O S F A C

OBSERVATOIRE SATELLITAL DES FORETS D'AFRIQUE CENTRALE

OSFAC ANNUAL REPORT 2018

Funded by

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CARPE

NASA

UNIVERSITY OF MARYLAND

October, 2018

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INTRODUCTION

In the current context of climate change, the monitoring of the Congo Basin forests, especially the aspects related to deforestation, degradation, greenhouse gas emissions and biodiversity is of paramount importance. Moreover, these environmental parameters are among the Results Indicators (IR) of the CARPE Program.

Among other tasks, the NASA-UMD Consortium is responsible for providing the CARPE Program with cartographic products derived from the processing of satellite data, information on the extent of forest cover, changes, losses, gains, etc. In the NASA-UMD Consortium, the Observatoire Satellital des Forêts d'Afrique Centrale (OSFAC) is a partner (Sub-grantee) with the responsibility to carry out a certain number of activities among which we can mention:

1. *Assess the GIS / Remote Sensing needs of CARPE partners, as well as those of other actors (Government Institutions, NGOs, civil society, private sector, etc.) and themes (environment, forest, health, agriculture, infrastructure);*
2. *Produce nationwide maps of High Conservation Value (HCV) in the forested areas;*
3. *Standardize geospatial data and large-scale maps in CARPE study areas*;
4. *Proactively disseminate the results of forest monitoring using satellite remote sensing;*
5. *Create a Cartographic / Geospatial Database of CARPE / USAID Landscapes;*
6. *Prepare forest monitoring data and results in a form useful to USAID partners and national governments;*
7. *Support and strengthen the capacity of national institutions to map forest cover and changes (losses, gains);*
8. *Validate the results of forest cover analyses, change and determine the factors of forest cover change;*
9. *Establish at OSFAC and among the partners a mapping capacity of forest cover using the Lidar technique.*

This report summarizes OSFAC Activities during year 2018.

CONGO BASIN FOREST MONITORING BY SATELLITE

TASK 1. Monitoring and mapping of forest cover and biomass in CARPE Landscape

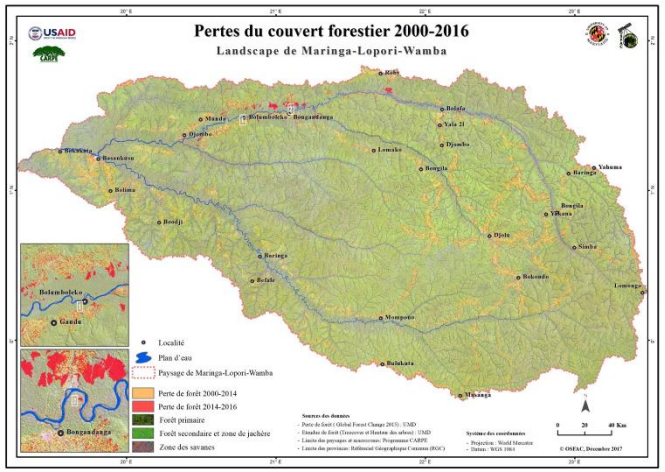


Fig. 1. Fire Maringa forest Cover loss and CO_2 emissions

ID	Macrozone	Facteur d'emission					Données d'activités	Emissions de C02	
		AGB X (Mg ha^{-1})	BGB X (Mg ha^{-1})	AGB + BGB Mean (Mg ha^{-1})	Carbon X (Mg ha^{-1})	C02 (eq) (Mg ha-1)	Pertes forestieres (2000-2016) (ha)	Carbon X (Mg ha^{-1})	Emission C02 (T eqC02 /ha)
1	Cadjobe CBNRM	317	73	390	191	701	392617	701	17201516
2	CFT	345	79	424	208	761	4326	761	205777
3	Corridor CBNRM	316	73	389	190	698	253146	698	11043493
4	Lyondji	325	75	399	196	718	2142622	718	96150154
5	Kokolopori	378	87	465	228	835	421575	835	22000952
6	Lomako CBNRM	330	76	406	199	729	64159	729	2923229
7	Lomako Faunal Reserve	343	79	422	207	759	424067	759	20116693
8	Lopori Congo area	373	86	459	225	824	42070	824	2166580
9	Luo Scientific Reserve	338	78	416	204	748	56213	748	2627937
11	Proposed CBNRM	321	74	395	194	710	134164	710	5953539
12	Rural Developement Zone	169	39	208	102	374	808019	374	18887449
13	SEDAF	371	85	456	224	820	350142	820	17944765
14	SIFORCO K2	346	80	425	208	764	331030	764	15806661
15	SIFORCO K7	335	77	413	202	741	448807	741	20785364
16	SOFORMA	347	80	426	209	766	57749	766	2764731
17	TRANS-M	324	75	399	195	716	308442	716	13802770
18	Wetlands	326	75	401	196	720	1349931	720	60746890
19	Yalunsa area	342	79	421	206	756	234109	756	11061633
20	Yalo CBNRMA	330	76	406	199	729	358323	729	16326101
	Total	5946	1369	7314	3584	13141	8181509	15869	85585488

As part of the CARPE[1] Program, OSFAC is working closely with the University of Maryland (UMD) / GLAD Laboratory (*Global Land Analysis & Discovery:* *https://glad.umd.edu*) to monitor the forest changes (tree cover loss including deforestation) and the quantification of biomass in the Congo Basin. Products generated under this collaboration are prepared by OSFAC in appropriate and useful formats to make them available free of charge to partners and stakeholders in the region.

Activity data

OSFAC has conducted geospatial data analyses by combining tree canopy cover density (≥ 30%) with the tree height (≥ 3 m) to produce the map of forest and non-forest areas according to the adopted forest definition by the DR Congo. The statistics on forest cover losses presented in the tables were made only in forest areas (see A0 Posters available on CD ROMs).

Emission Factors

The above ground biomass map of the DR Congo was produced under Carbon Map and Model Project (WWF, 2015) at 1 ha spatial resolution using Lidar data, Landsat data, Alos Palsar HH and HV (vegetation) data, and SRTM data (elevation). Forest inventory data were used to calibrate and validate Lidar measurements using the 2014 Chave allometric equation.

