

The proposed five-year roadmap prioritized planning components important to launch a national spatial planning program in the Republic of Congo. For each planning component, concrete outputs will be suggested that support a spatial planning process at sectoral and multi-sectoral level. The aim is to produce sound technical products that can help support key sectors and, if coordinated well with *MAT-DGGT*, contribute to new or revised multi-sectoral plans (i.e., the completion of the *PNAT* and a revision of the *SNAT*).

The proposed roadmap postpones a number of broad intervention areas, which can be addressed in a follow-up program and most likely will focus on ensuring successful implementation of the new and revised plans. The framework in Figure 23 provides a strategic screening device for *MAT-DGGT* and its collaborating lead agencies to identify additional planning components that may require strengthening in the future.

The selection of intervention areas in this roadmap – and the selection of specific activities and outputs in the implementation plan in section 4.2 – is based on the assessment of gaps identified in Chapter 3 of this document. This assessment and the proposed intervention areas require further discussions with technical staff at sectoral ministries and within *MAT-DGGT*. These discussions may reveal that the assessment in this document may have missed an important ongoing project or may have interpreted the language in the orientation law for land use planning differently than what government partners would have done. In addition, government partners may have different preferences on the scope, frequency, and timing of participation and consultation for the sectoral and multi-sectoral plans.

It is expected that the envisioned strengthening of sectoral and multi-sectoral planning in this roadmap will provide the following benefits:

- Contribute to better understanding of the land use potential of a geographic area.
- With newly established zoning, create clearer boundaries on where investment should go and not go.

- Reduce conflict between sectors or between national government actors and local community needs.
- Encourage wider agreement in the context of national development planning (and related budgeting) on the relative priority of certain investments and the need to allocate space for that to happen.

Ways to expand and strengthen the roadmap

Providing more granularity in selected areas and exploring technical and financial support options for planning processes more broadly could strengthen this roadmap. These limitations in emphasized research areas are a result of the technical and topic expertise readily available to the research team and the need to prioritize research tasks.

The first limitation is that not all planning components were assessed at the same depths. For example, the assessment of spatial data and map needs was more comprehensive than the one of the legal framework, which relied on the legal analysis of others. Hence the recommendations for planning component 1 are more specific than for planning component 4 in the proposed implementation plan.

The second limitation is that the assessment and recommendations for effective plan development and plan implementation can be further expanded. The following areas are especially relevant for developing a comprehensive national program to strengthen land use planning in the country:

- *Government capacity to organize and manage a multi-sectoral national planning process.* This will require a more systematic assessment of the government's capacity to organize and manage spatial planning processes in regular cycles (e.g., a five-year period suggested for the SNAT and other plans).
- *Incentives and regulatory changes needed to ensure smooth planning across sectors.* Delivery of coherent, consistent planning inputs from sector agencies, and eventually from sub-national units, will require a functioning planning system. An assessment of the current situation can prepare recommendation how to create a better system. It will require new incentives and regulatory changes to establish and institutionalize effective, responsive means to inform and solicit inputs to planning processes.
- *Stakeholder capacity to participate in planning process.* This can be determined with a more systematic assessment of the required information, tools, and other resources needed to ensure meaningful participation of people, communities, and stakeholders.
- *Cost estimates for the activities and outputs listed in the implementation plan.* This will require first agreement on the broad intervention areas and associated activities and outputs and then technical expertise to determine their costs to determine overall costs of a national implementation plan.
- *Funding plan to implement roadmap.* This can be determined with an assessment of current funding support for spatial planning in the Republic of Congo and recommendations to harmonize government and development cooperation partners' support to implement a national roadmap.

4.2 Draft implementation plan

The following draft implementation plan is based on perceived gaps in planning and associated tools, preliminary needs identified in stakeholder engagement at workshops and team meetings, and practical experiences from other countries. The proposed activities will require further review from planning and country experts. This section should be seen as a first step to encourage discussion at a workshop in Brazzaville and generate a new and better implementation plan.

This section will present first suggested activities to strengthen sectoral land use planning in the forest sector (4.2.1), agriculture sector (4.2.2), mining sector (4.2.3) and other sectors covering biodiversity conservation, tourism, and infrastructure (4.2.4). Next will be a section describing proposed outputs and activities to strengthen multi-sectoral land use planning (4.2.5). A final overview figure that shows the sequencing of all major packages of activities and outputs at sectoral and multi-sectoral level will conclude this section (4.2.6).

4.2.1 Forest sector

Rationale for proposed activities and outputs

Link to existing sector planning. The proposed activities take advantage of the forest sector's capacity with a national resource inventory and the sector's experience with management plans for forest management units. The work builds on the already established partnership between *CNIAT (MEFDD)* and *MAT-DGGT* to produce a *PNAT*.

Objectives of the proposed work. The objectives are to make forest resource information more readily available, strengthen spatial planning in the forest sector, and align this effort with implementing the orientation law on land use planning. The final objective is to create stronger zoning and classification of tree-covered land that can be used in future decision making on land allocations or establishing rules of access and on use of forest lands.

Timing of the proposed work. This technical work in the forest sector does not have to wait for progress at multi-sectoral level (e.g., revision of the *SNAT; code d'aménagement du territoire*). In fact, the envisioned work will be an important input to complete the *PNAT*, revise the *SNAT* and associated macro-zoning, and develop strategies and guidance documents required for important parts of the national territory (*parties du territoire*) under the new orientation law for land use planning. If the technical work in the forest sector proceeds swiftly – with the work ideally being completed within 12 to 18 months – the new forest maps and analyses can make a meaningful contribution to the envisioned multi-sectoral planning outputs.

Envisioned lead institutions. *CNIAF*, as the proposed lead institution, is envisioned to work closely with other programs and units associated with *MEFDD*. The forest sector institutions are envisioned to work closely with *MAT-DGGT* and also draw on mapping and planning expertise from the private sector (e.g., companies preparing forest management plans) and international NGOs involved in forest mapping (e.g., *WRI, WCS, WWF*).

Proposed packages of activities. The first proposed package of activities seeks to consolidate databases and create new summary maps (ultimately resulting in a stronger online platform of forest information).

This is followed by a package of activities that includes analytical studies on forest potential and spatial priorities of forest use.

These activities are justified because forest ecosystems cover the majority of the country. Up-to-date and comprehensive data on forest cover and use are the foundation for better planning within the sector and at multi-sectoral level. Likewise, improved baseline data are the foundation for any long-term forest and land use monitoring systems.

The reason for the analytical work is to provide an evidence-based foundation that can help to develop a national strategy for all forest lands, support decision-making to allocate logging concessions and other land uses within forest lands, and create new information that can support national biodiversity and conservation planning and determine tourism potential (see section 4.2.4). Most importantly, this type of analysis will be needed to justify prospective zoning and classifications of the forest estate.

Moving beyond the data and analytical work and translating its findings into proposals to strengthen (official) zoning and classification of the forest estate, represent the next package of activities. Agreed upon zoning and official classification of the forest estate create greater certainty for land managers within government (e.g., other sectors) and outside government (e.g., private companies interested in investing in new type of land uses in the forest-savannah transition zone; local communities seeking to establish community forests or other natural-resource-based enterprises). The ultimate output envisioned for the forest sector work stream is a national reference map of the forest estate and forest extent. Creating such a reference will require stakeholder validation.

Figure 30 shows the sequencing of these major packages of activities and outputs (green boxes) and how they lead to a final reference map and contribute to multi-sectoral planning. A more detailed set of proposed outputs and a preliminary work plan are shown in Table 2. These outputs, organized into four broad packages, will be described in more detail in the next sections.

Package 1 of outputs: consolidated databases, maps, and online platform

It is assumed that the final databases and maps from the National Forest Inventory (*IFN*), as envisioned in the project appraisal report to the Congo Basin Forest Fund, will be available by mid-2016. It is also assumed that the proposed activities for this roadmap will align with the efforts of the inter-ministerial working group to advance the National Land Use Allocation Plan (*Plan National d’Affectation des Terres - PNAT*), which was initiated by *MAT-DGGT* and *CNIAF (MEFDD)* in July 2015 under the *IFN* project.

To build a foundation for the proposed work stream, the envisioned *IFN* databases and maps will require, most likely, further refinement. In addition, planners and decision makers could benefit from a set of additional maps summarizing the sample data from the *IFN* (e.g., maps that show extrapolated surfaces of non-timber product use, tree and plant diversity, mammal diversity and distribution, level of human disturbance). A consolidated *IFN* database and maps of forest resources and forest use for broad dissemination are thus Output 1.

The second set of data and maps, whose consolidation and more widespread availability could be valuable for forest sector and multi-sectoral land use planning at national level, are the data and zoning maps that have been prepared for the Republic of Congo’s forest management units (FMUs). This consolidated database and associated maps represent Output 2. Both consolidated databases and associated maps will be made available on the Republic of Congo forest atlas platform (Output 3).

