AIDE MEMOIRE

Africa Higher Education Centers of Excellence (ACE 1)

Technical Support Mission (TSM) for

Centre for Dryland Agriculture (CDA)

Bayero University, Kano, Nigeria

April 5-6, 2018

1. *Technical Experts*

i. *Prof. Jonathan Mba (AAU).*
ii. *Prof. Abubakar Dominic Akpa (Country-Based Agricultural Expert/NUC).*
iii. *Dr. Carl Larsen (AAU/WB Agriculture Expert).*
iv. *Prof. Raphael Wahome (AAU/WB Agricultural Expert).*

2. *Acknowledgements*

The AAU/WB team thanks the entire CDA team for the collaborative and fruitful working sessions and for arranging the visit. Please see Annex 1 for a list of people met.

3. *Preamble*

The Centre for Dryland Agriculture (CDA) was established in 2012 at Bayero University with the aim of building human resource capacity and generating sustainable agricultural technologies that would increase the productivity of crops and livestock in the semi-arid and dry sub humid environments of Nigeria and the West African sub-region. The Centre offers postgraduate (PG) training at Postgraduate Diploma (PGD), Master (M.Sc.) and Doctorate (PhD) in Natural Resource Management and Climate Change, Crops and Cropping Systems, Range and Livestock Management, Livelihoods and Natural Resource Economics and Mechanization in Agriculture. CDA enjoys massive administrative support from the vice chancellor and chief officers of the university. The Centre continues to make good progress in training, research, and outreach. In addition, its infrastructural developments are phenomenal. The centre's headquarter building is complete and it has managed to retain its former building as an annex. It already has state of the art laboratories that are mostly fully equipped. The developments at its research and teaching farm are fairly advanced and will be ready as scheduled.

4. *CDA's Achievements*

i. CDA has received additional financing from the ACE project. After the midterm review, resources were calibrated among the Nigerian ACEs. CDA is the only one of the Agricultural ACE's in Nigeria to receive additional funding during the midterm reallocation.
ii. **Full national accreditation for all MSc and PhD programmes.** This DLR is capped at $200,000 for the center following achievement of national accreditation for a maximum two programmes.

iii. Has completed the gap analysis and will shortly complete self-assessment for international accreditation. Since no formal agency has been selected, these exercises may have to be repeated to fit the format of the accreditation body that is eventually appointed. For gap assessments and self-evaluation, the DLR is capped at a combined maximum of $200,000 for the centre and only awarded if following an international methodology. We recommend to confirm the eligibility of the methodology with the World Bank before starting.

iv. CDA has scored close to or over 100% on DLIs 2.1 (short courses), 2.2 (M.Sc. students), 2.3 (Ph.D. students) and 2.4 (Outreach activities). However, as outlined below, achievements for regional DLIs are far below expected targets:

DLR 2.1 (short courses): 548 trained (3% of target verified), with only 21% and 4% for regional and women respectively;

DLR 2.2 (M.Sc. students): 1982 registered (81% of target), with only 12% and 1% for regional and women respectively;

DLR 2.3 (Ph.D. students): 74 registered (121% of target), with only 27% and 3% for regional and women respectively and

DLR 2.4 (Outreach activities): 92 activities (39 % of target), with only 6% being regional

5. ***CDA's Challenges and Suggested Solutions***

i. **Academic and non-academic trade unions' strikes:** CDA being located within the main campus of the university has not succeeded to insulate itself from the strike actions by university staff. The consequence has been delays in academic and research programmes. *We suggested that the Centre Leader attempt to explain the regionality nature of CDA's programmes to the university management and union leadership and plead exemption to facilitate meeting regional milestones. Alternatively, CDA could transfer training to a partner institution's premises during the strike action periods in order to attain required timeliness.*

ii. **Incentivizing staff (especially from other units) to put in extra effort towards discharging assigned responsibilities:** Motivation of staff to participate in CDA's programmes has persistently challenged performance. BUK has assisted in providing some direct remuneration, but the challenge remains. *We recommend alternative incentives including: Support to present papers at conferences, documentation of the size of support to persuade participation, small competitive research grants to support academic research. To avoid doubt and render clarity of incentives, potential support opportunities for involved staff should be clearly outlined.*

iii. **Low numbers/proportion of females at regional short term and MSc training:** The former will be addressed through taking the short term to the neighbouring countries (Niger and Mali). *There is need to develop a strategy to attract women to the CDA MSc programmes including scholarship and specialized hostel with nursery facilities. Due to the perceived risk for coming to Northern Nigeria (see associated observation in item vi. below), CDA may never to attract sufficient numbers of regional women. We advise reallocation of this DLR (or a proportion of it to a more achievable DLR.*

iv. **Internships for students and in relevant sectors:** The internship DLR is for MSc and PhD students who are attached to private sector to ensure knowledge and research learning that can be applied in a business set-up. Public institutions can be eligible for internship but this

needs to be documented and approved before sending students at internship. It challenges CDA to find relevant internship institutions in Nigeria and the region as the agribusiness sector to a large degree is informal. *It is recommended that CDA form a task group to streamline the internship process.*

v. **Placement for faculty members in relevant sectors**: For staff, a similar requirement was made to enable them to learn from and make useful contribution to the industry. Importantly to cater for staff other obligations, the one month's placement/internship with private sector/industry can be executed as 25 days of placement within a maximum three months with 2 days per week; provided it can be clearly verified by third party that Staff has been out working with the sector equal to a month's work over a limited period of time (maximum three months). This also account for placement in the informal sector or in a value chain, as long as it can be clearly verified by third party. *It is recommended that CDA get more clarity on how staff placement can be designed to both meet DLR requirements and staffs interest. Again, a task group should be formed to facilitate the process.*

vi. **Difficulty in getting international accreditation body for PG programmes do to security concerns:** The international accreditation process is going slow as accreditation agencies so far have been reluctant to come to Northern Nigeria *CDA were advised by Prof. Mba to approach the HCERES (French) agency because its agents can venture to any place in Nigeria to accredit institutions.*

6. ***Student Academic Development***

The centre has several academic programmes at a total of five M.Sc. and Ph.D. level programmes in addition to short training programmes at Postgraduate Diploma. The students feel that they have the following advantages over the regular Bayero University (BUK) postgraduate students:

i. They have funding support to attend conferences/workshops and research; quick release of funds;
ii. They learn in an excellent environment, i.e. exposure to modern technologies; excellent laboratories and internet; national and regional academic tours; literature and writing support; excellent lectures; synchronized internships.

However, CDA students highlighted a few challenges including:

i. Lack of desired statistical software (SAS)funds.
ii. Ceiling set on research funds as the management has limited PhD grant to 1.5 million Naira and MSc at 750,000 Naira.
iii. International students do not benefit from outreach since they are reaching out to people who are not their nationals.
iv. The English course period is insufficient. It should be lengthened and intensified. Students have been introduced to a commercial course available within the city.
v. The social amenities during internship are of low standards. In addition, internship funds are not released on time and students must identify internship places for themselves.
vi. The timing of short-term training is sometimes not right especially on proposal writing.

vii. Slow development and approval of research proposals delaying graduate student progress. There is need to separate CDA students from regular students and to seek expertise from the region and international circles. If possible the CDA course programmes should be removed from the departments to the centre.

viii. Students need to be encouraged to publish as they approach the end of their studies.

7. ***Conclusion***

CDA has done well and come from far. They need to expand their time horizon view and start planning for the life after ACE. Therefore, they should address regional student recruitment and external fundraising, hasten accreditation and speed up the civil works so as to have a strong foundation for future development plans. Finally, they need a strategic plan to guide their future.