[1] ***CARPE***: Central Africa Regional Program for Environment

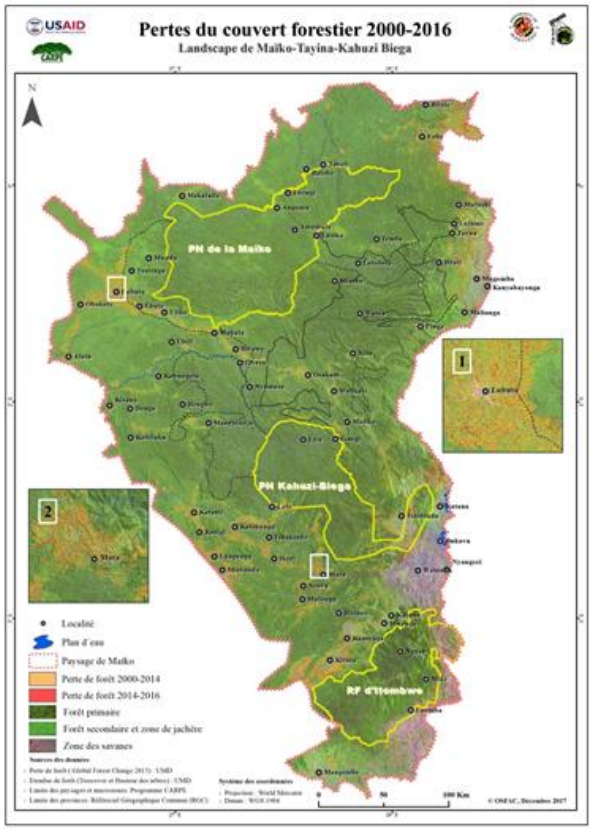


Fig. 2. Forest cover loss of 2000-2016 in Maiko-Tayna-Kahuzi Biega

ID	Macrozone	Facteur d'émission					Données d'activités	Emissions de C02	
		AGB X̄ (Mg ha^{-1})	BGB X̄ (Mg ha^{-1})	AGB + BGB Mean (Mg ha^{-1})	Carbon X̄ (Mg ha^{-1})	C02 (eq) (Mg ha-1)	Pertes forestières (2000-2016) (ha)	Carbon X̄ (Mg ha^{-1})	Emission C02 (T eqC02 /ha)
1	PN de Kahuzi-Biega	820	189	964	472	1732	1182197	215	15877753
2	Réserve C. primates de Bakumbule	198	45	285	140	513	9037088	501	95202139
3	Réserve C. primates de la forêt de la Lowa	592	136	688	337	1237	397466	213	5286329
4	Réserve des gorilles de Lubutu	525	121	677	332	1216	180963	353	2042975
5	Réserve des gorilles de Punia	360	83	722	354	1298	113597	335	992857
6	Réserve des gorilles de Tayna	255	59	342	168	615	742942	62	2900186
7	Réserve des gorilles d'Usala	309	71	378	185	679	105336	168	1104246
8	Réserve des gorilles d'Utunda et Wassa	363	84	434	213	780	100878	227	1433555
9	Réserve forestière de Bakano	381	88	464	227	834	454433	177	5015674
10	**Total**	**1573**	**362**	**1935**	**948**	**3476**	**12141916**	**948**	**138767530**

Spatial analyses were carried out by OSFAC to extract forest biomass in the study area.

The estimation of the biomass of two pools (above and below ground) was considered. Underground biomass accounts for 23% of the above-ground biomass. The fraction of carbon in the biomass is 0.49%, and the CO_2 emission factor was estimated by multiplying the carbon stock by 3.66 (from the molecular weight of CO_2 / carbon).

Carbon dioxide (CO_2) Emissions

Carbon dioxide emissions are therefore the product of emission factors with activity data (forest loss) over 16 years (2000-2016).

***NB**: All maps and statistics show forest cover, changes and biomass between years 2000 and 2016 in the DRC Landscapes (Lac Tele – Lac Tumba, Maringa Lopori Wamba, Salonga, Ituri, Maiko-Tayna-Kahuzi Biega and Virunga). These maps were made in A4 and A0 format and are available in CD ROM and OSFAC Website (https://osfac.net/fr/) for CARPE / USAID partners and stakeholders in the sub-region.*

TASK 2. Using Lidar for Forest Monitoring in DRC

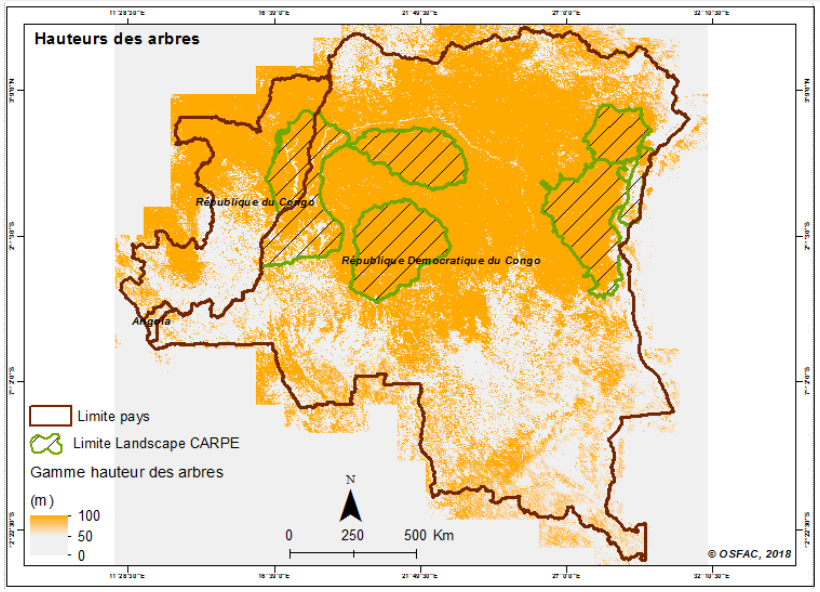


Fig 4. Preliminary Result: Tree Height Map ROC and DRC

ID	Landscape Name	Area (ha)	Range	Mean	STD	Majority	Minority	Median
1	Salonga-Lukenie-Sankuru	8,474175	100	98,46555	10,38389	100	42	100
2	Maringa-Lopori-Wamba	5,880105	100	99,02789	7,178469	100	6	100
3	Maiko-Tayna-Kahuzi-Biega	8,594666	100	93,00565	20,69236	100	1	100
4	Ituri-Epulu-Aru	3,320984	100	99,0747	7,03663	100	44	100
5	Virunga	1,413535	100	44,1484	36,29883	100	59	32
6	Lac Télé-Lac Tumba	10,62367	100	80,9814	36,52691	100	70	100
	Total	**38,30713**	**600**	**514,7036**	**118,1171**	**600**	**222**	**532**

Fig. 5. Collection biomass field data validation

As part of the REDD process in the DRC, it is necessary to know the forest cover and the changes, but the definition of the forest is often different in different countries. In the DRC and RoC, the definition of the forest takes into account:

- Area: ≥ 0.5 hectare;
- Canopy cover: ≥ 30%;
- Tree height: ≥ 3 m.

