GLOBAL BIODIVERSITY INFORMATION FACILITY BENIN (GBIF Benin)

PROJECT TITLE: **A TECHNOLOGICAL PACKAGE FOR THE IMPLEMENTATION OF THE BENIN NATIONAL BIODIVERSITY INFORMATION SYSTEM**

TRAINING AND INFORMATION WORKSHOP ON THE MOBILIZATION OF BIODIVERSITY DATA FOR THE CONSERVATION AND SUSTAINABLE MANAGEMENT OF NATURAL RESOURCE OF BENIN

(12-14 May 2015, Pantagruel Hotel, Cotonou, Benin)

WORKSHOP REPORT

Prepared by the Organizing Committee of the Workshop

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Introduction

Benin is a member country of the Global Biodiversity Information Facility (GBIF). The vision of GBIF is to support the availability and open access of biodiversity data to researchers, lecturers, students, and other stakeholders. GBIF Benin coordinates national actions of mobilization and publication of occurrence data of species of plants, animals, fungi, etc. on the internet data portals of GBIF and GBIF Benin. The country's efforts in biodiversity data mobilization (about 200,000 occurrence data published) are not sufficient so far to support reliable researches on species distribution modeling. Therefore, a training and information workshop was organized by GBIF Benin (12-14 May 2015, Pantagruel Hotel Cotonou) to strengthen the on-going efforts on biodiversity data mobilization. The objective of this workshop was to inform, sensitize, and train participants on the necessity of mobilizing biodiversity data. This in turn will contribute to the conservation and sustainable utilization of biodiversity in Benin. The workshop was organized in the framework of the project "A technological package for the implementation of the Benin National Biodiversity Information System" funded by JRS Biodiversity Foundation. The agenda of the workshop is in appendix 1.

A total of seventy-one (71) participants attended the workshop. These include two representatives of GBIF France who came to strengthen the training team. Participants were mostly representatives of organizations working on biodiversity (potential providers of biodiversity data). The workshop went through the following sessions:

- Opening ceremony;
- Information and sensitizing of decision makers on biodiversity data publication;
- Training of participants on Biodiversity Informatics;
- Training of journalists;
- Closing ceremony.

This report summarizes the key achievements of these sessions.

1. Opening ceremony

The opening ceremony of the workshop consisted mainly of the speech of the representative of the Director General of the Forest Service followed by the speech of the Dean of the Faculty of Agricultural Sciences of the University of Abomey-Calavi.

In his speech, Colonel Emmanuel Toni, representing the Director General of the Forest Service highlighted the interest of biodiversity in the livelihood of human people. Then he presented briefly GBIF as one of the leading organization in the field of biodiversity data mobilization for open access use. He renews the commitment of the forest service to support all initiatives related to sustainable use of biodiversity. He ended his speech with special thanks to JRS Biodiversity Foundation for funding this workshop through the project "A technological package for the implementation of the Benin National Biodiversity Information System".

In the opening address, Professor Joseph Hounhouigan, Dean of the Faculty of Agricultural Sciences (University of Abomey-Calavi) welcomed participants, and thanked them for attending the workshop. Then he presented GBIF by focusing on its history, the number of member countries and organizations, the membership of Benin, and the structure of GBIF representation in Benin where the head of delegation is hosted by the forest service, and the node manager is hosted by the Faculty of Agricultural Sciences. Professor Hounhouigan used familiar words to show participants the importance of biodiversity for human livelihoods, hence the necessity to mobilize biodiversity data. This is the objective of GBIF. Despite the significant achievement of GBIF Benin in this field, much more need to be done to be able to address the challenge of the future. He then proceeded with the presentation of the workshop objective which is to train, inform, and sensitize stakeholders (scientists, policy makers, NGOs, etc.) on the necessity of biodiversity data mobilization. He renewed the commitment of his Faculty to support GBIF Benin for anything at anytime. He ended his speech with warm thanks to JRS Biodiversity Foundation for funding the project "A technological package for the implementation of the Benin National Biodiversity Information System".

2. Informing and sensitizing decision makers on the necessity of biodiversity data publication

The first session of the workshop was related to information and sensitizing of decision makers on the necessity of biodiversity data publication. This session was composed of three presentations: (i) the history of GBIF and GBIF Benin, (ii) data publication issues and the necessity of institutional support, and (iii) interest of biodiversity occurrence data, and the need of support from decision makers.