Centre d'Excellence Africa (CEA)
Ecole Nationale Superieure de Statistique et d'Economie Appliquee (ENSEA)

Site Visit Report, April 10-11, 2018
Nkem Khumbah

1. Introduction and organization of the report

The CEA-ENSEA site visit took place on April 10-11, 2018 at the Ecole National Superieure des Statistiques et d'Economiques Appliques, (ENSEA) in Abidjan (Côte d'Ivoire). The site visit team consisted of: 1) Prof. Jonathan Mba (AAU and Team Leader) and Prof. Nkem Khumbah (WB/AAU STEM Expert). Center Director Prof. Kouadio led the CEA-ENSEA team. Other members of the CEA-ENSEA staff that were present in the meetings and discussions included: 1) Pierre Enile Gnebehi (ENSEA Finance), 2) Ms. Debora Olapade (Center Communications support staff), 3) Mr. Akpa Gnagne (Center Financial and Administrative Support Staff), 4) ….. (Center Procurement Support Staff) and 5). Ms. Alphonsine Ali Kouadio (Communications staff). The site visit was structured around the following activities:

a) **Courtesy call on Institution leadership.** We began our site visit with a courtesy call on Prof. Hugues Kouadio, Director of ENSEA.

b) **Meeting and discussion with Center Leadership.** We began our review with a meeting and discussion with the members of the CEA-ENSEA team. During this meeting, Center Leader Prof. Hugues Kouadio gave an overview of the Center's progress with a focus on academic activities, relations with partners and Industry, DLI results, extent of project implementation and near-term vision of the Center.

c) **Visit of Center research facilities.** We visited the facilities of ENSEA including a newly established IT support laboratory, a classroom equipped with modern computer, IT infrastructure and STATA software, and an almost completed building that will house the doctoral "school". The building will be one of largest on the ENSEA premises, and will include classrooms, offices, laboratories and housing for short-term visiting faculty and staff. The Center Leader also informed us of a 30-hectare piece of land available for eventual relocation of the ENSEA as it grows into a full-fledged "Institute of Excellence" for research and training.

d) **Meeting with Center students.** We met with a group of national and regional Masters students that were studying for various professional tracks: Actuarial sciences, Applied statistics, Stochastic Analysis, etc.

e) **Feedback meeting with the Center and ENSEA Leadership.** At the conclusion of our site visit, we met again Prof. Hugues Kouadio, who serves as both the Director of ENSEA and ACE Center Leader. During this feedback session, the site visit team shared its main findings and thoughts.

f) **Debriefing meeting with representatives of the Ministry of Higher Education and World Bank.** As a final activity for our ACE evaluation mission in Ivory Coast, we met with representatives of the Ministry of Higher Education and Scientific Research (Mr. N'Goh Bakayoko and Mrs. Rita Felicia Atta) and the World Bank Country Office Senior Education Specialist (Mr. Patrick Ramanantoanina). This meeting was broader in participation, discussions and context, including Prof Mamadou Diallo who had earlier joined the AAU team and participated in the site visit to CEA INP-HB in Yamoussoukro. During this debriefing session, which was held at ENSEA in Abidjan, the visiting AAU team briefed the government of Cote d'Ivoire and World Bank of its findings and recommendations for both site visits.

Below we summarize the key findings and recommendations that were derived from our site visit with a focus on three areas: 1) Governance, management and communication, 2) Partnerships, revenue generation and project implementation and 3) Education and research.

2. Governance, management and communication.

The CEA-ENSEA has the specific characteristic of being located at a host institution that is rather small in scale, nimble in its administration and specialized in its educational offerings, relative to other ACE hosting institutions. It also functions under two supervisory ministries: the Ministry of Higher Education and the Ministry of Economy and Planning. The ACE has the advantage of having its leader also serve as Director of the host institution, ENSEA, so the administration of the Center is well aligned with that of the host institution, thus minimizing any bureaucratic bottlenecks in institutional approvals and disbursements, even so within the context of the Ivorian government administering the common RICI accounting system.

ENSEA's ability to pivot its activities on the ACE and successfully transition from an institution offering Masters professional level training, to an institution offering Doctoral level academic training and research, could provide a model for transitioning similar specialized professional training institutions into leading Doctoral research and training institutions. This falls in line with current Ivorian and Africa regional efforts to upgrade the quality and quantity of active researchers, educators and corporate data analysts with doctoral level training. Indeed, the ENSEA leadership views the ACE as a specific activity to use as pivot to "re-invent" its future activities and role as the premier regional supplier of cutting-edge statisticians and data analysts. We note here that ENSEA is also working to change its statutes accordingly towards necessary institutional and regulatory requirements for incorporating conventional core functions of an academic institution into its current organizational and operational scheme.

We find that the relatively smooth pace of the CEA-ENSEA project implementation can be attributed for the most part to its current leadership, in addition to the nimble and agile governance of the host institution, and its exemplary experience in implementing grant-funded and contractual projects. Indeed, ENSEA recently won the 2017 Ivorian national award for best managed public institution in Cote d'Ivoire.

1) *Management system has full institutional support.* Compared to many of the STEM ACEs that we have evaluated during the last 3 years, the CEA-ENSEA is being operated by a leadership that is also the leadership of the home institution. Indeed, the leadership of ENSEA views the CEA as "the new ENSEA", and the two are barely separable. As ENSEA builds upon its ACE to expand into a more academic research institution, the management needs to think carefully about best modes of developing all the conventional core functions of a research institution alongside its current organizational and operational scheme. Given that the conceptual and operational tenets of a professional Institution differ significantly from those of a research Institution, it may not be sufficient for prevailing administrative and academic structures to simply extend to, and incorporate a PhD program as a new component in its organogram. A possibility is to appoint a senior career researcher of international repute, in Applied Statistical Sciences, to build an applied statistical research school with a vision of it becoming the main driver of ENSEA. This, in the spirit as CEA-ENSEA becoming the new ENSEA.
2) *A governance system with full financial and operational autonomy*. The CEA-ENSEA has the financial/operational autonomy and agility needed to move fast in the implementation of its work plan. The management and disbursement of the Center funds are carried out by a designated accountant within the RICI system of management of public funds (e.g. a World Bank Loan) in Ivory Coast. While this imposes additional checks and balances that have slowed the pace of implementation at other Centers, CEA-ENSEA has been able to avoid such delays, due mostly to Center leadership taking advantage of the broad overlap of Center and ENSEA operations.
3) *A strong understanding of the requirements of a performance-driven ACE project.* We were pleased to notice that key Center stakeholders (e.g. students), staff (e.g. ENSEA designated project

account) and partners (National Institute of Statistics) have rather good understanding of the ACE project after 1.5 years of implementation. We attribute this to concerted effort and plan by the CEA-ENSEA leadership to communicate the Center's vision, mission and impact to stakeholders within the ENSEA community including faculty, students, staff and partners.

3. Partnerships, revenue generation and partnerships

During our site visit, we were pleased to learn that the CEA-ENSEA is making significant progress in leveraging its long established and extensive network of 24 national, regional and international academic and corporate partners. Active academic partners include: 1) ENSEA d'Abidjan, 2) ISSEA de Yaoundé (Cameroon) and 3) ENSEA de Dakar (Senegal). Active sector industrial partners include: 1) the Ivorian National Statistical Institute, 2) The African Union's Strategy for the Harmonization of Statistics in Africa (SHaSA) and 3) Projet d'Autonomisation des Femmes et du Dividende Démographique au Sahel (SWEDD). The Center Steering committee held meetings in May and June 2017, with next planned for June 2018; Scientific Committee meetings were held in May 2017 with next planned for May 2018. It is noteworthy that each of the Center's active partners has a representative on the CEA-ENSEA Steering Committee.