LiDar improves the estimation of forest cover and has information on tree height. LiDar data from the Carbon Map & Model project (WWF) and Landsat metrics developed at Glad lab (UMD) were used for forest cover estimation in USAID / CARPE Landscapes. The main objectives of this study were:

- Integrate LiDAR and Landsat data to map tree heights with good accuracy, at a spatial resolution of 30 meters at a regional scale;
- Produce and validate the tree height map from LiDAR[1], SRTM and satellite data (Landsat);
- Produce and validate the tree canopy density map of at least 2, 3 and 5m height;

The results obtained during this work are:

- Annual tree height map of the DRC and the RoC for the periods 1985-2000; 2000 – 2016.

[1]**LiDAR:** Light Detection and Ranging

TASK 3. The Forest High Conservation Value (HCVF) in CARPE Landscape

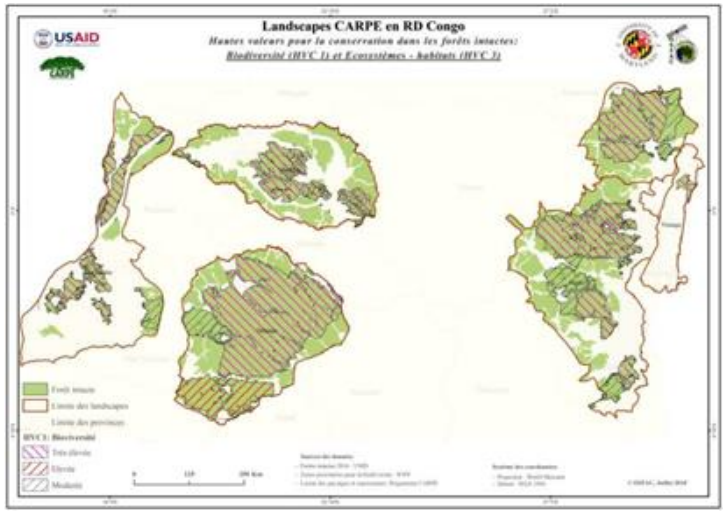


Fig. 6. Map of Height value forest conservation in USAID / CARPE Lands cape (DRC)

Biodiversity value in Landscape			
Landscape	**Moderate (ha)**	**Hight (ha)**	**Very height (ha)**
Ituri	520 060	-	1 736 757
Lac Tumba	244 770	-	1 533 725
Maiko	1 026 438	-	2 726 826
MLW	61 466	-	1 584 461
Salonga	469 460	1 283 117	5 091 240
Virunga	-	-	107 835

[2] ***GLAD***: *Global Land Analysis & Discovery*

For the High Value of Forests Conservation (HCVF) topic, OSFAC analyzed data on intact forests (University of Maryland/GLAD[2]) and animal biodiversity.

This analysis highlighted the existence of high value of forests conservation in the six landscapes of the USAID-CARPE Program.

The analysis has identified approximately 16,386,155 hectares of high value of forests conservation, distributed as follows:

- moderate biodiversity (12, 783,074 hectares;
- high biodiversity (1, 283,123 hectares);
- Very high biodiversity (2, 322,260 hectares).

Based on the variables (intact forests and animal biodiversity) considered in this analysis, the Salonga and Maiko Landscapes are those with the highest fauna biodiversity values.

Among the recommendations, one can retain:

- Continue to preserve the integrity of these areas of High Conservation Value (HCV) and better manage them;
- Consider the specificity of these areas as part of the implementation of community forestry that is currently in vogue in the DRC;
- Regularly monitor these areas to detect any changes that could be a threat to these ecosystems rich in biodiversity but also fragile.

N.B: Detailed maps of high value of forest conservation in Landscapes are available to download in OSFAC Website (https://osfac.net/fr/).

TASK 4. Active Fire Analysis in Maringa Lopori Wamba Landscape

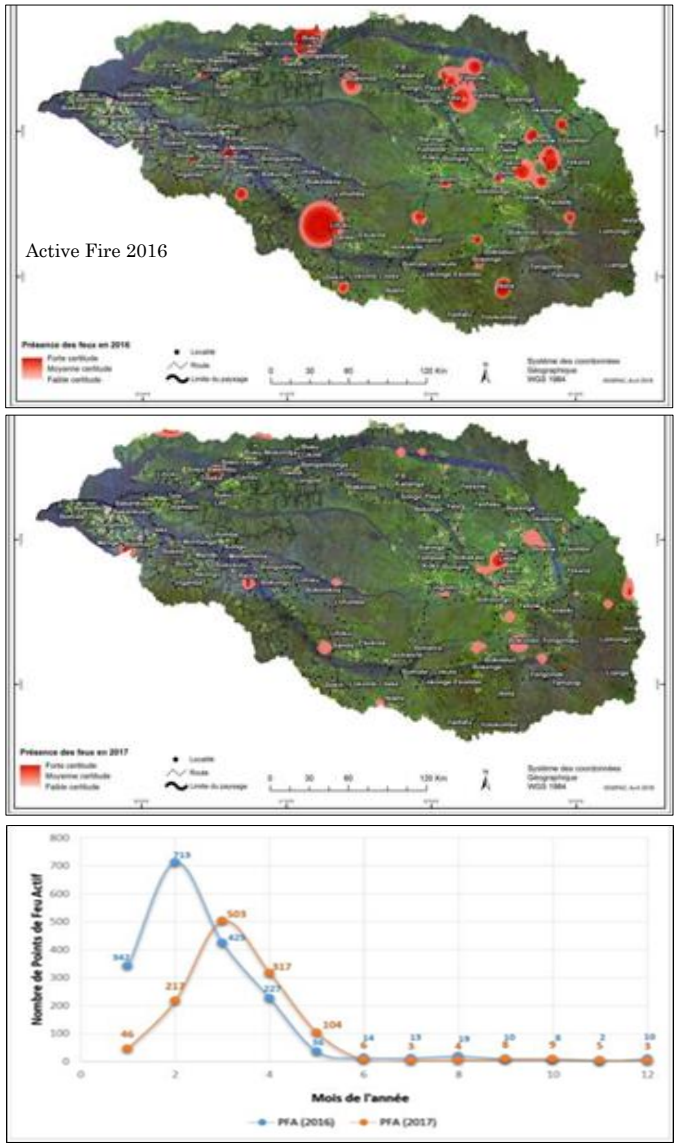


Fig.7. Number of Active Fire 2016 -2017

Forest resources and other terrestrial natural resources are highly threatened by bush fires and forests. In the Democratic Republic of the Congo, fires are among the causes of the loss of forest cover.