The objective of the first presentation on the history of GBIF and GBIF Benin (by Dr. Gaston Akouehou, Head of delegation of GBIF Benin) was to enable participants to get a thorough

knowledge of both organizations, especially their exceptional efforts in the mobilization of biodiversity data. Therefore GBIF has become one of the leading organizations providing open access to biodiversity data in the world.

In the second presentation titled "data publication issues and the necessity of institutional support", Mr. Eric Chenin (Head of delegation of GBIF France) showed participants the threats faced by biodiversity, and the challenges related to biodiversity. Then his presented the usefulness of biodiversity data in the current context, hence the necessity of institutional support for large-scale publication of biodiversity data.

The last presentation of this session titled "Interest of biodiversity occurrence data, and the need of support from decision makers" was done by Professor Jean C. Ganglo, Node Manager of GBIF Benin. The key points developed were as follows: introduction to Biodiversity informatics, practical uses of biodiversity data, and the state of data publication on the portals of GBIF and GBIF Benin. These enabled Prof. Ganglo to conclude with the necessity to publish more and more biodiversity occurrence data, and the responsibility of decision makers to support initiatives in this field.

Participants showed a high interest in this session. Besides positive comments on the actions of GBIF, GBIF Benin and JRS Biodiversity Foundation, questions were asked to know: how to join GBIF Benin, what is done to ensure the quality of published data, what procedure can be followed by data owners to publish through GBIF portal. All these questions receive thorough responses from the three presenters of the session.

Figure 1: Participants following the presentation on the interest of biodiversity occurrence data by Prof. Jean Ganglo

3. Training of participants on Biodiversity Informatics

The training on Biodiversity Informatics was the main activity of the workshop. The themes developed during this session were as follows: data collection and publication on the portals of GBIF and GBIF Benin, quality of biodiversity data, data use for mapping and species distribution modeling, and the Geographic Information System (GIS),.

3.1. Data collection and publication on the portals of GBIF and GBIF Benin

This presentation was done by Prof. Jean C. Ganglo Node manager of GBIF Benin. He started with an overview of the usefulness of biodiversity data, and the types of data. These include primary data from (bio collections, observations, and multimedia), secondary data, and metadata. Bio collections encompass specimens from herbarium and animal collections. Observational data are related to plants and animals directly observed in the field. These are occurrence data collected during inventories of plants and animals. Prof. Ganglo gave a special attention to primary biodiversity data associated to multimedia. Regarding secondary data, they originate from the exploitation of primary data while metadata provide a description of primary data, their reliability, and the limits of their use.

The presentation ended with the description of format of occurrence data to be published on GBIF portal. He used the case of occurrence data collected in Agrimey forest (Benin), to explain the various items of the format to participants.

3.2. Presentations on biodiversity data quality

Two presentations were done on biodiversity data quality: methods and tools to improve biodiversity data quality, and tools and resources to evaluate and improve the suitability of data for publication. Both were done by Mrs. Sophie Parmelon from GBIF France.

The first presentation dealt with good practices for taxonomic data, spatial data, and species data. Special dispositions should be taken to ensure the accuracy of the identification of taxonomic data (utilization of checklists and reference files for data entering, involvement of experts, etc.). The standardization of information related to gender, species, and authors is

necessary to avoid any ambiguity, and facilitate checking. With regard to spatial data, it was advised a proper transcription of geographic coordinates in decimal degree should they be in another coordinate unit. Tests (internal, via a GIS) are necessary for error detection and correction. Regarding sensitive data, the objective is to ensure the protection of endangered species, high economic value species, and external data of institution. The willingness of data owners must be respected, as well as the tradition of indigenous people, and the legislation in force. For the generalization of spatial data (locality or coordinates), it was advised to use a three levels grid (Chapman and Wieczorek, 2006): 0.1 degree, 0.01 degree, and 0.001 degree. This presentation ended with the specificities of GBIF.