In the areas of revenue generation and overall project implementation, the CEA-ENSEA reports impressive figures of US **$254,306** generated in 2016 and US **$ 1,796,932** generated in 2017. Much of these came from short courses offered under contract with sector partners. This places the Center on track to achieving its revenues target and corresponding DLI milestone.

CEA-ENSEA plans to expand its partners into the English-speaking Africa, starting with a mission to South Africa in 2018. While this is very welcome, it might serve more to concentrate such efforts on closer neighboring countries like Gambia, Liberia and Sierra Leone, where the need for well-trained statistical workforce may be higher.

4. Education and research

During our site visit, we were pleased to learn that CEA-ENSEA is making progress in the implementation of its education and research programs. Key accomplishments include: 1) in introduction of new Masters level courses in Actuarial Sciences, Agricultural Statistics and a research chair in Data Science. Research programs currently under development include: Quantitative Economics, Statistical Methods, Statistics in Public Health and Statistics in Social Sciences.

Progress in student recruitment and enrollment. During the 2018 academic year, the ENSEA has recruited and will enroll its first batch of students under the CEA: a total of 103 *new* Masters students, including 50 (49%) of whom will be international students from over 10 African Countries. This places the Center on track achieving the corresponding DLI. This enrollment also includes 24 (23%) female, which is slightly below the targeted 30% for fulfilling corresponding DLI. However, CEA-ENSEA is still to enroll students in its planned Doctoral program, and may not fulfill related target for corresponding DLI disbursement.

Although the CEA-ENSEA has made significant progress in the development and implementation of its education and research programs, it is facing a number of critical challenges and deficiencies that need to be addressed including:

a) *International accreditation*. While the CEA-ENSEA has accreditation for its traditional professional programs, it is yet to develop a plan to initiate and complete the work required to gain international accreditation for its new academic Master's and Doctoral degree programs.

b) *Student housing*. During our meeting and discussion with the Center students, they communicated the needs for better study space in the dormitories; i.e. a number of students reported not being able to study once they return home for the day. This reflects a recurrent concern for the ACEs and Ivorian Universities, and we recommend that CEA-ENSEA appoint a full-time student affairs officer, to be responsible for managing student life: assuring optimal learning and living conditions for students.

c) *Regional student support*. During our discussion with the students, the Center regional students communicated their special needs including (i) adequate IT support with Wi-Fi access, both for them and for part-time students and (ii) career counseling and institutional support to secure industrial internships for the completion of their final projects ("Memoire de Fin d'Etudes").

d) *Quality and Dedication of teaching Staff:* We were pleased to visit a classroom where the lecturer was a visiting short-term faculty from Canada. He was very happy to have been invited, and expressed willingness to return for longer term lectures as CEA-ENSEA may enable. It reported a full-time faculty ratio of about 25%, and students reported that part-time faculty barely had any teaching resources and were barely motivated (they actually requested that efforts be made to provide internet access to part-time faculty).

Although the CEA-ENSEA has made much progress in implementing its activities, the functional mandate of ENSEA since its creation, has been for training of professional functionaries for governmental agencies and other public sector institutions. This has had implications for the type of faculty and students that it attracts, and for that matter the characteristic academic and research dimension expected of a higher education institution is visibly lacking, resulting in low research publications. The students are recruited from parts of the Francophone subregion, through its partner network of similar professional institutions. While ENSEA is exemplary in this domain, it faces a major challenge to appropriately incorporate all the conventional core functions of an academic research institution in its scheme of things: choice of academic partners, research infrastructure, resources and faculty, sustainable funding mechanisms for doctoral students, academic programming.

5. Summary and overall recommendations

Since it became operational as a World Bank (WB)-Government supported Africa Center of Excellence in February 2016, the CEA-ENSEA has made significant progress in the implementation of its education and operational programs. Specifically, we applaud ENSEA for demonstrating exemplary administration and governance, through the "best managed public institution" award. However, the overall vision of the Center, to veer towards becoming a regional doctoral training and research institution is still to be implemented beyond construction of physical infrastructure. We therefore recommend the following:

Work Plan Implementation: The CEA-ENSEA needs to accelerate the implementation of its academic work plan (e.g. international accreditation, academic programing and research) to achieve all the DLI milestones within the project finance period, including especially, those linked to doctoral training. This will require more emphasis being placed on strong and continuous support from the Ivory Coast Ministry of Education and the ENSEA leadership to hire reputable research faculty and related requirements to successfully complete the project within the ACE I closing project date of December 2019.

Doctoral School: The CEA-ENSEA leadership needs to address critical issues related to expanding a professional school into a leading Doctoral and research Institution. We recommend the Center to hire or designate a faculty of strong repute in Applied Statistical Sciences, to provide academic and research leadership in building the Doctoral Program.

In any case, we recommend that the WB, AAU and the Ivory Coast Ministry of Higher Education continue to closely monitor and support the progress of the CEA-ENSEA including a follow-up site visit in October 2018.

AIDE MEMOIRE

Africa Higher Education Centers of Excellence (ACE 1)

Technical Support Mission(TSM) for

Centre of Excellence for Food Technology and Research (CEFTER)

Benue State University, Makurdi, Nigeria

April 3-4, 2018

1. *Technical experts*

i. Prof Jonathan Mba (AAU),

ii. Prof Abubakar Dominic Akpa (Country Based Agricultural Expert/NUC)

iii. Dr. Carl Larsen (AAU/WB Agriculture Expert)

iv. Prof. Raphael Wahome (AAU/WB Agricultural Expert).

2. *Acknowledgements*

The AAU/WB team thanks the entire CEFTER team for the collaborative and fruitful working sessions and for arranging the visit. Please see Annex 1 for a list of people met.

3. PREAMBLE

The Centre of Excellence for Food Technology and Research (CEFTER) was launched in 2014 to promote teaching, research and extension in post-harvest sciences and food technology, enhance agricultural productivity and industrial output for the socio-economic advancement of Nigeria and Africa. Since then it has made significant advances in evolution of excellence in all fronts including training in short courses, MSc and PhD, development of food harvest technologies, research in post-harvest food changes and dissemination of appropriate food handling and processing practices. However, it has lagged behind in securing target numbers of regional Post Graduate (PG) students, and in delivering on international accreditation, civil works and external fund raising.

4. CEFTER's Achievements:

v. CEFTER has scored close to or over 100% on DLIs 2.1(short courses), 2.2 (MSc students), 2.3 (PhD students) and 2.4 (Outreach activities). However, as is seen following, achievements for regional DLIs are far below expected targets.

   a. DLR 2.1(short courses): 678 trained (96.9% of target), with only 13% and 2% for regional and women respectively.
   b. DLR 2.2 (MSc students): 262 registered (167% of target), with only 15% and 40% for regional and women respectively.
   c. DLR 2.3 (PhD students): 59 registered (219% of target), with only 20% and 0% for regional and women respectively.
   d. DLR 2.4 (Outreach activities): 254 activities (85 % of target), with only 11% regional.

vi. Has set up a committee to spearhead and fast-track international accreditation.

vii. Has reallocated part of DLI target for externally generated funds to short training programmes to avert losses expected from inability to secure external funding.
viii. Established cordial relationships with a variety of partners that are committed to its objects.
ix. Has commenced civil works to construct the new CEFTER centre and renovation of two existing laboratories.
x. Has three cohorts of motivated students eager to learn and discover.