OSFAC has analyzed active fires in the Landscape Maringa-Lopori-Wamba during the 2016-2017 period. Data from the Moderate Resolution Imaging Spectroradiometer (MODIS) satellite of 1 km spatial resolution was used to analyze the presence of active fires. This data was provided by NASA FIRMS (Fire Information for Resource Management System).

Regarding fires in the Maringa-Lopori-Wamba Landscape, OSFAC has analyzed the active fire points from 2016 to2017. This analysis confirmed the presence of fires in this Landscape. Overall, the following observations can be made about the fire situation in this Landscape:

- fires were more frequent in 2016 compared to 2017;
- fires are more frequent during the dry season, corresponding to the period from January to April;
- the most affected localities are: Yekana, Bosow, Yakiri, Yasow and Djolu, Bozenge, Yala, Bosu likole, Busu nokondja, Bongandanga, Bakenga and Yaosafu.

TASK 5. Mapping opportunities for Forest Landscape restoration in DR Congo

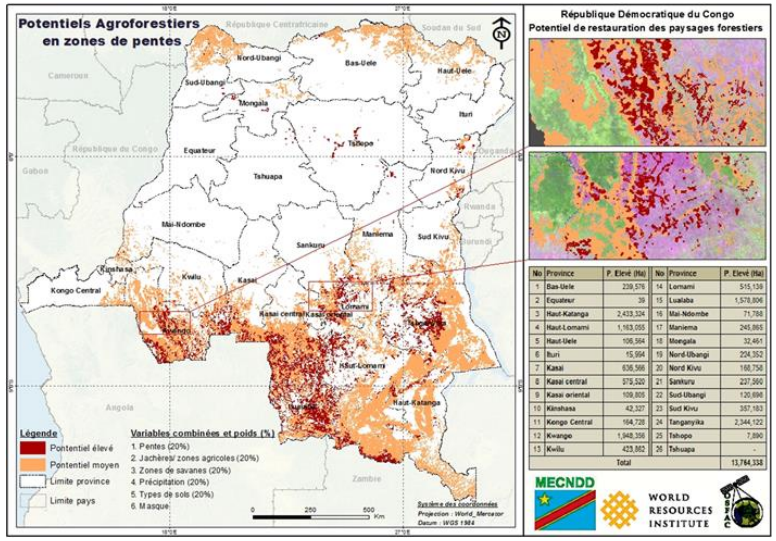


Fig.8. Restoration opportunities in slopes zone

ID	NOM	Pontiel Moyen (Ha)	Potentiel Elevé (Ha)
12	SOFORMA	113	10
8	Lomako CBNRMA	46	24
6	SEDAF	2	57
2	TRANS-M	367	61
15	Lopori Congo area	0	70
10	CFT	0	83
16	Proposed CBNRM	276	116
7	Luo Scientific Reserve	1225	187
13	Lomako Faunal Reserve (RFLY)	602	191
3	Corridor CBNRMA	742	233
9	Cadjobe CBNRMA	1278	441
5	SIFORCO K2	1	937
18	Kokolopori Bonobo Reserve	513	1072
1	Yahuma area	2	1679
19	Yala CBNRMA	249	2197
14	SIFORCO K7	819	2582
17	Wetlands (Proposed)	2707	2585
4	Iyondji Community Bonobo Reserve	2238	11746
11	Rural Development Zone	113898	203897
	Total	**125078**	**228168**

Fig.9. Restoration opportunities in Macrozone (MLW)

The main objective of this work was to analyze the opportunities for Forests Landscapes Restoration (RPF) in the Maringa-Lopori-Wamba (MLW) Landscape on the basis of two options, namely **afforestation** and **agroforestry**. The methodology used for this study is "Restoration Opportunities Assessment Methodology (ROAM)"

Based on the available data, 10 variables (slope, population density, forest areas and forest loss areas, erosion risks, distance from cities, soil types, rainfall, rivers, roads, cities) were analyzed to identify:

- **589,802** and **126.125** hectares of areas offering **high** and **medium** RPF opportunities for afforestation through reforestation, conservation, etc. on degraded lands and around large agglomerations;
- **361,891** and **866** hectares of areas offering **high** and **medium** RPF opportunities for agroforestry activities in deforestation areas.

For both options of the analyzed restoration (afforestation and agroforestry), the Macrozones Rural Development Zone and Iyondji Bonobo Community offer more opportunities to carry out forest Landscape restoration activities in the Maringa-Lopori-Wamba Landscape.

This information can be capitalized in the implementation of pilot projects for the forest Landscape restoration in the territories covered by the Landscape MLW, especially during sites selection. They can also support Landscape MLW's agricultural potential development initiatives for economic development, and support biodiversity conservation and environmental protection efforts.

REGIONAL CAPACITY BUILDING

In GIS Remote Sensing and GPS

TASK 6. Regional Capacity building of partners / Training in GIS, Remote Sensing and GPS

Fig 10. RoC US Ambassador and RoC Ministry of Environment

Fig 11. Forest Mapping Training (GTAC, USFS, OSFAC, DIAF)

Topics	Jan		Feb		Mar		April		May		Jun		July		Aug		Sept		Total
	H	F	H	F	H	F	H	F	H	F	H	F	H	F	H	F	H	F	
Spatial analysis					3	7			23	17			12	5	9	2			78
Remote Sensing Level 1	35	7			27	12			45	24	4	2			9	2			125
GPS for Beginners					4	2	85	46									6	2	145
Mapping					4	2	85	46					12	5	18	4	6	2	184
TOTAL	**35**	**7**			**38**	**23**	**170**	**92**	**68**	**41**	**4**	**2**	**24**	**10**	**36**	**8**	**12**	**4**	**532**

OSFAC has supported and strengthened the capacities of National Institutions (DRC and RoC) on the use of GIS and RS software for geo-spatial data processing, mapping forest cover and changes using mostly open source software.

For the period from January to September 2018, capacity building activities carried out by OSFAC focused on Geographic Information Systems (GIS), Remote Sensing and the use of GPS:

- **16** trainings were organized: **5** in Remote Sensing, **9** in GIS and **3** in GPS;
- **532** people (**387** men and **145** women) from **6** different institutions were trained in ArcGIS, QGIS and ENVI software;
- **262** people were trained in GIS and **125** in Remote Sensing and **145** were initiated to the GPS.