The second presentation of Mrs. Parmelon dealt with the tools to improve the suitability of data (metadata, spatial data, and tabular data) for use. In general, metadata are needed by data user to understand data quality, and determine how useful data could be. Metadata quality tools include the IPT (Integrated Publishing Toolkit) of GBIF, with several sections: Taxonomy, Citation, Sampling methods, Links…, and Darwin Core Archive Validator). GeoLocate, InfoXY, sp Outlier, Georeferencing Calculator, GIS software (DIVA-GIS, Quantum GIS, gvGIS…) etc. are commonly used tools for spatial data. Regarding tabular data, the main tools used are: Name Parser (for standardization of names), Name Finder (to find out names), and Taxon Tagger (web application used to identify, underline, and extract scientific names from websites and PDF documents), Darwin test (application to test and validate data records to the format Darwin Core 1.2 / 1.4 and Darwin Core Archive). For other types of data (data from Google, Yahoo etc.), OpenStreetMap and Thesauri are often used.

Questions were asked by participants after both presentations, and Mrs Parmelon provided additional clarifications. These questions were related to error detection, to enable good data quality, and reliable use.

Figure 2: Participants during the presentation on biodiversity data quality by Mrs. Sophie Pamerlon.

3.3. Data use for mapping and species distribution modeling

The presentation on the use of biodiversity data for mapping and species distribution modeling was done by Dr Gérard Gouwakinnou. Three points were developed in this presentation: (i) theoretical basis of ecological niche modeling, (ii) data types and data sources, and (iii) the Algorithm MaxEnt of ecological niche modeling.

In the theoretical basis of ecological niche modeling Dr Gouwakinnou started with the definition of the notion of ecological niche modeling, and its usefulness in biology and natural resource conservation. Then the relation between the geographic space and environmental space was explained to participants. At this point, participants were informed about the critical role of GIS in the visualization of the results of ecological models.

Regarding the second point of the presentation two types of data are necessary to elaborate species distribution models: species occurrence data and environmental data (mean annual temperature, mean annual rainfall…). The choice of spatial scale of data (resolution and extent) should receive a careful attention.

The presentation ended with the description of some models of algorithms used in ecological niche modeling. A particular emphasis was put on MaxEnt software which is the most used in

ecological niche modeling. The file formats requirements of MaxEnt and the procedure of data preparation were explained to participants. Websites where data (biological and environmental data) can be downloaded for free were presented to participants. A case study was implemented, as illustration, so as to help participants to understand the functioning of MaxEnt. Based on this practical case, participants were introduced to the interpretation of the results of the model: current distribution and future distribution of species. The training material was shared with participants in the form of a folder containing MaxEnt setup and useful data for self-learning.

Participants showed a high interest in the presentation about ecological niche modeling. They interacted with Dr Gouwakinnou through several questions on the precautions for reliable results of the modeling.

Figure 3: Presentation on ecological niche modeling by Dr. Gérard Gouwakinnou.

3.4. Download of data from GBIF portal

The presentation on data download was done by Mr. Jaures Gbetoho. All stages for completing data download from GBIF data portal were presented. The first stage consisted of creating a user account (for new users) and then logging for access. The process continues with data specification and download, browsing and filtering data according to research objectives. A practical case was performed through the download of occurrence data of *Afzeliana Africana* in Benin. Mr. Gbetoho explained how downloaded data could be useful,

and encourage participants to contribute to global efforts of biodiversity data mobilization by publishing their own data on GBIF portal.

3.5. Introduction to the Geographic Information System (GIS)

The presentation of the basics of GIS was done by Dr. Adi Mama. He started with the definition of GIS, and then focused on its usefulness for decision making. The application fields of GIS were widely explained. These includes, among others, transportation, food production, and natural resource management, etc. The process of GIS utilization starts with the measurement of environmental parameters, and the elaboration of models (alternatives of actions). The elaboration of maps and monitoring (temporal and spatial changes) represent the following stage. Dr Mama also presented data description (spatial data, non-spatial data, temporal data, metadata), as well as data structure in GIS (vector model, raster model). A particular emphasis was put on coordinates and projection systems. The various coordinates and projection systems used were presented (e.g., UTM which is a flat representation of the earth). Several examples of practical use of GIS were given to participants. At the end of the presentation, QGIS (open access GIS software) was provided to participants.

The presentation was followed by interactions where participants widely recognized the relevance of GIS for the development of Benin. They suggested actions of pledge toward the government, to promote the use of GIS to support public actions in the field of infrastructures, natural resources management, and mitigation of natural hazard.