5. CEFTER's challenges and suggested solutions

vii. **Attracting regional students**: This is largely because of security fears. The ACE proposes to commercialize the short courses and scholarships to Cameroonians for MSC/PhD studies. There is also a suggestion that they come up with a swapping student arrangement with the other ACEs including those in East and Southern Africa.
viii. **Verifications of results**: On average, only 37% of results realized have been verified. We suggested that CEFTER be more proactive to ensure verification: follow templates, provide accurate information, follow respondents to ensure compliance, and if necessary the M&E officer should travel to AAU Secretariat in Accra to get clarifications on verification. All communications demanding accurate documentation of results and their verification should be copied to Prof Mba, NUC, the experts and the WB.
ix. **External revenue generation**: CEFTER funds come from fees and grants. So far, they are low on revenue generation from grants. We suggest formation of a Research Grant Writing Team (RGWT) charged with a continuous responsibility to identify funding calls and prepare proposal drafts. CEFTER should plan to hire services of renowned grant writers to polish and tailor RGWT draft proposals to the calls. In between calls, the RGWT should prepare draft proposals in line with the CEFTER research direction. Such drafts can be quickly modified to suit any call that might come up. CEFTER should also strengthen the dialogue with the food industry to seek opportunities for assisting with contract-based research to help addressing postharvest, food processing and challenges.
x. **Networking of partners:** Networking of partners is good practice to enhance support and good will for CEFTER. It can eventually translate into research and development funds. Initially this can be secured through holding of regular partner meetings, training on networking, study tours and development demonstrations.
xi. **International accreditation**: The international accreditation process is going slow. The ACE has set up a committee to follow this up. They were advised by Prof. Mba in case the current efforts they were making with the UK based agency fails to approach the HCERES (French) agency because its agents can venture to any place in Nigeria to accredit institutions. Other accreditation agencies have so far been reluctant to come to CEFTER due to security concerns.
xii. **New Building:** The CEFTER's new buildings should be ready by September 2018. They are already three weeks behind schedule. We urged redoubling of efforts to catch up in order to ensure verification in September. The current construction phase is easy to accelerate by hiring in a bigger team of skilled workers.

6. Student academic development

The centre has several academic programmes at a total of nine MSc and four PhD level programmes in addition to short training programmes at certificate diploma and higher national diploma levels. The students feel that they have the following advantages over the regular Benue State University (BSU) postgraduate students.

1. They go through programmes uninterrupted by strikes.
2. They have funding support.

3. They learn in a conducive environment: i.e. knowledgeable lecturers, good delivery methods, e-learning, internet, over 95% lectures given, uninterrupted power, equipped labs, feedback opportunity.
4. The administrators, lecturers and supervisors have excellent interpersonal skills creating good student supervisor relationships.
5. Unique excellent internship experience.
6. Affordable fees.

However, CEFTER students highlighted a few challenges including:

1. Prolonged time to graduation probably occasioned by late allocation of supervisors, misallocation of supervisors, asynchrony in BSU/CEFTER programmes, slow approval of proposals and slow processing of research funds, and delayed thesis defense. This is a critical challenge as an important excellence indicator is ability to complete the PG education on time.
2. Some students aver that some promises made by CEFTER/BSU towards them on admission are not being fulfilled. This is a challenge that needs attention as graduates will be the future ambassadors of CEFTER. It seems partly to relate to insufficient communication on how the research grant functions and partly due to the fact that that students prefer cash at hand to cost recovery. If not already in place, CEFTER could consider developing a student contract that will clearly spell out expectations from/to students and CEFTER respectively. The agreement should be endorsed by both parties at admission and be referred to in cases of disagreement on any matter.
3. Insufficient communication of internship purpose or placement of students in inappropriate firms leading to some student frustration. This seems partly to be a communication challenge. While CEFTER tries to expose students to different industrial sectors, some students seem not to understand or appreciate the learning it enables. They are squarely focused on a single topic. Additional awareness raising seems to be necessary to try to get these PG students to appreciate learning rather than just graduation.
4. Poor guidance in writing proposals, journal articles and theses. Hopefully the PG Supervisor training just completed, and the additional innovative learning and teaching training will mitigate this shortcoming.
5. Failure of (about 5% of) lecturers to attend classes and lack of artisans to fabricate original technological designs.
6. Labs for sophisticated analyses are yet to be made available.
7. National students claim they are not provided with hostels minimizing their ability to interact with other students.
8. Rationing of electricity and internet in the hostels.

7. **Partnerships**

CEFTER has a variety of learning institutional and industrial partners. The relationships with the partners are one-on-one and they have, so far, not been organized into a coherent consortium of partners. Therefore, they do not network among themselves. Most partners have noted advantages and benefits from the partnerships including:

1. Experimentation on challenges they faced.
2. Power consumption reduction by industries.
3. Cost reduction.
4. Some grants to renovate and upgrade facilities.

On the other hand, a few have misgivings including

1. Fear of loss of trade secrets.

2. Inadequate internship period.
3. Added workload when hosting students. This is more important for the academic institutions and should be handled through negotiation of workload distribution. To these end, the University of Agriculture requested the experts to visit their vice chancellor during the next visit to ensure senior management's commitment.
4. Some industrial partners requested remuneration for hosting students.

8. **Administrative expansion.**

BSU has incorporated CEFTER as a unit of the institution and has in accordance with its Statutes appointed the Centre Leader as the Director and the Deputy Centre Leader as the Deputy Director in charge of Operations. An additional Deputy Director to work alongside the Centre Leader and the Deputy Centre Leader to take care of the growing administrative load. In addition, a new and very resourceful secretary has been appointed to the centre.

Conclusion

CEFTER has done well and come from far. They need to expand their time horizon view and start planning for the life after ACE. Therefore, they should address regional student recruitment and external fundraising, hasten accreditation and speed up the civil works so as to have a strong foundation for future development plans. Finally, they need a strategic plan to guide their future.

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Africa Higher Education Centers of Excellence (ACE 1)

Technical Support Mission (TSM) for

Centre for Research in Poultry Sciences (CERSA)

Universite du Lome, Togo

April 16-17, 2018

8. ***Technical Experts***
   v. *Dr. Carl Larsen (AAU/WB Agriculture Expert).*
   vi. *Prof. Raphael Wahome (AAU/WB Agricultural Expert).*

9. ***Acknowledgements***
   The AAU/WB team thanks the entire CERSA team for the collaborative and fruitful working sessions and for arranging the visit. Please see Annex 1 for a list of people met.

10. ***Preamble***

The Centre for Research in Poultry Sciences.

The centre was last visited on November 2016 and recommendations made to address progress issues on internship, exposure of students to the industry and publications. Since then CERSA has made significant progress on these and other fronts as will be seen below.

11. ***CERSA's Achievements***

xi. **Regional Tour:** CERSA has organized an annual student tour to several neighbouring countries for expanding the appreciation of the poultry industry to them. This activity was regarded very valuable by the students and part of CERSA's excellence trademark.

xii. **Full international accreditation for all MSc programmes.** One M.Sc. programme with five specialisations have been accredited qualifying the centre for the full DLR of $600,000 when verified. We congratulate CERSA for being among the first agricultural ACEs to achieve international accreditation.

xiii. The CERSA team has been officially appointed by the government (Director and two deputy directors and by the university administration (thematic service leaders) as per recommendation made during the last field visit.

xiv. Secured 6 PhD and 18 MSc scholarships for regional students for DAAD. The fund is growing at a high rate annually. CERSA is doing very well in terms of regional students and will exceed all targets.

xv. Has secured a research agreement with pre-eminent global poultry breeding company, *Issa Hendrick Genetics* of Netherlands for testing responses of their breeds to equatorial low altitude performance. The agreement provides support for a post doc., 3 PhD students and selected 2 MSc students, and is making steady progress.

xvi. Has completed construction of poultry research facilities (animal houses, metabolic units, partial hatching and rearing system etc). The space for the installation of the already procured

experimental respiration chamber is available, awaiting removal of other equipment when the labs in the CERSA building are complete (in four months' time).

xvii. Has made vast progress in the construction of the CERSA building scheduled to be ready for occupation within the next three months.

xviii. Superseded the revenue generation target, although it was lower than the DLI. However, will within the remaining time overshoot the DLI.

xix. Students from eleven countries within the region. Additional 3-4 countries will be included in the next admissions.

xx. CERSA has scored close to 100% on DLIs 2.1 (short courses), 2.2 (M.Sc. students), 2.3 (Ph.D. students) and over 100% on DLI 2.4 (Outreach activities).