In addition, thanks the United State Forest Service (USFS - IP) through its training body, Geospatial Technology and Application Centre (GTAC) trained twenty-six (**26**) technicians from OSFAC and DIAF on the advanced techniques for Lidar data processing and forest cover changes detection.

In perspective, OSFAC will create new training modules on the advanced processing of LiDAR data, Radar and data from drones.

SATELLITE DATA DISTRIBUTION

Data information archiving and Dissemination

TASK 7. Satellite Data Distribution and Archiving

Images	No
ASTER	3923
ASTER GDEM	418
LANDSAT	42740
MOSAIC LANDSAT	59
SPOT	655
SRTM	8119

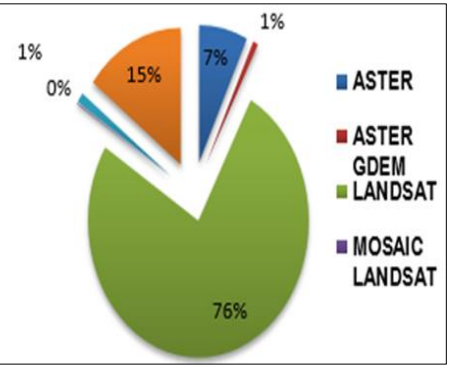


Fig.12. Satellite images number in OSFAC Database

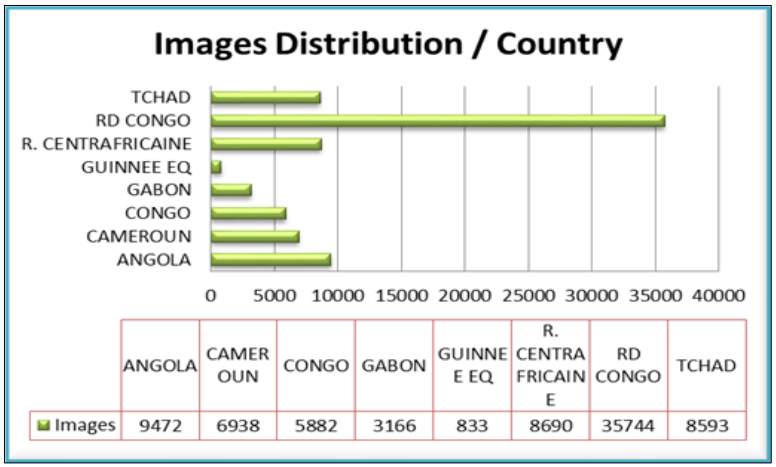


Fig.13. Data dissemination by country

The availability and access of satellite data for environmental monitoring being one of the major challenges of the sub-region, OSFAC continues to facilitate access to Central African satellite images and derived products by distributing them free of charge through a system he has put in place.

OSFAC currently has a large database of satellite images with a total of 55914 images of different resolutions covering the whole Congo Basin. The database includes several types of images including Aster, SRTM, Landsat, and Spot. New data including Landsat and STRM are being downloaded.

During 2018:

- 123 requests received by OSFAC;
- 2050 satellite images distributed by OSFAC (among them 1924 LANDSAT images, 125 SRTMs, etc.);
- 123 individuals including 112 men and 11 women made the request. All these individuals come from 22 different institutions of which the University of Kinshasa (UNIKIN) is in the top.

PARTNERS SUPPORT AND BUILDING INSTITUTIONAL SU-STAINABILITY

TASK 8. Erosion and flood risk analysis in urban areas: the case of Kinshasa

Fig. 14. Erosion and Inundation at Kinshasa

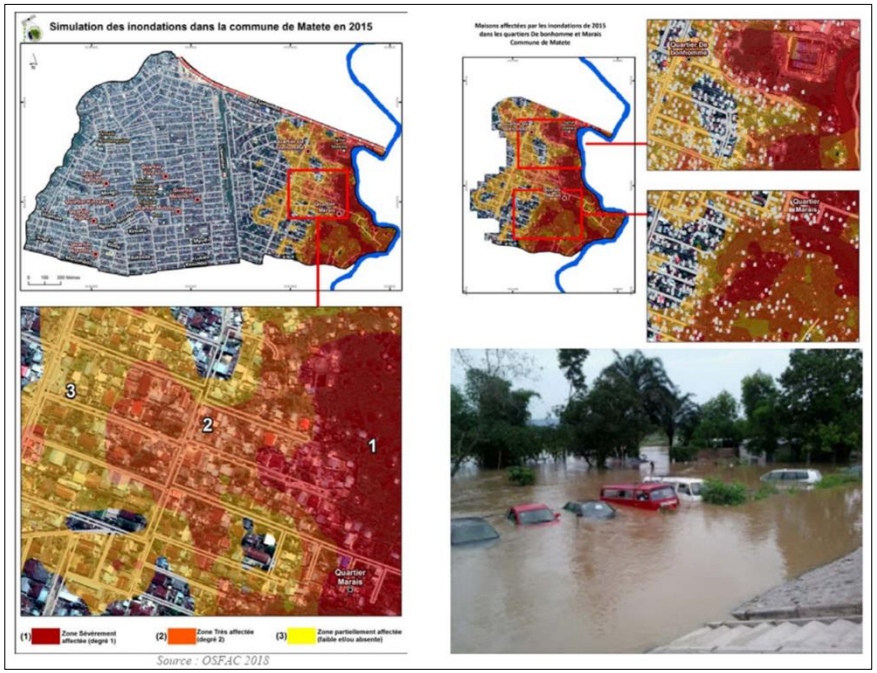


Fig. 15. Inundation of simulation in Matete Area / Township

According to the World Bank, the population of the city of Kinshasa is estimated at 12 million inhabitants in 2016, 30 times more than in 1960. Kinshasa is the largest and most dynamic urban system in Central Africa. Some neighborhoods, located on hillsides and others low-lying areas bordering rivers, are prone to flooding and erosion, with consequent loss of life and property.

This is the case of a few neighborhoods in the Kisenso and Matete communes which constitute the study area of the project. The communes of Kisenso and Matete are located in the N'Djili River watershed, and are often vulnerable to erosion and flood risk. Following an international call for tenders, the World Bank has chosen OSFAC to execute this project. The project is entitled Open Cities Kinshasa and OSFAC activities turns around:

- Create and/or collate and release open spatial data about the built environment, critical infrastructure, and natural hazards;
- Develop targeted products and/or tools (e.g., visualization tools, atlas, map series, or mobile application) to assist key stakeholders to utilize; risk information towards addressing natural disaster risk in the selected city;
- Enhance the local capacity and institutional development necessary to support the design and implementation of evidence-driven urban Resilience interventions;
- Promote peer mentorship and build regional networks across cities.