Figure 30 Strengthen forest sector planning: sequencing of major packages of activities and outputs

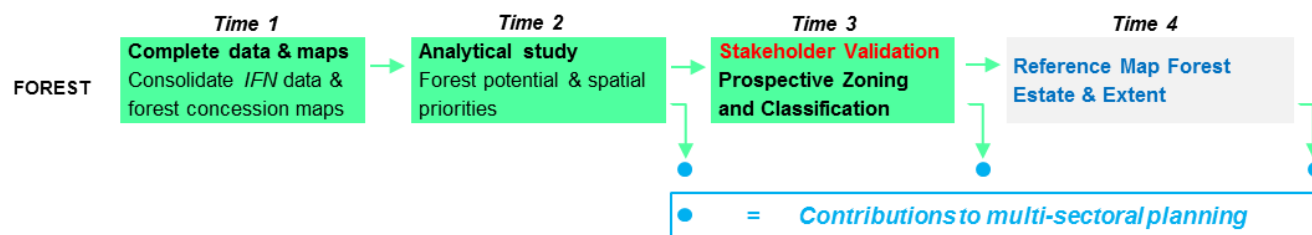


Table 2 Strengthen forest sector planning in support of multi-sector land use planning: outputs and work plan

OUTPUTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Package 1: consolidated databases, maps, and online platform					
1. Consolidated <i>IFN</i> database and maps of forest resources for broad dissemination					
2. Consolidated database and zoning maps from forest management units					
3. Online forest atlas platform to disseminate forest databases and maps					
4. Technical capacity building support and long-term plan to finance online platform					
Package 2: analytical study to determine forest potential and spatial priorities of use					
5. Analytical study and associated maps highlighting forest potential and spatial priorities for different types of forest use and forest benefits					
6. Stakeholder engagement and communication support					
Package 3: proposals to strengthen zoning and classifications within the forest estate					
7. Proposal to strengthen land use planning within the PFE by harmonizing planning and zoning for forest management units (FMUs)*					
8. Proposal to delineate NPFE lands and possible land use options within NPFE *					
9. Stakeholder engagement and communication support for Outputs 7 & 8.					
10. Lessons learned from Outputs 7-9 and recommendations for <i>SNAT</i> revision (e.g., macro-zoning) and implementation of orientation law for land use planning					
Package 4: final draft reference map of forest estate and forest extent					
11. Final draft reference map of forest estate and forest extent for sectoral and multi-sectoral plans					
12. Stakeholder engagement and communication support					
Notes <i>IFN</i> = National Forest Inventory PFE = Permanent Forest Estate NPFE = Non-permanent Forest Estate					

Differentiated access to this platform can be envisioned for users within government agencies (e.g., *MAT-DGGT*, *CNIAF*, *CGRM*, *DEPs* in different sector ministries) and outside of government such as logging companies, investors in the mining and agriculture sectors, national and international research institutes, and civil society organizations.

The general idea is to produce high quality data and summary maps from existing inventories quickly (within 12 months) and make them widely available and easily accessible. This would remove a major constraint of past planning, both within the forest sector and at multi-sectoral level. These outputs would also greatly facilitate future spatial planning in various sectors and at different scales.

When consolidating the databases, producing summary maps, and creating the online platform, it is critical to engage capable and motivated government partners with the institutional mandates for supplying and maintaining such data and maps. Moreover, resources need to be put in place to build technical capacity within these partners, and a long-term plan needs to secure regular budget resources to maintain core functions of the online platform. These efforts represent Output 4.

Package 2 of outputs: analytical study to determine forest potential and spatial priorities of use

The envisioned study will rely on the outputs listed above, but also incorporate relevant conservation planning and community mapping by non-governmental organizations. The objective is to highlight the multiple benefits provided by forest ecosystems and their contribution to livelihoods and economic development. This can be done by identifying important supply areas for timber, non-timber products, food crops and other agricultural commodities, habitat for wildlife and biodiversity conservation, carbon storage, and other ecosystem services. These areas can be analyzed to show the most promising areas for timber and non-timber forest production, agriculture, tourism, spiritual enrichment, carbon storage, biodiversity offsets areas, and other uses. A final set of maps could suggest spatial priorities such as:

- Areas with high timber potential (e.g., suitability for industrial, semi-industrial, and artisanal production; unsuitable areas).
- Areas most suitable for crop and food production.
- Areas with high potential for carbon storage and forest restoration.
- Areas with high conservation values and potential biodiversity offsets areas.
- Areas suitable for corridor creation to link areas with high biodiversity.
- Areas most suitable for tourism development and recreation.
- Potential “protection forest areas” (e.g., fragile soils, watershed services, sacred forests).
- Potential “forest conservation areas” (e.g., intact natural areas, core refugia areas, high plant and fauna diversity areas).
- Potential “community forest areas” showing lands occupied and claimed by local communities and indigenous peoples.

Within the forest sector, such spatial prioritization can be applied to propose a technically sound zoning of Permanent Forest Estate and Non-permanent Forest Estate and help to create greater synergies among plans prepared independently for the Republic of Congo’s FMUs. At multi-sectoral planning level, the analytical maps can inform preparation of the *PNAT* and the *SNAT*, improve planning for each land use management zone (*zone d’aménagement du territoire*) in the *SNAT*, and contribute to implementing the orientation law for land use planning.

Output 5 described above will be accompanied by stakeholder engagement and communication support (Output 6). It will seek comments to refine the approach for preparing the analytical maps, get feedback

on draft maps of spatial priorities, and prepare communication material that raise awareness about the study and its findings.

Package 3 of outputs: proposals to strengthen zoning and classifications within the forest estate

Over the past years, the Republic of Congo's forest management units (FMUs) have been delineated without the in-depth multi-resources information expected from the *IFN*. Concession allocations have not benefited yet from a national spatial strategy that prioritizes different types of forest use for specific geographic areas.

A timber company that has been allocated a concession has to follow the Republic of Congo's forest law, which requires a socio-economic and biophysical inventory and a management plan. The plan must include broad zoning such as logging units, road development, protected forest areas, experimental forest areas, protection of riparian areas (buffer along permanent water bodies), community development areas (e.g., for agriculture), and land designated for community hunting. Once a concession has been allocated, the land (and associated zoning) becomes part of the permanent forest estate (PFE).

While all companies developing management plans and establishing land use zoning follow the same steps outlined above, there is little coordination of plans, either across the boundaries of Forest Management Units (FMUs) or with non-forest land bordering FMUs. Land use planning and zoning within a concession therefore does not take advantage of a broader landscape perspective, for example by increasing ecological connectivity and improving forest biodiversity values or by encouraging agricultural activities in strategic locations (e.g., through buffer zone management, wildlife corridors between protected zones, and inclusion of biodiversity aspects into production forests).

Output 7 addresses this issue of zoning within the PFE. It seeks to harmonize plans across FMUs with a broader landscape and in some cases even a national perspective in mind. It envisions a proposal for zoning revisions that are based on a national assessment of current zoning within all FMUs and new maps suggesting shifts in zoning to create greater synergies across FMUs and with land use priorities in non-forest land. The zoning revisions would be based on the analyses supporting Output 5. The final proposal would also include suggestions on the most suitable incentives to encourage spatial shifts in zoning and forest production patterns within existing FMUs.

A second entry point to strengthen land use planning for the Republic of Congo's forest estate is focused on the non-permanent forest estate (NPFE) and its official delineation. As discussed above, the practice of awarding a concession for a FMU to a company defines the land as PFE. Areas that have been classified or allocated for one of the land allocation types defined by the Republic of Congo's forest law as being PFE become PFE through the process of classification. The NPFE, however, is a residual: it has not been delineated explicitly on a map.

Currently, the Republic of Congo's NPFE is all remaining land outside of PFE defined as forest. In 2011, the NPFE covered 7.8 million hectares, about 28 percent of the Republic of Congo's forests (WRI, 2012). For example, some of the largest blocks of NPFE are in Sangha department, with smaller blocks in almost all forested departments.

The forest in NPFE land are considered to be part of the public domain of the state. The land hasn't been classified for a specific land use yet. NPFE land could be assigned for any land use including timber production, agricultural crops, palm oil plantations, wildlife corridors, agro-forestry, and forest restoration (ClientEarth 2015).

Output 8 seeks to take advantage of the *IFN* project and the analytical outputs described above and develop a proposal to delineate NPFE land and possible land use options within this land. Delimiting the boundary of NPFE land, for example within the forest-savannah transition zone, will help create greater clarity in future land allocations for the agriculture, forest, and other sectors. The envisioned maps of possible land use options within NPFE areas would take a broader landscape and in some cases a national perspective into consideration. The maps would also incorporate ideas of past (and ongoing) regional land use planning efforts, for example macro-zoning for mining and conservation in Sangha department (WWF, 2015) and biodiversity offsets areas in Niari department (WCS, 2015).

Output 8 is expected to align with the work of the inter-ministerial working group to prepare a National Land Allocation Map (*Carte Nationale d'Affectation des Terres*) and associated plan (*Plan National d'Affectation des Terres*). However, at this point in time, there is not sufficient information to determine how much progress has been made to advance the *PNAT* since the group was established in July 2015. A typical first step to develop a *PNAT* would be to determine current land allocation followed by a map and description of future envisioned land allocation for different uses including PFE and NPFE.

A key principle underpinning Outputs 7 and 8 is to produce high quality maps and analysis quickly and consider the outputs as a proposal. To ensure that both outputs are not an isolated technical exercise, resources need to be earmarked for stakeholder engagement and communication support (Output 9).

Output 10 is the final output of the proposed work stream to strengthen zoning and classifications within the forest estate. It would cover lessons learned from Outputs 7-9 and recommendations for future revisions of the *SNAT* and other plans and guidance documents envisioned under the orientation law for land use planning. Output 10 will be an important contribution to strengthen the Republic of Congo's multi-sectoral planning process.

Package 4 of outputs: draft reference map of forest estate and forest extent

In other tropical forest countries, planners of different agencies are often facing the challenge of relying on multiple forest maps, resulting in misaligned maps of land use priorities and land use concessions. This is the reason why Indonesia's president launched the "One Map" project, a comprehensive effort to establish a standardized base map, create new thematic maps, build a national geo-portal, and other efforts to strengthen its geo-spatial data infrastructure.

Output 11 proposes to invest up front in efforts to create a reference map of the country's forest estate and forest extent, and thus avoid the costly mistake of multiple maps.

Such a reference would facilitate spatial planning across all sectors and help to lower transaction costs to allocate land. Such a map would provide government agencies in various sectors with an agreed-upon reference upon which to base their plans. Companies interested in investing in PFE and NPFE land would have greater certainty in their operations about the status of the land and the associated rules. And most likely, contestation in land allocations would be reduced.

Similarly, such a reference would help create greater certainty for establishing REDD+ projects. By clearly delineating land falling under the PFE and NPFE category, a land area's intended use is more clearly defined, providing project proponents of REDD+ projects with greater certainty that there will be no other unintended land use within the same forest area and that the Republic of Congo's established rules under the forest law (or future proposed drafts) would be followed (e.g., land use changes requiring a

deforestation permit; any declassification of forest in the PFE requiring prior classification of an equivalent size area in another location).