12. ***CERSAs Challenges and Suggested Solutions***

xiii. **Decentralisation of activities:** With the official appointments of the management team including thematic service leaders, CERSA now has the leadership structure in place. What still remains, is for the system to be fully functional. There is still too much reliance on the Centre Leader. Each and every appointed leader must proactively take responsibility. At the same time the leader needs to describe their duties, expect detailed action- plans from them and hold them to account on timely implementation and deliverables including accurate verification data.

xiv. **Cash flow:** CERSA has a critical issue with cash flow that might impede and delay construction work. This seems largely to be due to slow and verification process but also to slow release of advance funds by the government. CERSA needs to proactively engage AAU to speed up the verification and to address verification data inaccuracies. The suggested actions include documentation of required verification, constant reminders and follow-up, physical visits to M&E officer at AAU in Accra and copying all communications to AAU and WB, and the experts.

xv. **Insufficient regional activities:** CERSA needs to pay more attention to its regional outreach for staff and students as well as regional training through short courses. As outlined below, achievements for regional DLIs for short training and outreach (1) are far below expected targets:

DLR 2.1 (short courses): Only 28% and 43% for regional men and women respectively;

DLR 2.4 (Outreach activities): Only 15% of regional target

So far, CERSA has not offered short training to address product quality and the markets. They plan to do so shortly and believe that sufficient numbers of females will be trained locally and in the regional training planned at neighbouring countries.

xvi. **Failure to attract national female students:** All program categories have failed to attract sufficient national female applicants and students. So far, the achieved percentages of national female Post Graduate students are:

DLR 2.2 (M.Sc. students): Only 31% of target

DLR 2.3 (Ph.D. students): Only 13% of target

The nature of poultry business that CERSA addresses may be the cause. In Togo, women seldom engage in large scale commercial poultry production. Women are either engaged in family poultry production (small scale) or in retail, selling egg and meat products. Admission of MSc and PhD students from the current applications will compensate the quota for national female students by using regional female students. Therefore, admissions will remain open for regional applications including from eastern Africa.

xvii. **Low level of verification of student numbers:** It seems that breakdown in communication between the AAU, verifiers and CERSA is partly responsible for this problem. CERSA intend to:

a. **Adopt the new procedures of reporting short term training numbers** (Immediate submission of group photos, participant lists and certificates)
b. **Hold onto national short term training data until after a similar regional short term training has taken place** to take advantage of the regional training for full national verification
c. **Hold briefing and debriefing sessions for MSc and PhD students in connection with verification exercises.** Active follow-up of students to be verified. Will collect accurate contact information and increase compliance on response to verification questionnaire
d. **Institute competitive student award for compliance.** As an incentive CERSA will reward students that react fast to verification requirements.
e. **Clarify data on outreach periods**
f. **M&E officer to closely and proactively follow-up verification at AAU** and copy all communication on this matter to experts, Prof Mba and Mr. Andreas Blom. M&E officer to travel to Accra/AAU to sit with Adeline until all misunderstandings and backlogs has been cleared.

xviii. **No national accreditation body.** Since none exists in Togo, CERSA will request World Bank and AAU's permission to reallocate the DLRs to one they are likely to achieve with ease. Several ACEs have done DLI calibration as part of the mid-term review.

xix. **Low number of Publications.** The number can be increased through:

a. Ensuring students publish their thesis before graduation. Students write shops and publication completions groups to be established by the respective leader. Considering rewarding students and staff when publications are accepted.
b. Presenting publication covering all aspects of poultry sciences, basic, biological, biomedical, sociological, anthropological and economic.

xx. **Civil works:** The building needs close follow-up to ensure timely completion. The quality of construction of the CERSA building need to be improved. In several places things were not constructed in straight angles. Construction is in risk of being stalled due to CERSA's cash flow problems.

xxi. **Sustainability:** CERSA has been doing well in attracting external funding. The university itself has so far not put in much financial support. This causes concern for post ACE sustainability. The centre should be included in the university budget. While the meeting with the VC reassured the 'in principle' commitment to CERSA the 'in-kind' commitment remains to be seen.

xxii. **Visibility:** CERSA needs to implement a communication and visibility strategy.

13. ***Partners***

CERSA continues to have a strong and committed partnerships group. They could all clearly see how they contributed to CERSA and what they gained from CERSA. When asked what they valued most from CERSA the majority of them focused on knowledge transfer in the form of advice, training and joint research. Second came access to good lab facilities. It is recommended that CERSA involves its partners in its strategic planning including in developing its sustainability strategy. The partners wished for the experts to visit their businesses, seeing it as one of the gains expected of the partnership.

14. ***Student Academic Development***

Students valued the following things which they saw as contributing to CERSAs status as a Centre of Excellence:

I. Conducive learning environment. With updated teaching methods, good attitude from lectures that possessed relevant technical skills, regional study tour.
II. Diverse and pluralistic student background, with many nationalities.
III. Well designed and executed curriculums.
IV. Practical experience including placement/internship. Seeing is believing, learn a lot from transforming theory to practice.
V. Master is international accredited, give status and possibility for international studies (e.g. China).
VI. Good scholarship opportunities, especially for female students from the region.
VII. Strong commitment and involvement of CERSA core team.

Students of course also faced a number of challenges, these are listed below:

i. There was only one exam at some of the courses. Which meant that if you missed that you lost a lot of time. Recommended that re-examination was make an integrated part of all courses.
ii. Irregularity in teaching, due to availability of external lectures.
iii. Missing the labs that was to be installed in the new CERSA building.
iv. Release of funds for research was slow and bureaucratic, together with the cumbersome procurement procedures this delayed students, making it challenging to finish on time.
v. Insufficient affordable accommodation on campus or close to the university. Some student had to commute from far, costly in time and money.
vi. Regional student had to pay for their Togolese ID card which was costly (100.000 CFA).

15. ***Conclusion***

One of CERSA strength is that the team put realistic achievable numbers into their proposal and IP. Which means that for most DLI's they are close to or at target. An impressive amount of achievements has been made since last visit to a large degree due to the immense commitment of the centre leader. The stronger backing by his team is evident and very positive. CERSA is very aware of the challenges and are working hard to find mitigation strategies. Most prominent is the cash flow challenge. Funds release from government needs to be expedited. The same accounts for verification by AAU and third party. There are still too many errors and too long turnover time of the verification process.

Centre d'Excellence Africains (CEA)
Mines et Environnement Minier (MEM)

Compte rendu de la visite sur site, 12-13 avril 2018

Mamadou Diallo and Nkem Khumbah

1. Introduction et organisation du compte rendu

La visite sur site du CEA-MEM s'est déroulée les 12 et 13 avril 2018 à l'Institut national polytechnique Félix Houphouët Boigny (INP-HB) à Yamoussoukro (Côte d'Ivoire).