TASK 9. Water and Natural Resources Management in Congo Basin

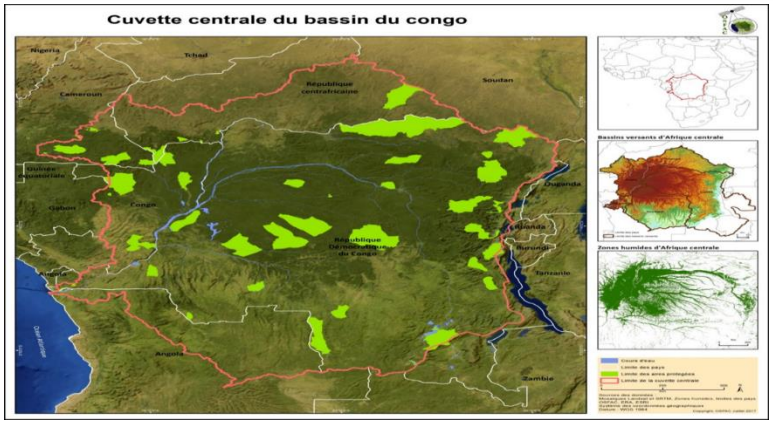


Fig.16. Congo Basin Boundary

Fig.17. Congo Rivers and Inga station

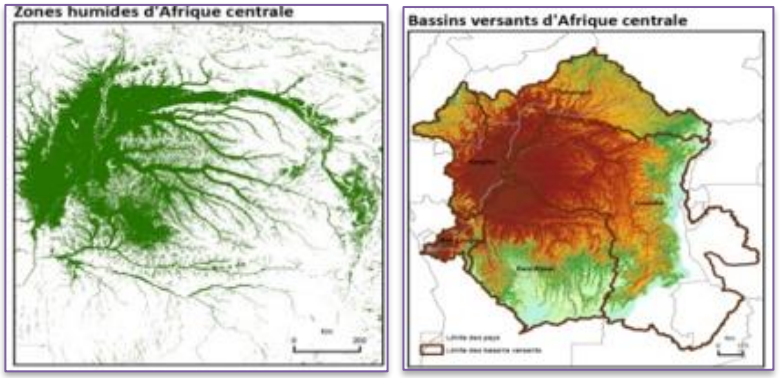


Fig.18. Congo Basin Boundary in Central Cuvette

This 36-month project is run by a consortium of which OSFAC is a member. The International Commission of the Congo-Ubangi-Sangha Basin (CICOS) coordinates the activities.

The main objective of this regional project is to promote sustainable management of water and natural resources by improving the decision-making process and by making available to decision-makers relevant information from Earth Observation (EO) data and derived information.

The main role of OSFAC in this project is the monitoring of the impacts of the dynamics of the floods of the Central Basin on the flows, climate change and biodiversity. Indeed, the central basin contains most of the humid forests of Congo basin, is home to more than sixty protected areas (PA) and plays a large role in the recharge of aquifers, the hydrological cycle, flood control, the purification of the water that is the source of life, the regulation of local and regional climate (carbon sequestration), the conservation of biodiversity, etc.

The expected results of the contribution of OSFAC are:

- Characterize humid / flooded areas and inter-annual variability;
- Produce thematic maps of forest cover and losses between 2000 and 2018;
- Analyze the impact of forest loss on biomass, carbon, CO2 emissions and biodiversity Characterize impact of forest fragmentation on natural habitats of wildlife;
- Develop a geospatial database management application (software) (vectors, raster) on humid / flooded areas under forests.