Creating a reference map of the forest estate and forest extent for sectoral and multi-sectoral plans is both a technical and political process (Output 10). It will require time and resources for stakeholder engagement and communication support (Output 11). As mentioned for previous outputs – speed and quality is going to be key. The orientation law for land use planning is expected to provide the necessary impetus to advance such a map, especially if interest and resources from key ministries can be secured to implement the law. However, there is not sufficient information yet to determine how quickly political issues can be resolved to create a final officially approved reference map of the Republic of Congo's forest estate. It is therefore assumed that a final draft (Output 10) can be prepared with stakeholder contributions within the planned time frame. It is also assumed that the new multi-sectoral planning institutions (see 4.2.5), envisioned under the orientation law for land use planning, most likely will need to be in place to help escape from any possible impasse brought on by incompatible sectoral and institutional priorities for different versions of delineating the forest estate (PFE and NPFE).

4.2.2 Agriculture sector

Rationale for proposed activities and outputs

Link to existing sector planning. The proposed work rests upon the *Plan de Développement du Secteur Agricole (PDSA)* and the expected agricultural land use information from the multi-resources inventory (*IFN*). The latter information is required to establish baseline information on the current extent of agricultural land use in the country.

Objectives of the proposed work. The objectives are to fill some of the important gaps in baseline data and to create a stronger analytical foundation to permit more precise zoning and use of land for agricultural purposes. These activities will strengthen decision making in the agriculture sector and support preparation of the *PNAT* and the *SNAT*. As in the forest sector, the final objective is to create stronger zoning and classification of agricultural land – building on the principles and macro-zoning applied in the *PDSA* to delineate future agricultural expansion.

Timing of the proposed work. This technical work in the agriculture sector can be launched immediately. This work for the agriculture sector will be an important input to complete the *PNAT* and revise the *SNAT* and associated macro-zoning. Completion of this initial technical work in the agriculture sector within 12 to 18 months is required to make a meaningful contribution to multi-sectoral planning.

Envisioned lead institutions. The *Ministère de l'Agriculture et de l'Elevage (MAE)* is envisioned to lead this effort and work closely with *MAT-DGGT*.

Proposed packages of activities. The first proposed package of activities seeks to consolidate existing data on agricultural use and community lands (e.g., from the *IFN*, land use zoning in forest concessions, and other remote sensing information). It also seeks to fill important soil information gaps, so that future micro-zoning for agricultural land and agricultural support to strengthen soil and nutrient management for agricultural production can be carried out more precisely. The next package of activities envisions analytical studies that can help to delineate the potential for agriculture in general and for palm oil specifically. Spatial analysis and maps of community lands round out this package of activities.

These activities are justified because agricultural growth and food security are a high priority in the country's national development strategy. Up-to-date and comprehensive spatial data on current agricultural use are the foundation for better spatial planning within the sector and at multi-sectoral level and can help to address a major driver of forest loss and ecosystem change. Likewise, improved baseline data are the foundation for any long-term land use monitoring system.

The reason for the analytical work is to provide a more evidence-based foundation so that the agriculture sector can proceed to the more precise micro-zoning of agricultural lands envisioned in the *PDSA*. In addition, such analytical maps can be helpful to delineate more defensible boundaries between agriculture and forest use, determine areas with high potential for agroforestry, and identify the most promising areas for selected crops and livestock production. Most importantly, this type of analysis will be needed to justify prospective zoning and classifications of agricultural lands.

As in the forest sector, the work stream for agriculture proceeds beyond the data and analytical work. It seeks to develop more specific recommendations on the type of agriculture use in a geographic area. Similarly, it seeks some type of zoning for one of the most profitable industrial crops – oil palm, a significant driver of deforestation in other countries. Agreed upon zoning and official classification of agricultural land, especially vis-à-vis the forest estate, can create greater certainty for land managers within government and outside government. The ultimate output envisioned for the agriculture sector work stream is a national reference map of agriculture and an investment guide for oil palm (with associated zoning indicating the suitability of land for sustainable oil palm production).

Figure 31 shows the progression of these major packages of activities and outputs (orange boxes) and how they would result in a reference map of agriculture and an investment guide for palm oil. A more detailed set of proposed outputs and a preliminary work plan are shown in Table 3. These outputs, grouped into four packages, will be described in more detail in the next sections.

Package 1 of outputs: consolidated databases and maps

Two outputs are envisioned for the first year. They focus on compiling existing information and commissioning an updated soil map.

Output 1 covers consolidating databases and maps of agriculture use and community lands. This effort combines information from the national multi-resources inventory (*IFN*), available remote sensing products, agricultural and community land zoning from the management plans of forest concessions, and other studies (e.g., *SNAT 2005*, *Plan de Développement du Secteur Agricole*).

A special emphasis of the data compilation will be extracting relevant information about community lands used for agricultural purposes for a preliminary national map of such use. This map will then become the foundation of a more comprehensive study to delineate potential community lands to encourage their macro-zoning in future land use plans.

Output 2 is an updated soil map. A higher resolution soil map (not necessarily covering the whole country) could help delineate high potential areas for agricultural production and identify soil constraints that need to be overcome to boost yields. Both the *PDSA* and the *PND 2016-2016* refer to

Figure 31 Strengthen agriculture sector planning: sequencing of major packages of activities and outputs

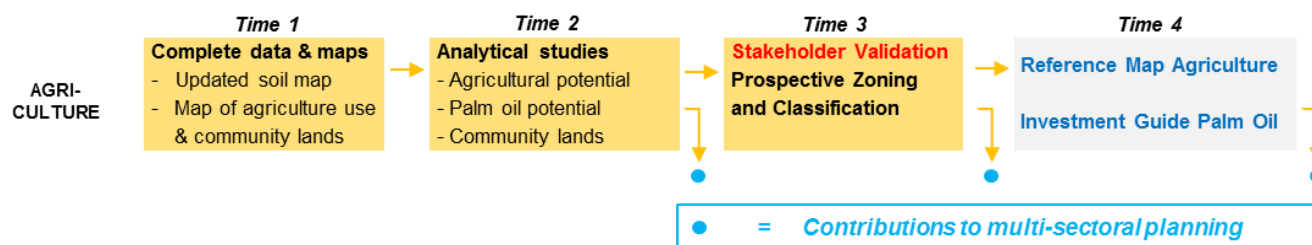


Table 3 Strengthen agriculture sector planning in support of multi-sector land use planning: outputs and work plan

OUTPUTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Package 1: consolidated databases and maps					
1. Consolidated database and maps of agriculture use and community lands					
2. Updated soil map					
Package 2: analytical studies to determine agricultural potential and spatial priorities of use					
3. Supporting study and maps to delineate agricultural potential					
4. Supporting study and maps to delineate suitable areas for palm oil production					
5. Supporting study and maps to delineate community lands					
6. Stakeholder engagement and communication support for Outputs 3-5					
Package 3: proposals to strengthen zoning and classifications					
7. National Agriculture Use Zones (Cat. 1-3 Land)					
8. Revised national macro-zoning for agriculture and zoning of community lands					
9. Proposal for zoning of palm oil production and associated investment guide					
10. Proposal for agriculture reference map					
11. Validation of agriculture reference map: stakeholder engagement and communication support					
Package 4: final draft reference map and investment guide					
12. Reference map agriculture					
13. Investment guide for palm oil production					

the need for such a map. In addition, the *PDSA* envisioned further micro-zoning to allocate agricultural concessions, which will require more detailed soil information.

Preparing an updated soil map can be time consuming and costly. At the writing of this document, the information about ongoing spatial data investments in the agriculture sector was still incomplete—it could be possible that such an update is already underway. In addition, there could be linkages with Africa-wide efforts to create more detailed soil maps using a combination of remote sensing and sampling sites. Once this background information has been obtained, commissioning two different products could be considered:

- One map, at coarser resolution, that can be completed within a year and be used for better agricultural zoning for the respective country-wide outputs of the roadmap.
- A second, much more detailed, soil map that would support micro-zoning and planning at more local scales. This map would be completed within the time horizon of the roadmap, but not incorporated in its multi-sectoral planning outputs.

Both maps should be completed in a format ready for online distribution and use.

Package 2 of outputs: analytical studies to determine agricultural potential and spatial priorities of use

A soil map combined with other data layers could be used to produce a more detailed map of agricultural potential. This could be done for a group of agricultural commodities or for selected high-value crops such as oil palm. Two supporting studies are proposed:

- Output 4 would delineate agricultural potential in a more general way.
- Output 5 would delineate the most suitable areas for palm oil production.

The first output would be used as an input in macro-zoning for the *PNAT* and the *SNAT*. The second output would become the foundation to prepare an investment guide for palm oil production.

Both studies can be carried out by the same consultant. The palm oil suitability map would build on existing studies such as CIRAD's and incorporate lessons learned from Gabon's national land use plan (*Plan d'Affectation des Terres*) and its delineation of potential palm oil areas.

The third study (Output 6) will explore new ways to delineate community lands. Such information can then become the foundation for their zoning, for example in the *PNAT* and the *SNAT*. This would send a strong message that such lands are essential to the Republic of Congo's economic and spatial development strategy.

The study needs to decide how to define community lands: it can focus on crop, livestock, and agroforestry related uses; or it could be wider in scope and include community lands for indigenous peoples (both in forest and savannah ecosystems). Likewise, the study needs to determine the scale and accuracy of its delineation, which depends on the overall purpose. A national effort that seeks to improve upon the *PDSA*'s 5-kilometer buffer around villages would rely on a different method and require fewer resources than a map for local planning or for legal purposes. Such local planning and zoning can successfully rely on participatory mapping to delimit land for local use such as cropping, fuelwood production, hunting, and fishing areas.

Outputs 4-6 will require resources for stakeholder engagement and communication products. Output 7 earmarks resources for that.

Package 3 of outputs: proposals to strengthen zoning and classifications

It is proposed to use the improved baseline data and analytical maps to support zoning and classifications of agricultural lands. The rationale for this is as follows:

- Improved classification of agricultural land for different purposes can support macro-zoning for the *SNAT* and the *PNAT*. In the orientation law for land use planning, agricultural land is not listed as one of the key parts of the national territory such as forests, wetlands, and mining areas. This means that the law provides no opportunity to guide agriculture land use to more suitable areas and sustainable use with the help of a legally required master plan (*les schémas directeurs de les parties du territoire*) and associated guidance (*orientation*). Agriculture use, however, has been addressed in the *SNAT* of 2005 with the help of macro-zoning for crop and livestock production in each land use management zone (*zone d'aménagement du territoire*).
- The *PDSA's* macro-zoning was preliminary and envisioned completion of agricultural macro-zoning by 2015 and of micro-zoning by 2025. The plan encouraged more harmonized forest and agriculture sector plans and zoning, especially in savannah ecosystems, which are suitable for both agricultural purposes and reforestation efforts. Zoning for agricultural and forest purposes that is clearly delineated can facilitate land-use allocations, both for industrial agriculture concessions and for village land use.
- Identifying the most suitable areas for palm oil production and identifying zones of preferred investments would address an important component of future agricultural expansion. It would also address one of the key drivers of future forest loss.