L'équipe de visite était constituée de : 1) Professeur Jonathan Mba (AUA et responsable d'équipe), 2) Professeur Mamadou Diallo (Expert en STEM* de la Banque Mondiale et l'AUA) et Professeur Nkem Khumbah (Expert en STEM* de la Banque Mondiale et l'AUA).

L'équipe du CEA-MEM a été dirigée par Le directeur du Centre, Professeur Alphonse Yao. Plusieurs membres du CEA-MEM et de l'INP-HB ont également participé aux réunions et échanges notamment : 1) Pr. Moustapha Sangaré (directeur adjoint de l'INP-HB), 2) Pr. Benjamin Yao (Coordinateur du Centre de recherche), 3) M. Modeste Koffi (service d'appui administratif et financier du Centre), 4) M. El Issiaka Djabakaté (service d'appui à la passation des marchés du Centre), 5) Mme Jeanne N'Goran Koffi (comptable des projets de l'INP-HB et du Centre). La visite sur site a été organisée autour des activités suivantes :

g) **Visite de courtoisie a la direction générale de l'université.** Notre visite a commencé par une visite au Professeur Nguessan Koffi, Directeur général de l'INP-HB.

h) **Réunion et discussion avec le directeur du Centre.** Nous avons commencé notre revue par une réunion et des échanges avec les membres du CEA-MEM. Au cour de cette réunion, le directeur du Centre, Pr. A. Yao a présenté les différents progrès accomplis, avec un accent sur les réalisations en termes de recherche/enseignement, les résultats des ILD (indicateurs liés au décaissement) et l'étendue de la mise en œuvre du projet.

i) **Visite des installations de recherche.** Nous avons visité les installations de l'INP-HB, notamment un laboratoire de pointe dédié à la caractérisation des propriétés physiques et chimiques des sols. Les capacités d'analyse de ce laboratoire des sols (par exemple, mesure des ions métalliques par spectrométrie ICM-MS) sont mises à jour en utilisant les fonds du Centre afin de soutenir les activités de recherche du CEA-MEM.

j) **Rencontre avec des étudiants du Centre.** Nous avons échangé avec un groupe d'étudiants nationaux et régionaux (pour la plupart étudiants en Master), inscrits dans les différents programmes d'études du Centre.

k) **Bilan avec les dirigeants du Centre et de l'INP-HB.** À l'issue de notre visite à Yamoussoukro, nous avons rencontré le DG et le DGA de l'INP-HB ainsi que les responsables du CEA-MEM (Prof. A. Yao et Prof. B. Yao) afin de partager nos principales conclusions.

l) **Séance de compte rendu avec des responsables du Ministère de l'Enseignement supérieur et de la Banque Mondiale.** La dernière activité de notre mission d'évaluation en Côte d'Ivoire a consisté en une rencontre avec les responsables du Ministère de l'Enseignement supérieur et de la Recherche scientifique (M. N'Goh Bakayoko et Mme Rita Felicia Atta) et le Spécialiste principal en Éducation de la Banque Mondiale et Responsable du Projet en Côte d'Ivoire (M. Patrick Ramanantoanina). Lors de cette réunion organisée à l'ENSEA à Abidjan, l'équipe de visite a présenté ses conclusions et recommandations.

Veuillez trouver ci-dessous un résumé des principales conclusions et recommandations établies à l'issue de notre visite, avec un accent particulier sur trois domaines : 1) Éducation et Recherche, 2) Partenariats, génération de revenus et mise en œuvre du projet, 3) Gouvernance, gestion et communication.

2. Éducation et Recherche

L'opportunité nous est donnée ici de souligner le grand potentiel et le rôle du CEA-MEM de l'INP-HB à devenir un leader régional dans le secteur minier en Afrique de l'Ouest et au-delà.

Durant notre visite, nous avons constaté les progrès substantiels du CEA-MEM dans la mise en œuvre de ses programmes d'enseignement et de recherche. Les réalisations-phares comprennent :

a) *La mise en place de nouveaux programmes d'études de Master en :* 1) Exploration et exploitation des mines, 2) Exploitation et traitement des minerais, 3) Environnement minier et 4) Mines et Carrières. Il est important de noter que ces nouveaux programmes ont été créés avec la contribution significative de partenaires/parties prenantes-clés du secteur, parmi lesquels 1) SODEMI (Société d'État pour le développement minier de Côte d'Ivoire), 2) Newcrest (mine d'or de Bonikro en Côte d'Ivoire) et Persus Mining (Sissingué Gold Project).

b) *La forte évolution du recrutement et des inscriptions d'étudiants.* Pour l'année académique 2016, le CEA-MEM a recruté et inscrit un total de 89 étudiants, dont 59 candidats de Master, 11 doctorants et 19 étudiants inscrits dans des programmes de formation de courte durée (40 heures). Pour l'année académique 2017, le CEA-MEM annonce un recrutement total de 180 étudiants, dont 171 candidats de Master et 9 étudiants en programmes courts. Notons que le Centre a dépassé ses objectifs de 2017, fixés à 132 étudiants au total.

c) *Le progrès notable du recrutement d'étudiants régionaux.* Le CEA-MEM est en voie d'atteindre son objectif de recrutement d'étudiants régionaux. Plus précisément, le Centre accueille des étudiants de 9 pays, parmi lesquels Guinée-Conakry, Mali, Burkina Faso, Niger, République Centrafricaine, Comores, Mauritanie, Bénin et Togo. Pour l'année académique 2017, le pourcentage d'étudiants régionaux inscrits s'établit entre 20 et 25%, légèrement en deçà de l'objectif de 30% requis pour atteindre l'ILD correspondant.

d) *Les programmes de stages pour tous les étudiants.* Le CEA-MEM demande à tous ses étudiants inscrits d'accomplir une période significative dans l'industrie et des activités pertinentes (3 mois et +) à travers leurs formations et leur recherche. Plus encore, le Centre prévoit d'ouvrir une école pratique d'extraction, afin d'offrir plus d'opportunités de stages pratiques à ses étudiants.

e) Les doctorants du Centre (11) conduisent des recherches appropriées au développement d'un secteur minier national. Les activités de recherche du CEA-MEM sont structurées autour de thématiques appliquées qui concernent des aspects importants et adéquats, tels que 1) Géologie structurale appliquée à la recherche minière, 2) Télédétection appliquée à la recherche minière, 3) Utilisation des rejets miniers pour les travaux du génie civil et 4) Étude du drainage acide dans l'environnement minier.

Bien que le CEA-MEM ait réalisé d'importantes avancées dans le développement et la mise en place de programmes d'enseignement et de recherche, il rencontre un certain nombre de défis et lacunes majeurs, qui doivent être résolus, notamment :

f) *Difficultés de compréhension de la vision et de la mission du Centre de la part des étudiants.* Pendant notre discussion avec eux, les étudiants ont exprimé le besoin de comprendre 1) la mission globale du CEA-MEM et 2) quel serait l'impact de leurs études/formation au Centre sur leur vie professionnelle et leur avenir.

g) *Logement étudiant.* Durant cette même rencontre, les étudiants ont émis le souhait de bénéficier de meilleures conditions de vie sur le campus de l'INP-HB, en particulier des dortoirs plus

fonctionnels. Ainsi, plusieurs ont déclaré repeindre leur chambre ou en changer les verrous à leurs propres frais.

h) *Soutien aux étudiants régionaux*. Toujours dans le cadre de cette réunion, les étudiants régionaux du Centre ont exprimé leurs besoins spécifiques, à savoir : 1) un soutien financier approprié, au moyen de bourses, pendant l'année 3 de leur Master et 2) un accompagnement institutionnel pour sécuriser les stages en entreprise requis pour finaliser leurs cursus (mémoire de fin d'études).

i) *Accréditation internationale*. Le CEA-MEM doit encore entreprendre l'élaboration d'un plan destiné à initier et réaliser les étapes nécessaires pour l'accréditation internationale de ses nouveaux programmes de Master.