Figure 4: Training session on GIS by Dr Mama Adi

4. Training of journalists

The parallel session on journalist training gathered a total of nine persons: six journalists and three representatives of GBIF Benin. The objective of the session was to train journalists on the interest of biodiversity and biodiversity data, and the activities of GBIF and GBIF Benin in data mobilization. As communicators, they can therefore provide the right information on biodiversity informatics to the general public and decision makers.

The training operated through interactive discussion based on the presentation of Prof. Jean C. Ganglo titled "Interest of biodiversity occurrence data: necessity of support from journalists". The presentation included the following elements: presentation of GBIF and GBIF Benin, introduction to Biodiversity Informatics, practical uses of biodiversity data, types of primary data (bio collections, observational data, data from multimedia), secondary data and metadata. The presentation ended by recommendation for the work of journalists. Journalists showed a critical interest in this training. Some of them are already working on environment and biodiversity, but the current training will enable them to refine their work. As a sign of the commitment of journalists, several articles were published on the opening ceremony of the workshop.
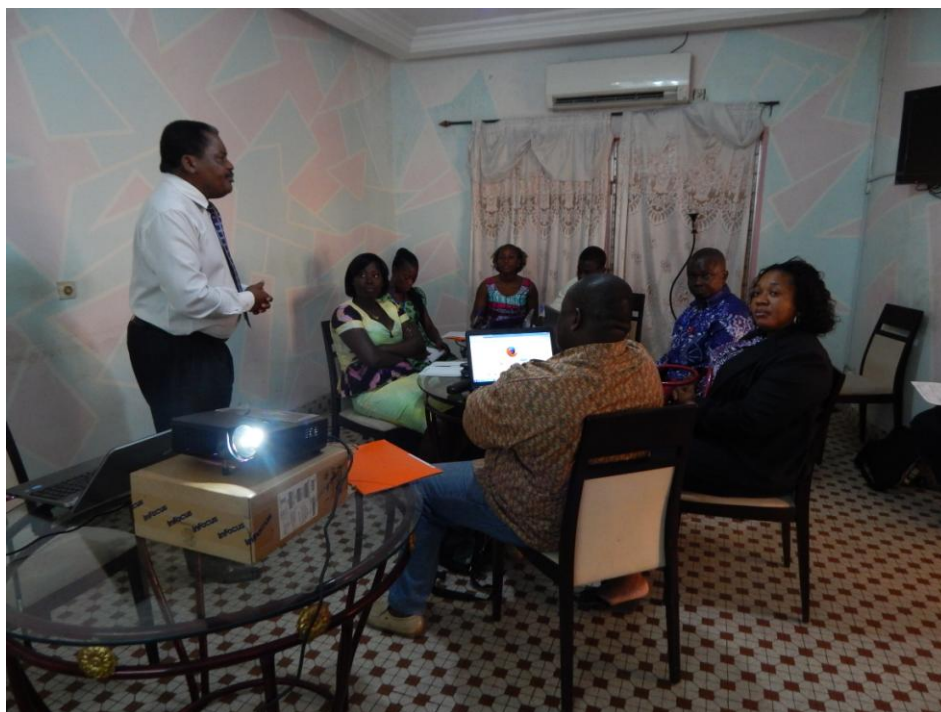

Figure 5: Training session of journalists.

5. Closing ceremony

The closing phase of the training and information workshop started with the evaluation of the workshop by participants. The results showed that participants were fully satisfied with the overall organization of the workshop (venue, agenda, content of the training, quality of presentation, coffee and lunch breaks).

The first speaker during the closing ceremony was Mr Eric Chenin, Head of delegation of GBIF France. He said how glad he was to attend this workshop, and how happy he was that GBIF France could make a contribution to this event. He recognized the expertise of GBIF Benin members and the quality of the training and its associated events. He renewed the commitment of GBIF France to cooperate closely with GBIF Benin in the future.

Second, Professor Jean C. Ganglo (GBIF Node manager for Benin) thanked all participants for attending this three days workshop. He promises that other capacity building workshops will be organized in the future. He ended his speech with special thanks to GBIF France and JRS Biodiversity Foundation.

The workshop ended with the speech of the Dean of the Faculty of Agricultural Sciences. Professor Joseph Hounhouigan said he was positively surprised by the high number of participants in the workshop (on average more than 50 people per day). He congratulated the organizing committee of the workshop and said the Faculty of Agricultural Sciences will be supporting all actions of GBIF Benin. He thanked the delegation of GBIF France. He ended with special thanks to JRS Biodiversity Foundation for continued support to GBIF Benin.