Thus three outputs to guide agricultural land use are suggested:

- Output 7 is a map of proposed national agriculture use zones. It supports implementing Law n° 25-2008 (agro-land regime law). The law classifies agricultural land into three categories: 1st category land (subsistence farming; fallow land, grazing land and paths); 2nd category land (intended for intensive farming of food crops, farming, or livestock cooperatives; land for commercial or industrial use of perennial crop plantations); 3rd category land (land reserved specifically for forestry or mining).
- Output 8 is a national map with proposed macro-zoning for agriculture and zoning for community lands.
- Output 9 is a proposed map for zoning of palm oil production and associated investment guide.

Package 4 of outputs: draft reference map for agriculture and palm oil investment guide

Output 10 is a proposed agriculture reference map. The map would combine information from the various zoning proposals explored above (Output 7-9). Such a reference would facilitate spatial planning across all sectors and help to lower transaction costs to allocate land. Government agencies in various sectors can base their plans on an agreed-upon reference. Companies would have greater certainty in their operations about the status of the land and the associated rules.

Creating an agriculture reference map is both a technical and political process (Output 10). It will require time and resources for stakeholder engagement and communication support (Output 11).

The orientation law for land use planning is expected to provide the necessary impetus to create such a map, as will be *MAT-DGGT's* effort to advance the *PNAT* and the *SNAT*. However, there is not sufficient information to determine how quickly political issues can be addressed to create a final officially approved reference map. It is therefore assumed that a final draft of Output 10 can be prepared with stakeholder contributions within the planned time frame – this will be sufficient to support the *PNAT* and *SNAT* outputs envisioned in this roadmap.

The final output of the validation process would be the administrative sign-off on the reference guide and investment guide (Output 12 Reference map for agriculture; Output 13 Investment guide for palm oil). This separate sign-off may not be required, if the agricultural zoning maps discussed above are incorporated sufficiently in the *PNAT* and the *SNAT*, and if their technical and political processes advance quickly.

4.2.3 Mining Sector

Rationale for proposed activities and outputs

Link to existing sector planning. Institutions in the mining sector are building their capacity on mining concession data, geological maps, and geological information management. These efforts are the starting point to strengthen spatial planning.

Objectives of the proposed work. The proposed activities to strengthen land use planning in the mining sector are narrow in focus. They address mining as a driver of new infrastructure investments such as roads and railroads, which in turn can affect indirectly land and resource use of large geographic areas. The first objective is to make up-to-date and accurate mining concession data and geological survey information available to all government sectors. The second objective is to prepare an analytical study with associated maps on infrastructure options and areas for biodiversity offsets. These maps can inform both the *PNAT* and the *SNAT*. Influencing the spatial priorities established in the *SNAT* is especially important because of its emphasis on investments in transport and energy infrastructure and other government services.

Timing of the proposed work. This technical work in the mining sector does not have to wait for progress at multi-sectoral level (e.g., revision of the *SNAT*; *code d'aménagement du territoire*), but will require information on infrastructure and biodiversity (see proposed activities in section 4.2.4). If the technical study in the mining sector is completed within 12 to 18 months, it can contribute to the envisioned multi-sectoral planning outputs.

Envisioned lead institutions. The proposed lead institutions are the *Ministère des Mines et de la Géologie – MMG* and the *Centre de Recherche Géologique et Minière – CRGM*. They are envisioned to work closely with *MAT-DGGT*. *MMG*, *CRGM*, *MAT-DGGT*, and most likely *CNIAF*, would collaborate on a joint set of maps for a land use GIS and also establish partnerships with relevant institutions working on transport and energy infrastructure and on biodiversity conservation.

Proposed packages of activities. Two major packages of activities are envisioned to strengthen mining sector planning: the completion of consolidated databases and maps and the preparation of an analytical study that identifies potential future mining areas and available options to route infrastructure and designate land for biodiversity offsets areas. A map of potential mining areas and options for infrastructure routing and biodiversity offsets are the ultimate outputs of the proposed work stream for the mining sector. This map is envisioned to contribute to the *SNAT* and strengthen long-term spatial planning for the mining sector.

Figure 32 gives an overview of the sequencing of major packages of activities and outputs (purple boxes). Table 4 provides a summary of all outputs and a preliminary work plan. These outputs, organized into two packages, are discussed in the next sections.

Figure 32 Strengthen mining sector planning: sequencing of major packages of activities and outputs

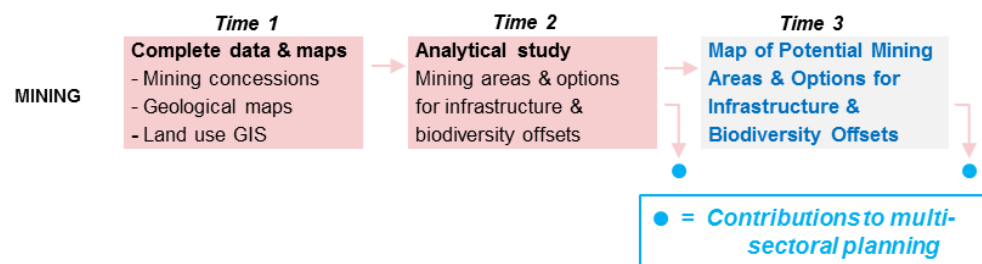


Table 4 Strengthen mining sector planning in support of multi-sector land use planning: outputs and work plan

OUTPUTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Package 1: consolidated databases and maps					
1. Consolidated mining concessions database and associated land use GIS					
2. Consolidated public use data from exploration concessions					
3. Updated geologic maps and derived map products					
Package 2: analytical study					
4. Study and maps to support analysis of mining areas and associated options for infrastructure development and biodiversity offsets					

Package 1 of outputs: consolidated databases and maps

Three outputs will build better databases and maps that are expected to strengthen planning and decision-making in the mining sector and support multi-sector land use planning. These outputs include a mining concession database and associated land use GIS, public use data from exploration concessions, and geologic maps and derived map products.

In addition, two more data and map outputs – updated information on energy and transport infrastructure and areas for potential biodiversity offsets– will be relevant for the analytical study in the mining sector. These activities are described in detail in section 4.2.4.

Output 1 is a consolidated mining concession database and associated maps. A 2014 review on the status of geospatial data in the Republic of Congo indicated that the Ministry of Mines and Geology was maintaining an internal database on mining concessions. An up-to-date, shareable database, ideally online, would greatly facilitate planning in other sectors. In the past, both the *PDSA* and the *SNAT* from 2005 could not incorporate mining issues adequately because of a lack of up-to-date mining concession information.

As part of this output, *MMG*, *CRGM*, *MAT-DGGT*, and most likely *CNIAF*, would collaborate on a joint set of maps for land use planning. Their collaboration would result in a fully functioning land use GIS that combines mining permits with appropriate baseline layers on geology and current land use information from the multi-resources inventory (*IFN*). The GIS can also include data and map compilations envisioned from the roadmap (e.g., infrastructure, biodiversity).

Output 2 consolidates public use data from exploration concessions and makes them available for land use planning. Mining companies with exploration permits are compiling new data and map layers as part of their reporting to the Mining Research and Prospection Service of the Ministry of Mines and Geology. So far the data and map layers with unconfidential geological and mining data have not been combined in a national database and are not available for dissemination.

Output 3 includes updated geologic maps. The 2014 review of geospatial data availability in the Republic Congo mentioned that a new geological map was being created by *ASPERBRAS* in the north and by *TOTAL* in the south of the country. *TOTAL* commissioned the French Geological Survey (*BRGM*) to produce seven 1/200 000 geological maps and one 1/100 000 map over three years, covering selected parts of the country.

Output 3 also earmarks resources to evaluate the expected final spatial data sets from the geological mapping effort and to create relevant maps for land use planning – selected geological map layers could be relevant for environmental planning, hazard risk mapping, and land use planning. In other countries, for example, national geological survey institutes have prepared important information products from geological surveys. These derived map products play an important role in land use planning at various scales. They include maps that support the siting of buildings and transport systems (based on detailed topographic and geological maps) or identify mineral resource potential (e.g., construction materials, metals, ground water), geo-hazards (e.g., flooding, landslides), and environmental risks (e.g., acid drainage, radionuclide potential).

Package 2 of outputs: analytical study

Output 4 will use the data and maps from the previous outputs and combine them with information on transport infrastructure (roads, rail, pipelines, and navigable rivers) and energy infrastructure and

information on areas for potential biodiversity offsets (see section 4.2.4). Combining these data will support an analysis of mining areas and associated options for infrastructure routing and biodiversity offsets.

The analysis examining the feasibility of different transport options to reduce the direct and indirect footprint of mining could answer questions such as:

- Where would it be possible to consolidate the routing of infrastructure and avoid negative impacts on habitat loss and biodiversity?
- Which areas would be most suitable for an “offshore” approach to mining and how would that affect the choice and location of transport and energy infrastructure?
- What options exist to obtain land for biodiversity offsets (this would be linked to the study assessing options for biodiversity and conservation areas – see section 4.2.4)?

The analytical study could be narrow in scope and examine one mineral and one region, for example iron ore mining in the TRIDOM interzone (see Box 3). Alternatively, the scope of the study could be more ambitious covering multiple minerals and include a comprehensive strategic assessment for the mining sector (or an important mining region).

Such a strategic assessment would identify options to avoid or reduce cumulative mining impacts and align planning for the mining sector with large infrastructure planning (e.g., road, ports, electricity). Experience from the *Strategic Environmental Assessment* for the central Namib Uranium Rush region and the *Cameroon Strategic Environmental and Social Assessment* (World Bank Mining Sector Capacity Project) could be instructive when preparing the terms of reference for such a comprehensive assessment.