TASK 10. Analysis of baseline data for implementation of REDD+ in DRC

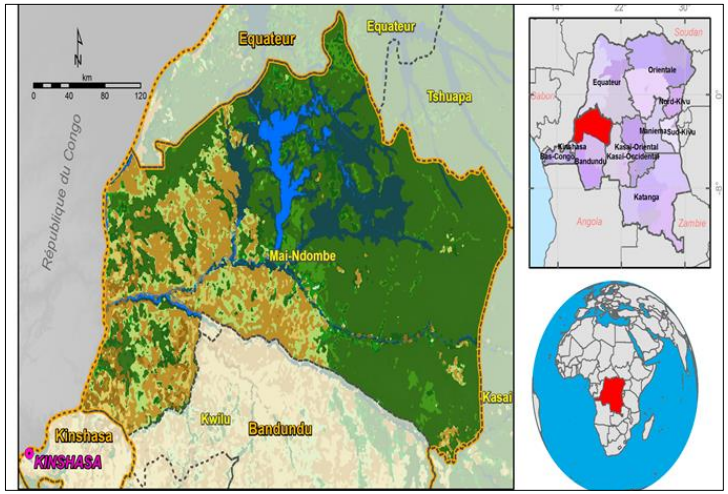


Fig.19. Location of study area: Mai-Ndombe

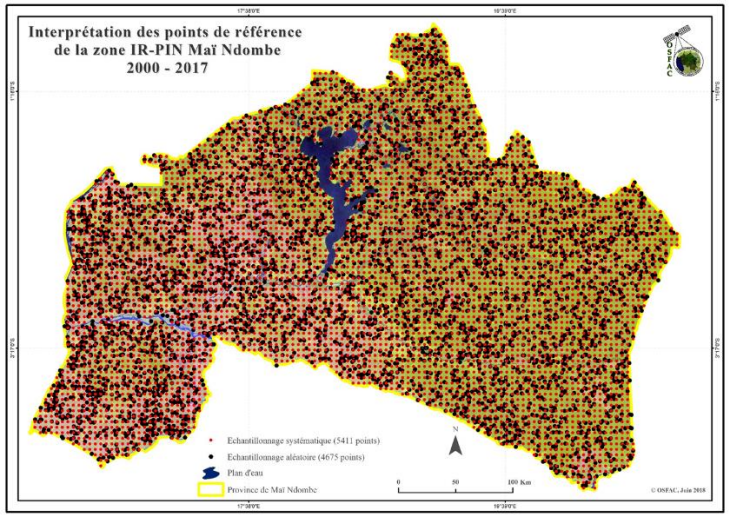


Fig.20. Distribution of Random and Systematic interpretation points

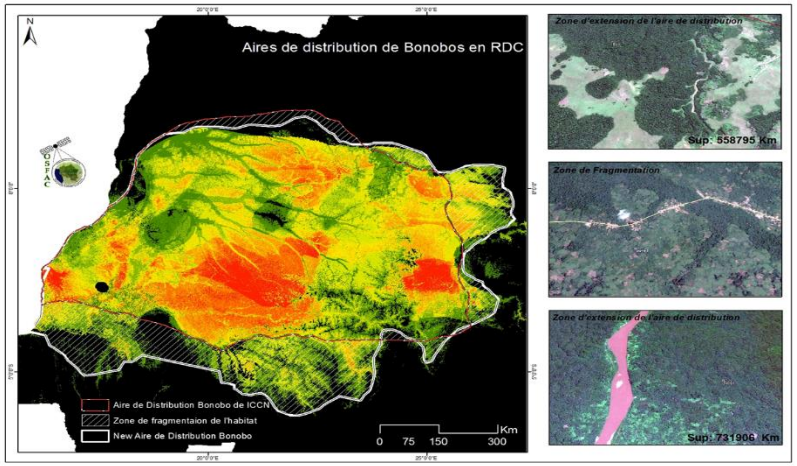
Like the majority of Central African countries, the Democratic Republic of Congo is engaged in the process of Reducing Emissions from Deforestation and Degradation (REDD) of Forests. The Food and Agriculture Organization of the United Nations (FAO) is assisting the DRC in this process of implementation.

It is within this framework that it has requested the technical support of OSFAC for the production of the Activity Data of the Emission Reduction Program Document (ER-PD) of the Province of Mai-Ndombe. Activity data are essential in the calculation of Greenhouse Gas emissions (GHG) in REDD+ program. OSFAC's intervention focused on the establishment of the database of reference points required for the estimation of Activity Data (DA) for the historical reference period (2004-2016).

The OSFAC team proceeded:

- visual interpretation of 30,000 samples from Landsat images and high-resolution images (years 200-2005, 2005-2010, 2014-2016) using a methodology defined by the FAO on the SEPAL-CEO platform or directly in the Collect Earth software;
- Identification of land cover types, in particular, the different forest layers;
- Calculating statistics associated with REDD+ activities.

TASK 11. Biodiversity and sustainable management of Protected Areas (PA)



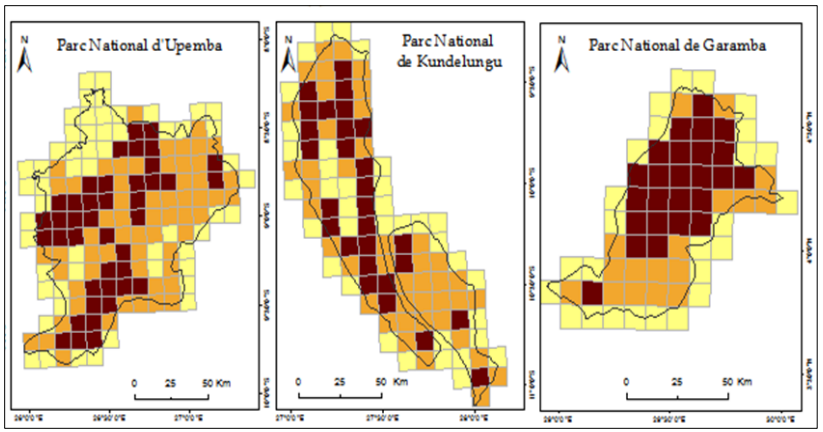


Fig.21. Active Fire in protected area: PN. Upemba, Kundelungu & Garamba

As part of the implementation of the Program for Biodiversity Conservation and Sustainable Forest Management (BGF), in the Democratic Republic of Congo (DRC) by the German Cooperation, through the GIZ, a need for strengthening researchers of the Technical and Scientific Direction (DTS) of the Congolese Institute for the Conservation of Nature (ICCN) has been identified.

Thus, the Satellite Observatory of Central African Forests (OSFAC) was selected as a structure to ensure the training of ICCN researchers DG / DTS in cartography / GIS. This is to provide the latter with concrete capacities to carry out information gathering, field and satellite data processing, analysis, monitoring and sustainable management of protected areas (PA).

OSFAC is supporting Congolese Institute for the Conservation of Nature (ICCN) in various areas, including:

- Capacity building of ICCN staff in the use of mapping and spatial analysis tools and software (Arc GIS and QGIS);
- Support for analysis of synergies between REDD+, climate change and biodiversity conservation: monitoring of forest cover (deforestation / degradation) and estimation of biomass, carbon and CO2 in Protected Areas;
- Support for spatial analyzes on the identification of optimal areas for sustainable management activities in Protected Areas (e.g. priority area for a given species, priority area for reforestation or integral conservation activities, etc.);
- Support for analyzes of the impact of human activities around and within protected areas (installation and extension of human settlements, extractive activities, fires, etc.);
- Support for updating and improving the geo-spatial database on protected areas;
- Support for setting up a GIS laboratory.