Figure 4: Officials during the closing ceremony.

The speech of Prof. Hounhouigan was preceded by the distribution of certificate of attendance to all participants.
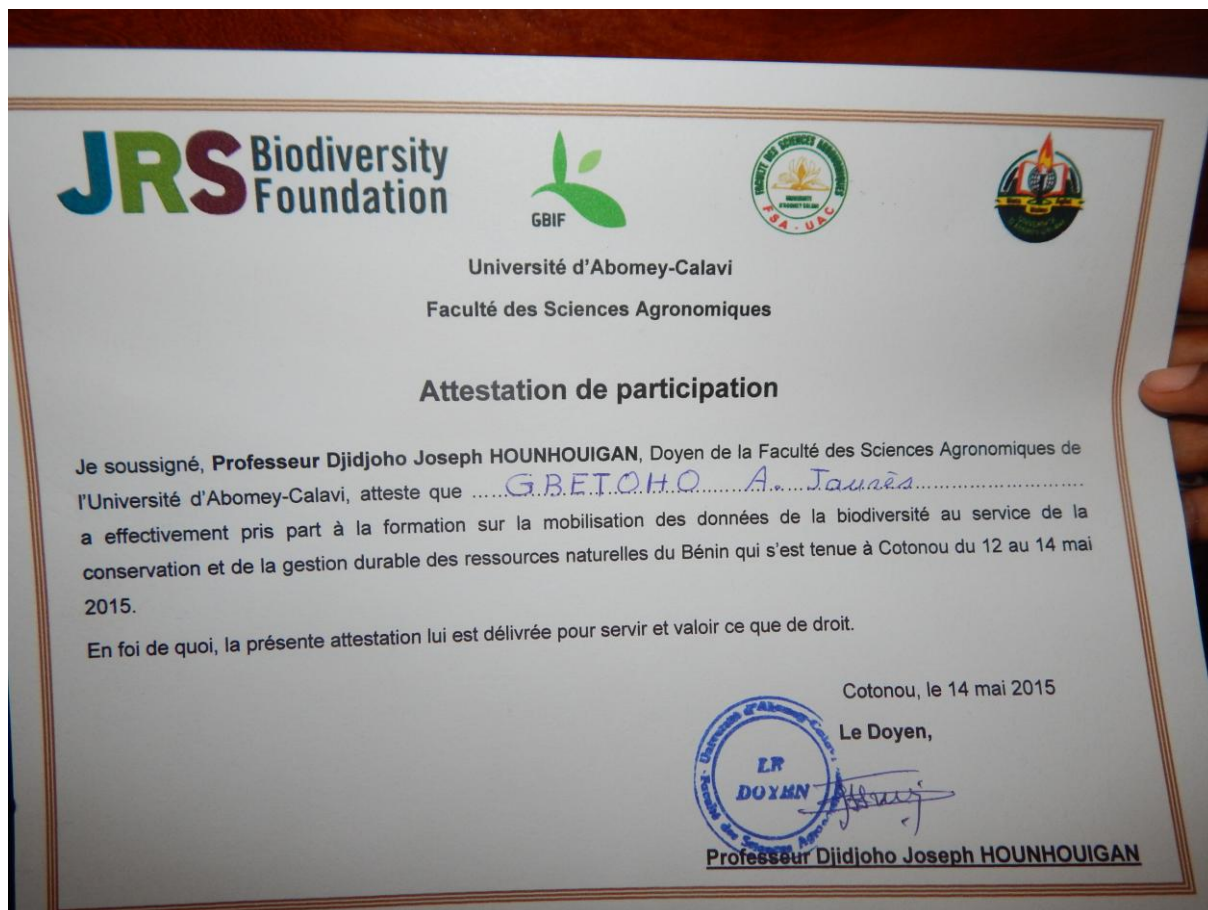
Figure 6: Specimen of certificates given to participants.

Figure 7: Distribution of certificates to participants.

Conclusion

The training and information workshop was a successful event. The key achievements of the workshop were as follows: information and sensitizing of decision makers on the necessity of increased efforts for biodiversity data publication, capacity building of participants in Biodiversity Informatics, and training of journalists to inform adequately citizens. The training team was strengthened by two representatives of GBIF France.