For this roadmap, it is proposed to carry out a technical study focusing on iron ore mining. It would include some stakeholder consultation and be completed within 12 months.

4.2.4 Other sectors: biodiversity conservation, tourism, and infrastructure

Rationale for proposed activities and outputs

Link to existing sector planning. Increasing spatial planning capacity in support of biodiversity and conservation objectives can build on data compilation and map production from the *IFN* and on local conservation planning carried out by international conservation organizations and RoC partners. Mapping of tourism potential can be linked to the efforts to develop a national strategy and master plan for sustainable tourism (e.g., work by the *comité du pilotage du projet de la strategie nationale et du développement durable du tourisme*). Linking transport and energy infrastructure planning to land use planning and the *SNAT* is envisioned to build on national efforts such as the National Transport Plan (*Plan National des Transports – PNT*).

Objectives of the proposed work. The proposed activities will strengthen biodiversity conservation, tourism, and infrastructure planning at national scale. The objectives are to make these sectors’ information more readily available across government agencies and align the respective sector planning efforts with the preparation of the *PNAT* and the revision of the *SNAT*. The outputs from each sector are expected to strengthen the macro-zoning in the multi-sectoral plans.

Timing of the proposed work. All proposed activities for these sectors are envisioned contributions to the *PNAT* and the *SNAT* and can start immediately. The initial compilation and map production for these

sectors can be completed quickly—ideally within a 12 to 18 months. Close coordination with the mining sector is required to complete the proposed study on options for infrastructure routing and possible biodiversity offsets areas.

Envisioned lead institutions. The lead institutions proposed for these sectors include: biodiversity conservation (*MEFDD*); environment and tourism (*Ministère du Tourisme et de l'Environnement- MTE*); transport infrastructure (*Ministère des Transports, de l'Aviation Civile et de la Marine Marchande – MTACMM*); and energy infrastructure (*Ministère de l'Énergie et de l'Hydraulique - MEH / Société Nationale d'Électricité – SNE*). *MAT-DGGT* is envisioned to contribute in two roles to the proposed activities: as a planner of infrastructure the ministry is directly involved in and as the overall coordinator of multi-sectoral planning. In addition, international NGOs (e.g., *WCS, WWF*) planning conservation areas and companies preparing forest management plans can provide relevant mapping and planning expertise.

Proposed packages of activities. The first proposed package of activities seeks to consolidate data and create maps on biodiversity, habitats, tourism infrastructure, and transport and energy infrastructure. Two analytical studies, a national assessment of biodiversity conservation and conservation priorities and an assessment of new potential tourism areas based on available infrastructure and natural assets, make up the second package. Package 3 seeks to translate the analytical work on biodiversity conservation and develop a proposal for new macro-zoning for biodiversity conservation and biodiversity offsets areas. The final, fourth package proposes activities to create a reference map of these macro-zones.

Figure 33 shows the sequencing of these major packages of activities and outputs (green boxes) and their contributions to multi-sectoral planning. Table 5 lists all proposed outputs and a preliminary work plan. These outputs, grouped into four broad packages, will be discussed below.

Package 1 of outputs: consolidated databases and maps

Three outputs are envisioned for the first year, covering the biodiversity conservation, tourism, and infrastructure (energy and transport). These outputs focus on compiling existing data and information and preparing summary maps for land use planning:

- Output 1 consolidates habitat and biodiversity data and maps.
- Output 2 consolidates existing tourism infrastructure data and invests in new data and maps to fill important information gaps to determine tourism potential.
- Output 3 creates an updated infrastructure (transport and energy) database and maps.

Package 2 of outputs: analytical studies

Two analytical studies are being proposed. One advances macro-zoning for conservation and biodiversity offsets areas, and the other creates more complete information on areas most suitable for tourism development.

Output 4 takes the habitat and biodiversity data and maps from Output 1 to carry out a national study to determine priority areas for safeguarding biodiversity and ecosystem services outside of the existing protected area network. This would strengthen biodiversity and ecosystem management planning and establish a foundation for better macro-zoning of biodiversity and ecosystem services in the *PNAT* and the revised *SNAT*. The study would focus on key habitats, conservation corridors, protected areas, and

Figure 33 Strengthen biodiversity conservation, tourism, and infrastructure planning: sequencing of major packages of activities and outputs

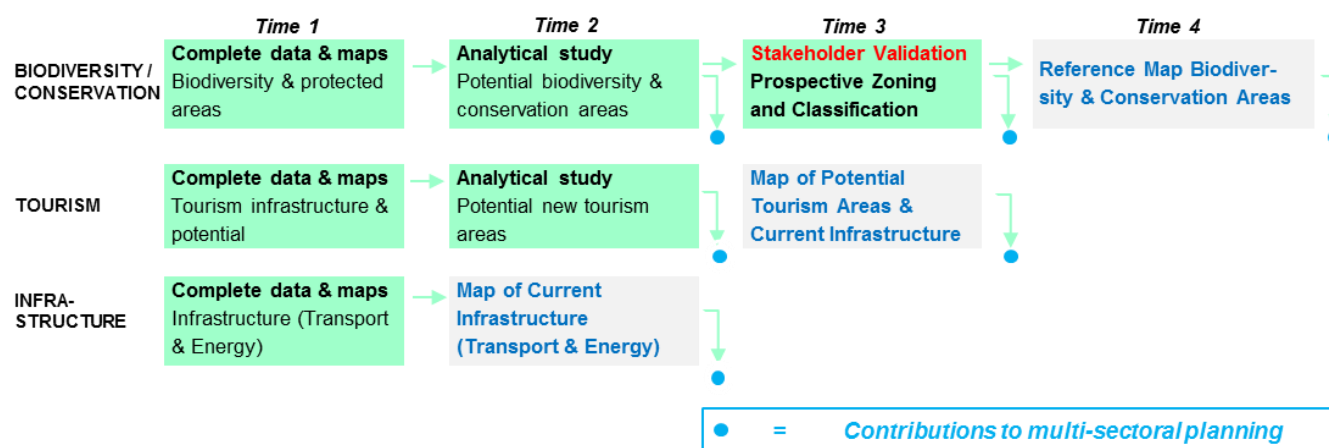


Table 5 Strengthen biodiversity conservation, tourism, and infrastructure planning: outputs and work plan

OUTPUTS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Package 1: consolidated databases and maps					
1. Consolidated habitat and biodiversity database and maps					
2. Consolidated tourism infrastructure database and maps					
3. Updated infrastructure (transport and energy) database and maps					
Package 2: analytical studies					
4. Study and maps to support biodiversity and conservation priorities					
5. Study and maps to support maps of potential tourism areas and current infrastructure					
Package 3: proposal to strengthen zoning					
6. Prospective macro-zoning for conservation and biodiversity offsets areas					
7. Stakeholder engagement and communication support: validation of macro-zoning					
Package 4: final draft reference map					
8. Reference map for macro-zoning of conversation areas and biodiversity offsets areas					

areas important for wildlife management and ecosystem services and cover all major ecosystems (e.g., forests, savannah, coastal ecosystems).

Output 5 is a study and associated maps of potential tourism areas. The maps would combine information of current tourism and transport infrastructure with information showing the distribution of scenic habitats, important wildlife areas, and other areas important for tourism-related activities.

Package 3 of outputs: proposals to strengthen zoning

The analytical maps from Output 4 can be used to propose a more formal zoning of land for biodiversity and conservation purposes. Such zoning could include priority areas for sustainable natural resources management (both in forest and savannah ecosystems), potential future conservation areas, and fragile ecosystems.

Output 6 earmarks resources to develop such prospective macro-zoning for conservation and biodiversity offsets areas. Output 7 covers stakeholder engagement and communication support to ensure the validation of this macro-zoning.

Package 4 of outputs: draft reference map

Creating a reference map for macro-zoning of conservation and biodiversity offsets areas is both a technical and political process. It was assumed that a final draft of Output 6 would be prepared with stakeholder contributions within the planned time frame – a draft would be sufficient to contribute to the *PNAT* and the *SNAT* envisioned in this roadmap.

The final output of the validation process would be the administrative sign-off on the reference map for macro-zoning of conservation and biodiversity offsets areas (Output 8). This separate sign-off may not be required, if the macro-zoning map is incorporated sufficiently in the *PNAT* and the *SNAT*, and if their technical and political processes advance quickly.

4.2.5 Multi-sectoral planning

Rationale for proposed activities and outputs

Link to existing multi-sector planning. The proposed activities can draw from the experience with the *SNAT 2005* and the general outline for multi-sectoral plans sketched out by the orientation law for land use planning.

Objectives of the proposed work. The objectives are to implement key components of the orientation law for land use planning covering initially the national scale. This includes completing important multi-sectoral spatial plans (e.g., *PNAT*, *SNAT*, plans for land use management zones) and putting in place selected legal and institutional components envisioned under the orientation law on land use planning. The final objective is to strengthen *MAT-DGGT*'s technical planning and process capacity to carry out and coordinate multi-sectoral planning.

Timing of the proposed work. The proposed activities build on the sectoral planning efforts discussed in the previous sections. Two assumptions on timing have been made: most of the data compilation, map production, and analysis for key sectors can be completed within 12 to 18 months to support the multi-sectoral planning process; the ongoing work on producing a *PNAT*, carried out under *MAT-DGGT* and *MEFDD* leadership, will continue and segue into the *SNAT* revision.

Envisioned lead institutions. The lead institution for multi-sectoral land use planning is the *Ministère de l'Aménagement du Territoire et de la Délégation Générale aux Grands Travaux - MAT-DGGT*.

Proposed packages of activities. The proposed activities seek to boost the government's technical capacity to produce maps and carry out spatial analyses, complete important multi-sectoral spatial plans, and put in place selected legal and institutional components envisioned under the orientation law on land use planning. The following five broad packages of outputs will be discussed in more detail:

- Center for land use and spatial development planning.
- National Land Use Plan (*Plan National d'Affectation des Terres - PNAT*).
- National Spatial Development Plan (*Schéma National d'Aménagement du Territoire – SNAT*).
- National institutions for multi-sectoral planning.
- Aligned legal codes for land use and spatial development planning.