TASK 12. Development of community Land Management Plans

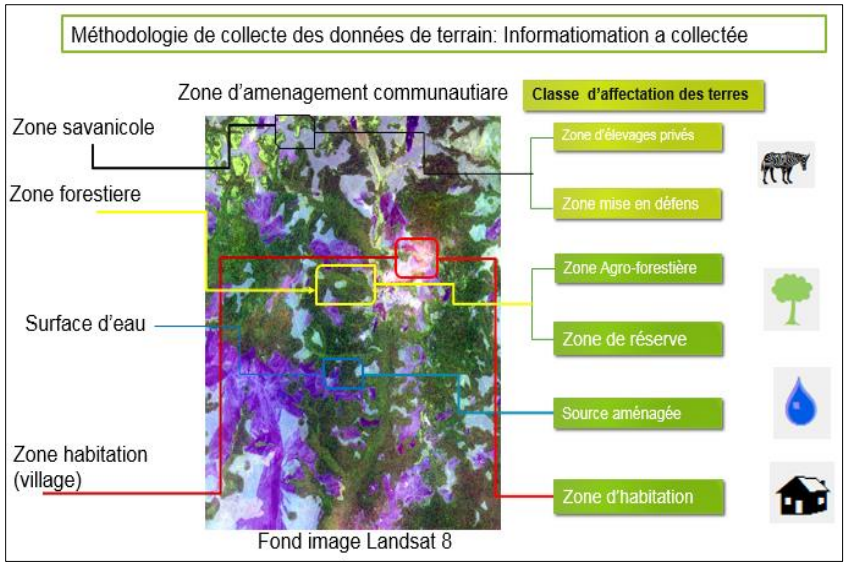


Fig.22. Methodology of Field Data validation

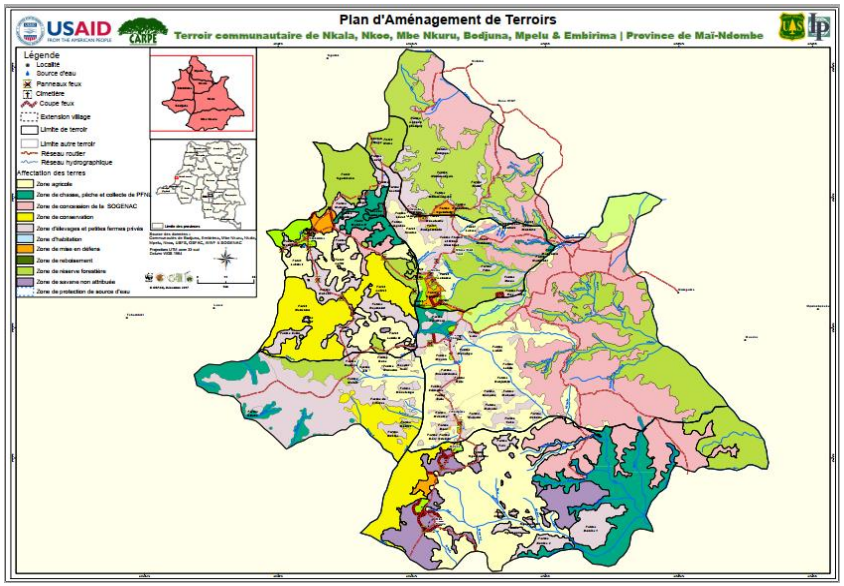


Fig.23. Communities zoning Maps of Bodjuna, Nkala, Nko, Embirima and Mbee-Nkuru

As part of the CARPE Program, US Forest Service through its International Program (USFS-IP) is collaborating with Central African countries in several areas, including the development of micro-mapping guides, land management for fire management, preservation of wildlife, development of community land management plans, etc.

To carry out some of its activities, including planning and land development, USFS sought the expertise of OSFAC.

Thus, the contribution of OSFAC focused on:

- Collecting field data through surveys and GPS surveys,
- location, delimitation of protected savannahs and reforested areas of 5 villages (Nkala, Nkoo, Bodjuna, Embirima, Mbee);
- Verification of the status of savannahs and unallocated forests in the village of Embirima;
- Verification and validation of local farm boundaries with village conservation forests;
- Delineation of current villages and their areas of extension;
- Delimitation and location of the water source protection zone,
- Mapping land use and development plans in the community lands of Mai-Ndombe province in the Democratic Republic of Congo.

OSFAC success story in USAID / CARPE Program

Thanks to financial and technical support from respectively USAID/CARPE and the UMD/NASA, the Central African Forest Satellite Observatory (OSFAC), a Congolese NGO with a regional vocation, has:

1. Developed and established a free distribution system for users of thousands of satellite images (55914) and derived products for monitoring the forests and environment of the Congo Basin countries (Cameroon, Central African Republic, Congo, DR Congo, Gabon, Equatorial Guinea, Burundi and Rwanda);

2. Trained 3784 persons including 693 women from various institutions, organizations and universities on the use of New Information Technologies (GIS, Remote Sensing, GPS and Spatial Analysis) for sustainable management of forest analysis and natural resources;

3. Actively contribute to the conservation of biodiversity and mitigation of climate change by regularly providing national and international institutions, civil society organizations and decision-makers with reliable and relevant information on the state of forests (extent, Gains, biomass, carbon and CO_2 emissions) and wildlife habitat in the Congo Basin.

OSFAC WEBSITE VISITORS

OSFAC Website Visitors

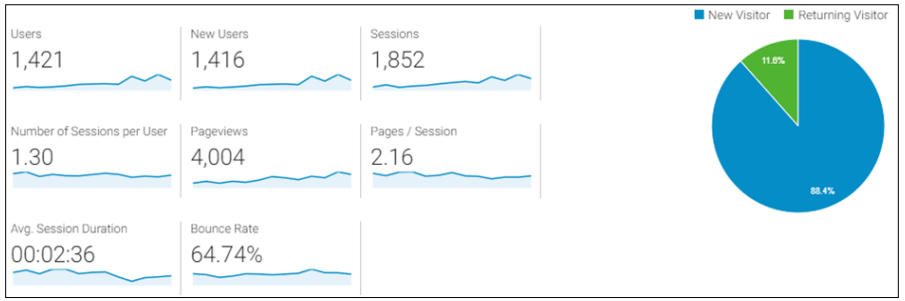


Fig.24.Percentage of Internet users having visited the OSFAC

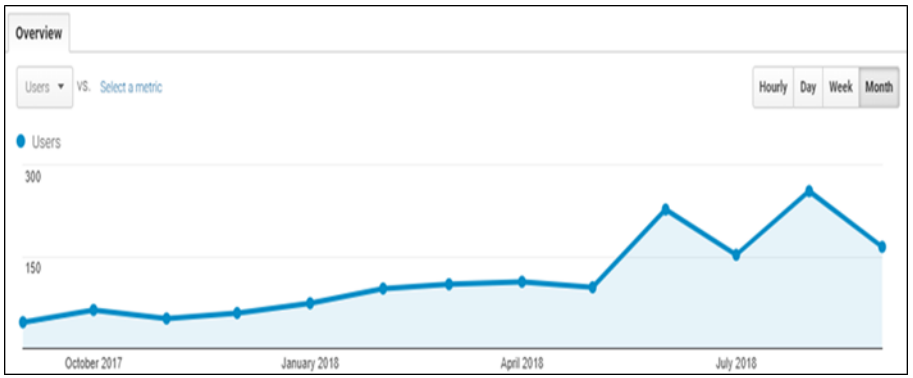


Fig.25. Number of Internet users having visited the OSFAC website

	Country	Users	% Users
1.	France	319	22.23%
2.	United States	302	21.05%
3.	Congo - Kinshasa	272	18.95%
4.	South Korea	79	5.51%
5.	India	48	3.34%
6.	Cameroon	41	2.86%
7.	Canada	34	2.37%
8.	Belgium	31	2.16%
9.	China	27	1.88%
10.	Germany	26	1.81%

Fig.26. Visitors by countries

For its visibility, OSFAC has developed a website that presents its activities.

The OSFAC website is regularly visited by internet users looking for information. Some visitors come for the first time while others come from time to time to take information and data that interest them.

During the year 2018:

- 1852 people visited the OSFAC website;
- 1421 are new;
- 431 people came back.