3. Partenariats, production de ressources et mise en œuvre de projets

Lors de notre visite sur site, nous avons constaté avec satisfaction que le CEA-MEM avance dans la formation de son réseau de partenaires académiques nationaux, régionaux et internationaux. Les partenaires académiques actifs comprennent : 1) Université Cheikh Anta Diop du Sénégal, 2) Université technique Takoradi du Ghana, 3) Université Abdou Moumouni du Niger, 4) École supérieure polytechnique de Nouakchott (Mauritanie) et 5) École nationale supérieure d'ingénieurs de Fada N'Gourma (Burkina Faso).

Les partenaires économiques actifs sont notamment : 1) SODEMI, 2) Taurus Gold CI (acquis par Teranga), 3) Newcrest (mine d'or de Bonikro-CI) et 4) Perseus Mining (CI).

Parmi les partenaires internationaux actifs du Centre : 1) École des mines Goodman de l'Université Laurentienne (Canada) et 2) École nationale supérieure de géologie de l'Université de Lorraine (France). Il est important de noter que chaque partenaire actif du Centre dispose d'un représentant au comité de pilotage du CEA-MEM, présidé par le directeur de la SODEMI. Du 5 au 8 décembre 2017, le comité de pilotage a tenu sa première réunion à l'INP-HB, parallèlement à un atelier de travail international sur l'exploitation minière durable. Cet atelier a été accueilli par le CEA-MEM en collaboration avec le réseau AMEDEE (Activités minières, environnement, développement, économie, éthique). Le Centre a indiqué la participation totale de 30 chefs de projet sectoriels venus de 14 pays, dont Côte d'Ivoire, Sénégal, Mali, Niger, Mauritanie, Ghana, Burkina Faso, Cameroun, Maroc, Tunisie, Madagascar, Brésil, Nouvelle Calédonie et France.

Dans les domaines de la génération de revenus et de la mise en œuvre globale du projets, le CEA-MEM rencontre plusieurs enjeux majeurs, et doit résoudre les faiblesses énumérées ci-dessous :

a) *Lenteur dans la génération de revenus.* En 2016, le CEA-MEM n'a généré aucune ressource. Pour l'année 2017, le Centre a indiqué un montant de 22 000 CFA (~$41,513). À cette allure, le Centre n'atteindra probablement pas son objectif de génération de ressources, ni le jalon ILD correspondant. La génération de revenus peut être réalisée grâce à des consultances en recherche sous contrat, des dons du secteur privé, des financements de donateurs et des frais de scolarité établis pour certains des programmes d'études. Il est essentiel d'assigner un point focal pour prendre en charge ces activités, et élaborer un plan stratégique crédible pour engendrer des ressources en tirant parti de l'expertise, des installations et des partenariats sectoriels.

b) *Lenteur dans la mise en œuvre du projet*. Dans l'ensemble, la mise en œuvre du projet est plus lente que d'autres centres, avec seulement 11% de résultats réalisés, un taux d'utilisation des fonds inférieur à 10% pour un taux de décaissement de 20%. D'important fonds ont été décaissés pour le CEA-MEM, mais n'ont pas été utilisés au profit des activités principales. L'équipe préconise d'identifier une équipe de mise en œuvre, et, si nécessaire, de recourir aux services d'un consultant

de projet afin de faciliter la mise en œuvre et la coordination des plans du CEA-MEM. De tels dispositifs avec un consultant/coordinateur de projet ont aidé d'autres centres à activer la mise en place de leurs activités.

4. Gouvernance, gestion et communication

Le CEA-MEM a pour but de tester la capacité de l'INP-HB à réaliser avec succès un projet transdisciplinaire, axé sur la performance et impliquant plusieurs de ses différents départements et programmes. Sa réussite et sa viabilité à long terme pourraient donc servir de modèle pour intensifier les réformes institutionnelles actuellement discutées par le Ministère ivoirien de l'Enseignement supérieur, la Banque Mondiale et la direction de l'INP-HB. La mise en œuvre lente du projet par le CEA-MEM peut être essentiellement attribuée à des aspects de gouvernance, de gestion et de communication, parmi lesquels :

4) *Un système budgétaire fastidieux qui appelle une autonomie financière et opérationnelle accrue.* À la différence de la plupart des CEA STEM* que nous avons évalués ces trois dernières années, le CEA-MEM ne dispose ni de l'autonomie financière/opérationnelle ni de l'agilité indispensables pour avancer vite dans la mise en œuvre de son plan d'action. En l'occurrence, la gestion et le décaissement des fonds du Centre sont opérés par le comptable référent de l'INP-HB sous le système de gestion des fonds publics RICI (un prêt de la Banque Mondiale par exemple) en Côte d'Ivoire. Ceci induit des contrôles et états supplémentaires, qui semblent avoir ralenti l'achat de matériels coûteux, à l'instar des instruments d'analyse perfectionnés indispensables pour atteindre les jalons et objectifs de l'ILD 2.8. Relevons par ailleurs que cette absence d'autonomie financière empêche également le centre d'utiliser les fonds externes récoltés pour inciter le corps professoral du centre.
5) *Un système de gestion* ad hoc *avec un soutien institutionnel limité.* Comparé à d'autres CEA STEM* que nous avons évalués ces trois dernières années, le CEA-MEM est géré par un groupe de professeurs *ad hoc* sans nomination officielle au sein de l'institution. En particulier, l'administration de l'INP-HB n'a pas encore doté le CEA-MEM de son propre espace, afin de favoriser une "Centritude" et promouvoir les interactions et collaborations entre ses divers programmes (par exemple, Mines et Géologie, Génie civil, Génie chimique et des procédés). À l'inverse, la plupart des CEA STEM* ont investi des ressources conséquentes, soit en allouant des espaces/zones assignés à l'équipe du CEA, ou en construisant des locaux d'enseignement et de recherche intégrées, avec des bureaux pour les enseignants et doctorants.
6) *Une compréhension limitée des particularités du projet CEA axé sur la performance.* Nous avons été surpris de constater que les principales parties prenantes (les étudiants, par exemple) et collaborateurs (ainsi, la comptable référente de l'INP-HB) n'ont qu'une compréhension très réduite du projet CEA après un an et demi de mise en œuvre. Nous attribuons ceci à l'absence d'effort et de démarche concertés de la part des responsables du CEA-MEM à transmettre la vision, la mission et l'impact du Centre aux parties prenantes de la communauté de l'INP-HB, enseignants, étudiants, personnels et administrateurs.

5. Résumé et recommandations générales

Depuis qu'il est devenu un Centre d'Excellence Africain de la Banque Mondiale, le 17 février 2016, le CEA-MEM a accompli de substantiels progrès dans la mise en œuvre de ses programmes d'enseignement et de recherche. Toutefois, l'aspect globale de cette mise en œuvre doit être intensifiée. Le Centre dispose du potentiel nécessaire pour devenir un vrai leader régional du secteur minier. Afin d'accélérer l'exécution, les recommandations sont les suivantes :

Exécution du plan de travail : Le CEA-MEM doit accélérer l'implémentation de son plan de travail (par exemple, accréditation internationale, passation de marchés et génération de ressources) afin d'atteindre tous les jalons des ILD pendant la durée du projet. Un soutien fort et continu sera attendu de la part du ministère ivoirien de l'Enseignement supérieur et de la direction de l'INP-HB, pour simplifier/rationaliser la gouvernance et la gestion du CEA-MEM, et lui conférer l'autonomie financière et opérationnelle exigée pour mener à bien le projet d'ici la date de clôture de CEA-I, soit décembre 2019.