Figure 34 provides an overview of the sequencing of these five major packages of activities and outputs (blue boxes). Table 6 lists the more detailed outputs and a preliminary work plan. The detailed outputs for each of the five broad packages will be discussed in turn.

Package 1 of outputs: center for land use and spatial development planning

The orientation law for land use planning envisions a multitude of strategies and plans at national and subnational scales. Good land use planning requires a comprehensive set of base maps at various scales, analytical maps and online mapping tools for use within government agencies and public engagement, and associated technical capacity to update such spatial data and apply them in land use planning.

Presently, there is no specialized technical unit within government focusing on multi-sectoral land use planning, especially one that can deliver consolidated spatial databases, produce new analytical maps, perform spatial land use analyses, and develop options of different land use scenarios taking the interests of all economic sectors into account. Furthermore, there is no national repository that compiles all sector and multi-sector plans (and associated maps), ideally in the form of an online platform that can be continually updated and accessed by analysts and decision makers within and outside government.

It is therefore suggested to establish a land use planning center, either within a single Ministry or as a shared center among multiple agencies. The exact terms of reference for such a center need to be aligned or subsumed with two *MAT-DGG* efforts: the first is the ongoing process to obtain the political clearance for a land use planning unit (*Direction de la Géomatique*) within the ministry, and the second is the effort to establish a National Cadaster and a National Geomatics Center (*Projet Etablissement du Cadastre National / Centre National Géomatique*). At the time of preparing this report, the terms of reference outlining the objectives and envisioned scope of technical and human resources were not yet available for this new unit and the center.

Over the long-term, such a unit would be in charge of the country's reference maps and online atlases related to land use and spatial development planning. Such a center could also supply analytical and mapping services for subnational planning in the country, especially in the case where such capacity has not been established yet locally or where such centralization can be more cost effective and faster in product delivery.

Figure 34 Strengthen multi-sector land use planning: sequencing of major packages of activities and outputs

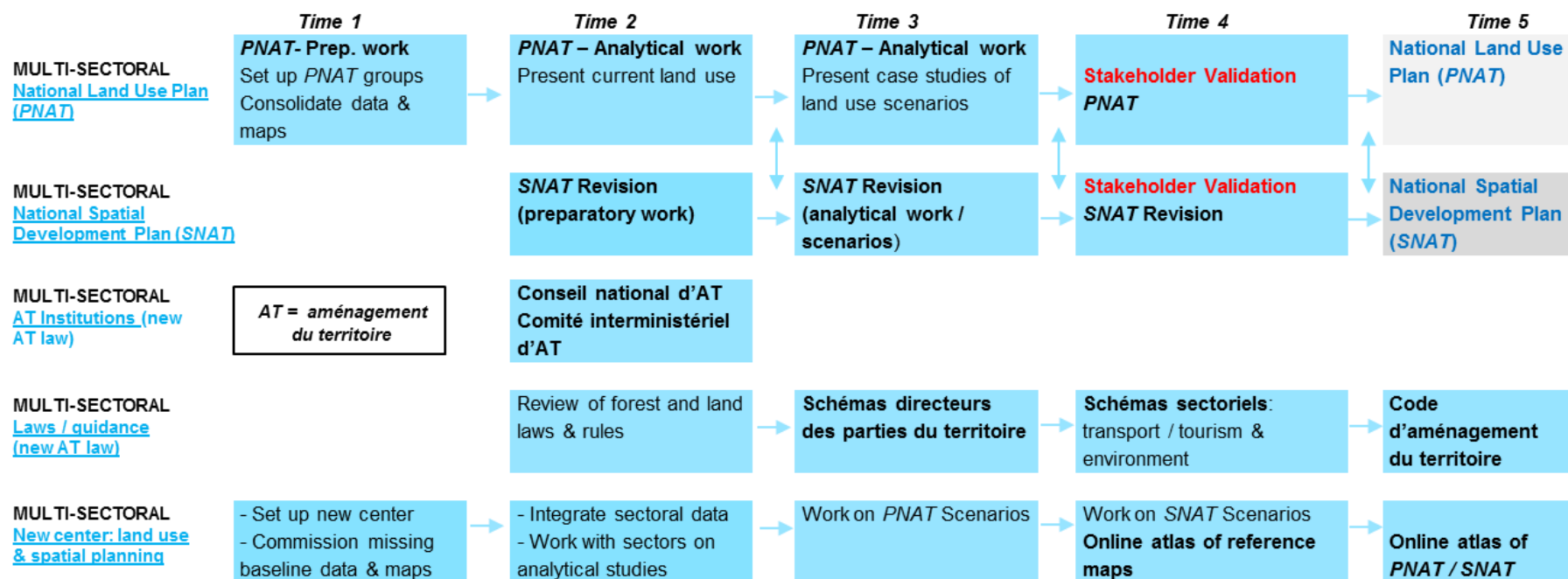


Table 6 Strengthen multi-sector land use planning: outputs and work plan

OUTPUTS	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5	
Package 1: center for land use and spatial development planning										
1. Set up center for land use and spatial development planning										
2. Consolidated data and maps from <i>IFN</i> and other sector databases										
3. Additional baseline layers and maps needed for multi-sector planning										
4. Maps and data supporting analytical studies in sectors										
5. Maps and data supporting scenarios for National Land Use Plan (<i>PNAT</i>)										
6. Maps and data supporting scenarios for National Spatial Development Plan (<i>SNAT</i>)										
7. Online atlases: reference maps, <i>PNAT</i> and <i>SNAT</i>										
Package 2: National Land Use Plan (<i>Plan National d’Affectation des Terres - PNAT</i>)										
8. <i>PNAT</i> preparatory work										
9. <i>PNAT</i> analytical work: current land use										
10. <i>PNAT</i> analytical work: case studies of land use scenarios										
11. <i>PNAT</i> validation: stakeholder engagement and communication support										
Package 3: National Spatial Development Plan (<i>Schéma National d’Aménagement du Territoire – SNAT</i>)										
12. <i>SNAT</i> revision: preparatory work										
13. <i>SNAT</i> revision: analytical work and scenarios										
14. <i>SNAT</i> including [11] <i>Schémas d’Aménagement du Territoire</i> and [11] <i>Plans d’AT</i>										
15. Validation of <i>SNAT</i> , <i>Schémas</i> & <i>Plans</i> : stakeholder engagement & communication support										
Package 4: national institutions for multi-sectoral planning										
16. <i>Conseil National d’Aménagement du Territoire</i>										
17. <i>Comité Interministériel d’Aménagement du Territoire</i>										
Package 5: Aligned legal codes for land use and spatial development planning										
18. Supporting study to align legal codes to review forest law and land laws & regulations										
19. <i>Schémas directeurs des parties du territoire</i> (7 types) required by law n° 43-2014										
20. <i>Schéma sectoriel du tourisme et l’environnement</i> required by law n° 43-2014										
21. <i>Schéma sectoriel des transports</i> required by law n° 43-2014										
22. <i>Code d’Aménagement du Territoire</i> required by law n° 43-2014										
Notes										
IFN = National Forest Inventory AT = Aménagement du Territoire										

Output 1 includes all efforts to set up such a center. This would cover activities such as securing political buy in, establishing institutional, legal and financial support, seconding and hiring staff, and acquiring computer hard and software.

The next two outputs build the foundation to create maps and carry out spatial analysis. Output 2 would consolidate and set up all readily available spatial data and maps on the center's system. This would include data and maps from the national forest inventory (*IFN*) and other sector databases. In addition, the center would commission a small set of missing baseline layers and maps for multi-sector planning. They would focus on essential data and maps that can be obtained within 9-12 months (Output 3). In the following year, center staff would closely collaborate with the already discussed analytical studies in the forest, agriculture, mining, environment, tourism, and infrastructure sectors (Output 4). This collaboration can be tailored to the specific circumstances in each sector and include:

- Review of interim products prepared for the sector analytical studies.
- Analytical contributions to support envisioned sector studies.
- Final clean-up and consolidation of sector data and maps to be housed on the center's computer system.

Output 5 and 6 would get the center involved in the work of finalizing a National Land Use Plan (*Plan National d'Affectation des Terres – PNAT*) and revising the National Spatial Development Plan (*Schéma National d'Aménagement du Territoire – SNAT*). The scope of this involvement will depend on the skill set and resources available at the center and the level of out-sourcing chosen for these two plans (e.g., with the help of short-term consultants). A similar range of contributions for the center can be envisioned as discussed above in its collaboration with the sectors (Output 4).

The final activities for the center would involve setting up an online platform for land use planning (Output 7) that can be used for data dissemination, communication of land use plans, and stakeholder engagement. As soon as the final outputs from the sector studies, the *PNAT*, and the *SNAT* have been completed, center staff would create an online atlas version of them. This work can be completed with technical support from short-term consultants, but center staff would be responsible for long-term maintenance of this platform.

Package 2 of outputs: National Land Use Plan (Plan National d'Affectation des Terres - PNAT)

The objective of the National Land Use Plan (*Plan National d'Affectation des Terres - PNAT*) is to achieve a balance between different uses of land and avoid conflicts resulting from multiple assignments of the same land for incompatible uses. A *PNAT* typically seeks to create synergies between broad type of land uses, for example between biodiversity conservation, carbon storage, safeguarding drinking water supplies, and eco-tourism. In cases where one land use results in negative impacts (e.g., cropland expansion in natural habitats), different strategies are applied to either avoid an impact on most sensitive areas (e.g., no large-scale expansion into intact, carbon-rich forests) or mitigate the impacts (e.g., encourage only small-scale cropping combined with agro-forestry in certain areas). A robust *PNAT* would explore different land use scenarios for certain locations, solicit stakeholder input, and balance economic, environmental, and social criteria to prioritize specific land use options.

The *IFN* project, as originally conceived, had a *PNAT* as a final output. However, multiple factors have delayed its delivery. In July 2015, the lead assignment for the *PNAT* was officially transferred from *CNIAF (MEFDD)* to *MAT-DGGT*.