The evaluation showed that participants were widely satisfied with the workshop, and were willing to receive further capacity building training in the future. JRS Biodiversity Foundation was warmly thanked for funding this workshop through the project "A technological package for the implementation of the Benin National Biodiversity Information System".

Appendix 1: Workshop agenda

Day 1: Plenary session (Moderator: Dr Augustin Aoudji)

N°	Activities	Hours	Responsible
1	Welcome and installation of participants	8:30-9:00 AM	Jaures Gbètoho
2	Speech of the Director General of the Forest Speech of the Dean of FSA and Launching of the workshop	9:00-10:30 AM	Moderator (Dr Augustin Aoudji)
3	Cocktail	10:30-11:00 AM	Jaures Gbètoho
4	History GBIF and GBIF Benin	11:00-11:15 AM	Head of delegation GBIF Benin (Dr Gaston S. Akouehou)
5	Data publication issues and the necessity of institutional support	11:00-11:30 AM	Head of delegation GBIF France
6	Interest of biodiversity occurrence data, and the need of support from decision makers	11:30 AM -00:00 PM	Node Manager of GBIF Benin (Professor Jean C. Ganglo)
7	Debates	00:00-00:30 PM	Moderator
8	Lunch break	00:30-1:30 PM	Jaures Gbètoho
9	Departure of decision makers	1:30 PM to…	

Day 1 (continuation): Training session for participants (Moderator: Dr Gaston S. Akouèhou)

N°	Activities	Hours	Responsible
10	Presentation of the data portals of GBIF and GBIF Benin	1:30-2:00 PM	Node Manager of GBIF Benin (Professor Jean C. Ganglo)
11	Data collection on herbarium specimens	2:00-3:30 PM	Professor Yédomonhan Paul
12	Collection of occurence data	3:30-4:30 PM	Professor Jean C. Ganglo

Day 2: Parallel session of training for journalists (Moderator: Dr Aoudji Augustin)

N°	Activities	Hours	Responsible
1	Welcome allocution	9:00-9:15 AM	Dean of FSA
2	Interest of biodiversity occurrence data, and the necessity of support from journalists	9:30-10:30 AM	Head of delegation and Node Manager of GBIF Benin
3	Coffee break	10:30-11:00 AM	Jaures Gbètoho
4	Debates: What information to present to the public?	11:00 AM-1:00 PM	Head of delegation and Node Manager of GBIF Benin
5	Lunch break	1:00-2:00 PM	Jaures Gbètoho
6	Departure	2:00 PM	

Day 2: Parallel session of training for participants (Moderator: Professor Paul Yédomonhan)

N°	Activities	Hours	Responsible
1	Data collection and publication on GBIF and GBIF Benin sites (first part)	9:00-10:30 AM	Mrs. Sophie Pamerlon (GBIF France)
2	Coffee break	10:30-10:45 AM	Sunday Kakpo
3	Cleaning of collected data	10:45 AM-00:00 PM	Mrs. Sophie Pamerlon (GBIF France)
4	Lunch break	00:00-1:00 PM	Sunday Kakpo
5	Use of data for mapping and modeling of species distribution	1:00-3:00 PM	Dr Gérard Gouwakinnou
6	Data collection and publication on GBIF and GBIF Benin sites (second part, focus on GBIF spreadsheet use)	3:00-4:30 PM	Mrs. Sophie Pamerlon (GBIF France) / Professor Jean C. Ganglo

Day 3: Training session for participants (Moderator: Dr Gaston S. Akouèhou)

N°	Activities	Hours	Responsible
1	Data downloading from GBIF portal	9:00-10:00 AM	Mr. Jaures Gbètoho
2	Coffee break	10:00-10:30 AM	Sunday Kakpo
3	Cleaning of data collected	10:30 AM-00:00 PM	Mrs. Sophie Pamerlon
4	Lunch break	12:00-1:00 PM	Sunday Kakpo
5	Basics on Geographic Information System (GIS)	1:00-3:00 PM	Dr Adi Mama
6	Use of data for mapping and modeling of species distribution	3:00-4:30 PM	Dr Gérard Gouwakinnou
7	Workshop evaluation	4:30-5:00 PM	Dr Augustin Aoudji
8	Closing ceremony and distribution of certificates of attendance	5:00-6:00 PM	Dean of FSA