Completing preparatory work, so that a successful *PNAT* can be achieved, is Output 8. This includes the following general steps (some of which have been started, but detail on the process was not fully available when drafting this report):

- Set up an inter-ministerial committee. This committee would provide the political support to coordinate land use planning for all major administrative units and for the major sectors that are typical users of large land areas in the country. In July 2015, *MAT-DGGT* and *MEFDD* initiated an inter-ministerial working group advising on the *PNAT*. The role of this *PNAT*-specific working group is envisioned to be further aligned with broader efforts to set up new land use planning institutions under the orientation law for land use planning envisions (e.g., *Comité Interministériel d'Aménagement et de Développement du Territoire*, *Conseil National d'Aménagement et de Développement du Territoire*).
- Set-up a technical working group that deals with the spatial and geographic analysis, spatial data compilation, and map production.
- Set up a legal working group that covers the legal issues linked to land use and land allocation.
- Determine the approach and method to carry out the *PNAT*.
- Sign a memorandum that clarifies the respective roles of the *PNAT* and *SNAT* (see more detail on *PNAT* and *SNAT* objectives and interlinkages in 3.1.2). This was done, for example, in Gabon.

Output 9 covers the first half of the analysis envisioned for *PNAT* and is focused on current land use and land allocations. This analysis would compile all the baseline information, use the data and the maps from the *IFN* multi-resources inventory, and incorporate information from the analytical studies in the sectors as they become available. An assessment of maps showing current land allocations (*affectation des terres*) would follow and highlight some of the main challenges and inconsistencies of current land use and land allocations. A final analytical step is the compilation of the legal information linked to these allocations with an associated assessment.

The second half of the analysis is expected to look at future land use (based on various planning documents and past land use trends). This is Output 10, which would develop case studies of different land use scenarios for selected sectors and regions. These scenarios would seek to create greater synergies between compatible land uses and avoid and mitigate incompatible land uses. Maps showing different land use options (and ideally a description of their major associated costs and benefits) would then become the basis for a comprehensive stakeholder engagement (Output 11) to determine preferred land use options. Consultations may be required at multiple scales, for example at national and at various subnational levels. The final step of the *PNAT* validation process would be the official administrative sign-off on the plan.

Package 3 of outputs: National Spatial Development Plan (Schéma National d'Aménagement du Territoire – SNAT)

The National Spatial Development Plan (*Schéma National d'Aménagement du Territoire – SNAT*) is a long-term plan that seeks to ensure a balanced distribution of people, activities, equipment, and infrastructure throughout the territory. It focuses on reducing spatial disparities across the country by investing in major infrastructure and government services that could help achieve sustainable use of above and below ground resources and diversify and grow the economy. A robust *SNAT* would explore various development scenarios that take different demographic, labor, investment, and land use options into account. Comprehensive stakeholder engagement and spatial prioritization of investments that balance economic, environmental, and social criteria, all contribute to a stronger plan.

The orientation law on land use planning designates *MAT-DGGT* as the technical lead to develop the *SNAT* through a participatory process. The *SNAT* is a 20-year plan that will be evaluated and reviewed every five years. The law does not stipulate the specific technical approach and the scope of consultation processes. The law does not refer to the Republic of Congo's first *SNAT* from 2005, thus leaving considerable discretion for *MAT-DGGT* to modify its approach for the *SNAT* revision.

It is assumed that revising the *SNAT* will commence once the sectoral studies are completed and the validation process for the *PNAT* is underway. The maps from these efforts are an important foundation to define land management zones (*zones d'aménagement du territoire*) and associated macro-zoning in the *SNAT*. The general approach for the *SNAT* in this roadmap is similar to the sequencing of outputs for the *PNAT*. Initial preparatory work is followed by analysis and scenarios (with stakeholder consultation), then preparation of a revised *SNAT* and associated plans, and finally validation of the plans.

The preparatory work for the *SNAT* (Output 12) assumes that all required spatial planning institutions such as the *Conseil National d'Aménagement du Territoire* and the *Comité Interministériel d'Aménagement du Territoire* have been established (Outputs 16 and 17). Any other technical and legal working groups required for the *SNAT* could build and expand upon the ones that were set up for the *PNAT*. Likewise, most of the initial data and map compilation should be in place because of the *PNAT*.

When determining the approach and method for revising the *SNAT*, *MAT-DGGT* can use this preparatory phase to learn from other countries' planning experiences such as Gabon and Tunisia, Ghana and South Africa, and Brazil. *MAT-DGGT* has multiple entry points to revise the *SNAT* process such as making principles of sustainability more explicit, creating stronger links to sectoral plans, modifying the analytical approach, and expanding the participation process (see more detailed suggestions in 3.1.4).

Output 13 includes analytical work and scenarios for the *SNAT* revision. They are discussed in turn.

The analytical work is envisioned to build on the *PNAT* maps. It is recommended to consider a case study that explores new ways of macro-zoning going beyond the land use categories applied in the Republic of Congo's first *SNAT*. This could raise the awareness of decision-makers that new types of investments and government services are needed, for example to support land managers in areas important for wildlife corridors, the supply of ecosystem services, and tourism development (all of them outside of national parks and other highly protected areas).

For example, much can be learned from Brazil's zoning approach at state level, which has evolved over many years. It combines both ecological and economic criteria, and takes land for indigenous peoples into considerations. This has resulted in macro-zoning that clearly identifies possible agricultural expansion zones, areas of agricultural intensification and consolidation of crop and pasture lands, buffer zones for rural settlements, areas for sustainable natural resource management (both in forest and savannah ecosystems), space for potential future conservation areas and protected areas, and fragile ecosystems that are outside of the protected area system.

Such a new type of zoning could then influence, for example the routing of the transport network to service new iron mining sites. Or it could provide guidance on the type of desired mining operation encouraged in close proximity to high conservation areas and wildlife corridors, for example an offshore approach of housing staff that discourages establishing new permanent settlements and land use change within the mining concession.

The second half of the analytical work to produce Output 13 is the preparation of land use and spatial development scenarios. In most cases and for many geographic locations, more than a single land use option is possible. In addition, diverse stakeholders such as local communities or an agriculture investor for biofuels prefer various types of land uses, infrastructure investments, and government services. This is why countries often explore multiple socio-economic projections and different development scenarios for a geographic area and then solicit stakeholders' preferences for land use options and infrastructure development in a *SNAT*. It is recommended that a similar approach is used for this roadmap.

Output 14 covers the preparation and completion of the *SNAT*, based on these scenarios. It includes preparation of a *Schéma d'Aménagement du Territoire* and a *Plan d'Aménagement du Territoire* for each land use planning zone (*zone d'aménagement du territoire*), as specified in the orientation law for land use planning. In the *SNAT* from 2005, the Republic of Congo had eleven land use planning zones, but modifying this number should be taken under consideration.

Output 15 earmarks resources for stakeholder engagement and communication support to validate the revised *SNAT* and the associated *Schémas* and *Plans*. If the *SNAT* revisions includes eleven land use management zones, region-specific consultations are most likely required.

Package 4 of outputs: national institutions for multi-sectoral planning

To implement the orientation law for land use planning, new institutions must be established. This roadmap prioritizes the ones at national level. They can support the sectoral and multi-sectoral planning efforts envisioned in this road map. Furthermore, they can be supportive with their endorsement of the roadmap's final outputs, which would facilitate a more successful implementation. Output 16 covers the *Conseil National d'Aménagement du Territoire*, and Output 17 focuses on the *Comité Interministériel d'Aménagement du Territoire*.

The main purpose of these institutions is sketched out in the orientation law for land use planning. As part of this roadmap, detailed terms of references need to be developed.

Package 5 of outputs: aligned legal codes for land use and spatial development planning

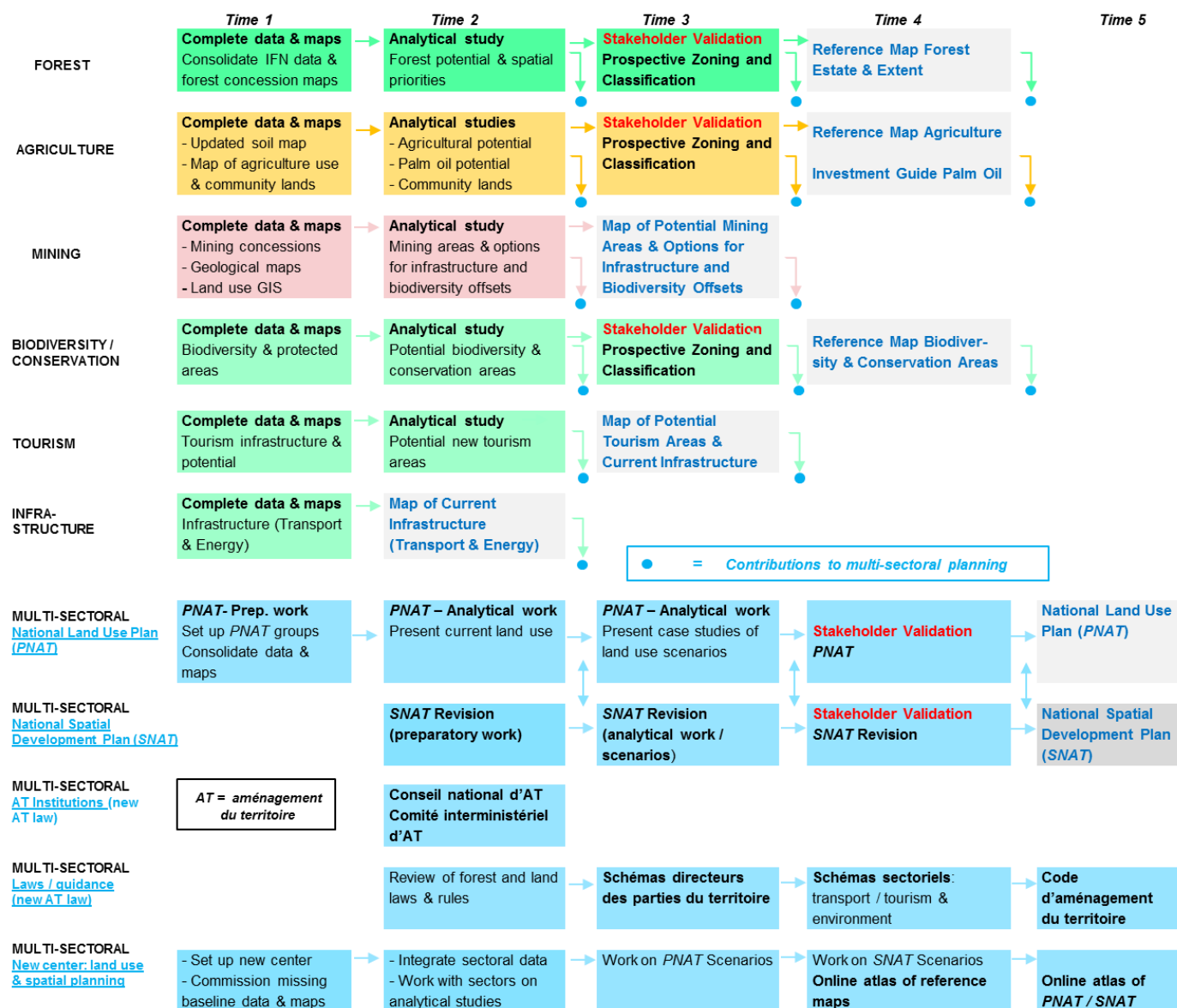
The final set of outputs consists of assessments of the existing laws and rules for land use planning and land allocation and seeks to put in place new codes and other guidance required under the orientation law for land use planning. This includes:

- Output 18, which is a supporting study to align legal codes to review the forest law, land laws and associated rules.
- Output 19 covers the preparation of *Schémas directeurs des parties du territoire*. There are seven different types, which are most relevant for the sectors prioritized in this roadmap.
- Output 20 and 21 covers the preparation of two *Schémas sectoriels*. The first is for tourism and environment and the second for transport (covering all modes of transport).
- Output 22 is the preparation of the *Code d'Aménagement du Territoire*.

4.2.6 Summing up

Figure 35 shows the proposed implementation plan of the roadmap to strengthen land use planning. The figure summarizes the sequencing of all major packages of activities and outputs at sectoral and at multi-sectoral level.

Figure 35 Proposed implementation plan of roadmap: major packages of activities and outputs



REFERENCES

- African Development Fund, 2013, *Congo Agricultural Sector Study, Project Completion Report (PCR)*.
- Agence d'Information d'Afrique Centrale, 2015, Développement durable : le budget du Pronar revu à la baisse, Lundi 24 Août 2015. <http://adiac-congo.com/content/developpement-durable-le-budget-du-pronar-revu-la-baisse-37318>
- Banque Africaine de Développement (BAD)/Congo Basin Forest Fund (CBFF), 2011, *Projet : Inventaire forestier multi ressources en vue de l'élaboration du plan d'affectation des terres, Pays : République du Congo, Rapport d'Evaluation du Projet, Septembre 2011*.
- Caslin, O., 2015, "Congo : comment Bolloré transforme le port de Pointe-Noire," in *Jeune Afrique*, 13 novembre 2015. <http://www.jeuneafrique.com/mag/275836/economie/congo-comment-bollore-transforme-le-port-de-pointe-noire/>
- CIRAD, 2015, *Modélisation spatiale du potentiel de plantation durable de palmier à huile, une étude réalisée par le CIRAD et CRDPI en 2012 ; présentation : Feintrenie L. et al.*
- Cole Baker Associates, 2013, *Rapport : diagnostic institutionnel et plan de formation*, République du Congo, Ministère des Mines et de la Géologie, Diagnostic institutionnel et développement d'un plan de formation du Ministère dans le cadre du projet EI-TAF : renforcement des capacités du Gouvernement sur la gestion des mines en République du Congo.
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2011: *Land Use Planning: Concept, Tools and Applications*, GIZ, Eschborn, Germany. <https://www.giz.de/fachexpertise/downloads/Fachexpertise/giz2012-en-land-use-planning-manual.pdf>
- Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), 1999: *Land Use Planning. Methods, Strategies and Tools*, GTZ, Eschborn, Germany.
- Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), 2010, *A study of the development and implementation of strategies for sustainable local land management based on practical experiences, Part 2: Brazil*. <https://www.giz.de/fachexpertise/downloads/Fachexpertise/giz2010-en-land-management-brazil.pdf>
- E.O International, 2014, *État des lieux actuel et Besoins, Analyse des futurs bénéficiaires du CNG, Septembre 2014, Le Projet Etablissement du Cadastre national - Volet II*.
- euromines, 2011, *Mineral Resources in Land Use Planning Why Consider Minerals in LUP?*, European Association of Mining Industries, Metal Ores & Industrial Minerals. <http://www.euromines.org/files/publications/mineral-resources-land-use-planning.pdf>
- FAO, 2015, Food and Agriculture Organization of the United Nations (FAO), *The Congo and FAO, Building capacities for sustainable agricultural development and food security*, FAO, Brazzaville. <http://www.fao.org/3/a-ax465e.pdf>
- FAOLEX, 2014, http://faolex.fao.org/cgi-bin/faolex.exe?rec_id=143289&database=faolex&search_type=link&table=result&lang=eng&format_name=@ERALL
- Faure, N. and Henriot, C., 2015, *The legal framework for forest conversion (Republic of Congo)*, June 2015, ClientEarth.
- Fonds Africain de Développement, 2008, *Etude du Secteur Agricole, Termes de Reference*.

- Franks, DM, Brereton, D, Moran, CJ, Sarker, T and T, Cohen, 2010, *Cumulative Impacts, A Good Practice Guide for the Australian Coal Mining Industry*, Centre for Social Responsibility in Mining and Centre for Water in the Minerals Industry, Sustainable Minerals Institute, The University of Queensland. Australian Coal Association Research Program. Brisbane.
<https://www.csr.uq.edu.au/docs/CSRM%20SMI%20Good%20Practice%20Guide%20document%20LR.PDF>
- GRADE and Practical Action Consulting, no year, *Land Use Planning for Extractive Industries, Policy Brief, Evidence and lessons from Latin America (ELLA), ELLA Area: Economic Development; ELLA Theme: Extractive Industries and Land Use*. <http://ella.practicalaction.org/knowledge-brief/land-use-planning-for-extractive-industries/>
- Hance, J., 2016, *Prospective Congo palm oil plantation wrecking prime great ape habitat*, Mongabay, 5th February 2016. <https://news.mongabay.com/2016/02/prospective-congo-palm-oil-plantation-wrecking-prime-great-ape-habitat/>
- Johnson, S.D.R., *A National Biodiversity Offset Scheme: A Road Map for Liberia's Mining Sector*, Washington, D.C. <http://documents.worldbank.org/curated/en/2015/04/24418254/national-biodiversity-offset-scheme-road-map-liberia%E2%80%99s-mining-sector>
- MEFDD/CNIAF, 2015, Personal Communication, Pascal Douard, WRI, October 2015.
- Government of Canada, 2016, *Mining Information Kit for Aboriginal Communities*. <http://www.pdac.ca/docs/default-source/aboriginal-affairs-docs/2006-mining-toolkit-eng.pdf>
- Mining Journal, 2012, ...
- Ministère du Plan, de l'Aménagement du Territoire, de l'Intégration Economique et du NEPAD (MdP), 2005, *Schéma National d'Aménagement du Territoire (SNAT)*.
- Ministry of Mines and Energy, Geological Survey of Namibia, German Federal Institute for Geosciences and Natural Resources, and Southern African Institute for Environmental Assessment, 2011, *Strategic Environmental Assessment for the central Namib Uranium Rush region. Final report*. http://www.the-eis.com/data/literature/Strategic%20Environmental%20Assessment%20for%20the%20central%20Namib%20Uranium%20Rush_Final_Merged.pdf
- NEPAD, 2016, *Kinshasa-Brazzaville Bridge Road/Rail Project*. <http://www.nepad.org/content/kinshasa-brazzaville-bridge-roadrail-project>
- OI-FLEGT (Observation indépendante de l'application de la loi forestière et de la gouvernance), 2013, *Rapport N°016/REM/CAGDF/FM, 13 juin 2013*. http://www.observation-congo.info/documents/OI_II_Rapport_016.pdf
- Ortega, 2014, *Evaluation préliminaire du système actuel d'octroi des titres miniers a la République du Congo*, Ministère des Mines et de la Géologie and World Bank.
- Oyono, et al., 2014, *Allocation and Use of Forest Land : Current Trends, Issues and Perspectives*, in de Wasseige C. et al. (editors), *The Forests of the Congo Basin – State of the Forest 2013*. Weyrich, Belgium. http://www.observatoire-comifac.net/docs/edf2013/EN/EDF2013_EN.pdf
- République du Congo (RoC), 2012, Ministère de l'Economie, du Plan, de l'Aménagement du Territoire et de l'Intégration, *Plan National de Développement Congo 2012-2016*.
- République du Congo, 2014, *Journal Officiel de la République du Congo du jeudi 16 octobre 2014*. http://www.sgg.cg/imageProvider.asp?private_resource=2092&fn=jo_2014_42.pdf

- SOFRECO in collaboration with CERAPE, 2012, *Plan de Développement du Secteur Agricole (PDSA) National, Version définitive, Etude du Secteur Agricole (ESA)*, May 2012, Banque Africaine de Développement and République du Congo.
- State of New South Wales, Department of Planning and Infrastructure, 2012, *Upper Hunter Strategic Regional Land Use Plan*.
https://www.nsw.gov.au/sites/default/files/initiatives/upperhunterslup_sd_v01.pdf
- World Bank and PROFOR, 2012, *Deforestation Trends in the Congo Basin – Reconciling Economic Growth and Forest Protection*, Washington, DC. <http://elibrary.worldbank.org/doi/abs/10.1596/978-0-8213-9742-8>
- World Bank, 2014, *A literature review on balancing (mining) Development and (forest) Conservation*.
- World Bank, 2012, Republic of Congo - Mining Sector Review. Washington DC.
<http://documents.worldbank.org/curated/en/2012/10/17393756/republic-congo-mining-sector-review>
- WRI, 2012, *Atlas Forestier Interactif du Congo - Version 3.0*. <http://www.wri.org/publication/atlas-forestier-interactif-du-congo-interactive-forest-atlas-congo-version-30>