Nommer et recruter un gestionnaire administratif/consultant pour appuyer la mise en œuvre du programme. Cette personne peut être embauchée dans le cadre du projet pour soutenir la coordination sous la responsabilité du directeur de centre. Plusieurs autres centres l'ont fait, avec pour résultat une mise en œuvre solide.

Affaires étudiantes : La direction du CEA-MEM doit résoudre les difficultés rencontrées en matière d'enseignement et de bien-être des étudiants. Nous suggérons au Centre de désigner un collaborateur académique en charge des Affaires étudiantes, dont la contribution se situe au-delà des questions liées au logement et à une meilleure expérience d'enseignement. Le responsable du corps enseignant chargé des Affaires étudiantes aidera les étudiants à approfondir leur compréhension et leur appréciation des opportunités uniques offertes par le CEA-MEM en enseignement et formation, alors même qu'ils travaillent à devenir la prochaine génération de scientifiques, ingénieurs, entrepreneurs et managers pour développer les industries minières et extractives d'Afrique.

Production de ressources et partenariats industriels : Le CEA-MEM doit élaborer un plan stratégique et commercial détaillé et ciblé afin 1) de nouer des partenariats avec des entreprises industrielles locales et internationales et 2) d'exploiter ses programmes d'enseignement et de recherche de haut niveau pour générer des ressources. Nous recommandons au Centre d'étudier et de déployer un modèle durable de soutien aux étudiants qui combinerait 1) génération de ressources externes (par exemple, recherche industrielle/internationale parrainée) 2) frais d'inscription des formations courtes et 3) programme de levée de fonds à long terme, pour constituer un fonds destiné à financer des bourses totales ou partielles pour doctorants.

Un espace désigné pour le Centre : Nous suggérons à l'administration de l'INP-HB d'examiner l'attribution d'un espace de travail au CEA-MEM, pour favoriser la "Centritude" ainsi que les interactions et collaborations entre le corps professoral, les étudiants et personnels de recherche de ses différents programmes (Mines et Géologie, Génie civil, Génie chimique et d'ingénieurs...). Cela pourrait être au sein de l'actuelle École supérieure des Mines et de Géologie.

Mises à jour régulières et suivi par le ministère de l'Enseignement supérieur et le bureau pays de la Banque Mondiale. L'équipe préconise une coordination et un soutien rapprochés du ministère de l'Enseignement supérieur et de l'équipe du bureau Côte d'Ivoire de la Banque Mondiale, pour aider à alléger certaines des procédures fastidieuses évoquées ci-dessus. En complément, des web-conférences avec l'équipe technique de l'AUA sont recommandées, sur une base bimestrielle (c'est-à-dire tous les deux mois).

**STEM : Sciences, technologie, ingénierie et mathématiques*

Centre d'Excellence Africa (CEA)
Mines et Environment Minier (MEM)

Site Visit Report, April 12-13, 2018

Mamadou Diallo and Nkem Khumbah

1. Introduction and organization of the report

The CEAM-MEM site visit took place on April 12-13, 2018 at the Institut National Polytechnique Félix Houphouët Boigny (INP-HB) in Yamoussoukro (Côte d'Ivoire). The site visit team consisted of: 1) Prof. Jonathan Mba (AAU and Team Leader), 2) Prof. Mamadou Diallo (WB/AAU STEM Expert) and Prof. Nkem Khumbah (WB/AAU STEM Expert). Center Director Prof. Alphonse Yao led the CEA-MEM team. Other members of the CEA-MEM and INP-HB teams that were present in the meetings and discussion included: 1) Prof. Moustapha Sangaré (INP-HB Deputy Director), 2) Prof. Benjamin Yao (Center Research Coordinator), 3) Mr. Modeste Koffi (Center Financial and Administrative Support Staff), 4) Mr. El Issiaka Djabakaté (Center Procurement Support Staff) and 5) Mme Jeanne N'Goran Koffi (INP-HB and Center Project Accountant). The site visit was structured around the following activities:

m) **Courtesy call on University leadership.** We began our site visit with a courtesy call on Prof. Nguessan Koffi, Directeur Général de L'INP-HB.

n) **Meeting and discussion with Center Leadership.** We began our review with a meeting and discussion with the members of the CEA-MEM team. During this meeting, Center Leader Pr. A. Yao gave an overview of the Center's progress with a focus on the research/education achievements, DLI results and extent of project implementation.

o) **Visit of the Center research facilities.** We visited the facilities of the INP-HB including a state of the art laboratory dedicated to the characterization of the physical and chemical properties of soils. The analytical capabilities of this soil laboratory (e.g. metal ion measurements by ICM-MS) are being upgraded using Center funds to support the research activities of the CEA-MEM.

p) **Meeting with Center students.** We met with a group of national and regional students (mostly Master's candidates) that were enrolled in various degree programs of the Center.

q) **Feedback meeting with the Center and INP-HB Leadership.** At the conclusion of our site visit in Yamoussoukro, we met with the Director and Deputy Director of INP-HB and the CEA-MEM leadership (Prof. A. Yao and Prof. B. Yao). During this feedback session, the site visit team shared its main findings.

r) **Debriefing meeting with representatives of the Ministry of Higher Education and World Bank.** As a final activity for our ACE evaluation mission in Ivory Coast, we met with representatives of the Ministry of Higher Education and Scientific Research (Mr. N'Goh Bakayoko and Mrs. Rita Felicia Atta) and the World Bank Country Office Senior Education Specialist and Co-Task Team Leader (Mr. Patrick Ramanantoanina). During this debriefing session, which was held at the ENSEA in Abidjan, the site visit team summarized its findings and recommendations.

Below we summarize the key findings and recommendations that were derived from our site visit with a focus on three areas: 1) Education and research, 2) Partnerships, revenue generation and project implementation and 3) Governance, management and communication.

2. Education and research

We would like to take this opportunity to emphasis the strong potential and role of INPHB CEA-MEM to really be a regional leader in the Mining sector in West Africa and beyond.

During our site visit, we were pleased to learn that CEA-MEM has made significant progress in the implementation of its education and research programs. Key accomplishments include:

j) *Establishment of new Master's degrees programs* in 1) "Exploration et exploitation des mines", 2) "Exploitation et traitement des minerais", 3) "Environnement minier" and 4) "Mines et Carrières". It is worth mentioning these new programs were developed with significant input from key sector and industrial partners/stakeholders including 1) SODEMI (Société d'Etat pour le Développement Minier de Côte d'Ivoire), 2) Newcrest (Bonikro Gold Mine) and Persus Mining (Sissingué Gold Project)

k) *Strong progress in student recruitment and enrollment.* During the 2016 academic year, the CEA-MEM recruited and enrolled a total of 89 students including 59 Master candidates, 11 doctoral students and 19 students in short-term training programs (40 hours). For the 2017 academic year, the CEA-MEM reported a total enrollment of 180 students including 171 Master candidates and 9 students in short term training programs. It is worth mentioning that the Center exceeded its 2017 target student enrollment of 132.

l) *Noticeable progress in regional student enrollment.* The CEA-MEM is making progress toward achieving its target of recruiting regional students. More to the point, the Center has enrolled regional students from 9 countries including Guinea (Conakry), Mali, Burkina Faso, Niger, Central African Republic, Comores, Mauritania, Benin and Togo. As of the 2017 academic year, the percentage of regional student enrollment is between 20-25%, which is slightly lower than the 30% target required for the Center to achieve the corresponding DLI.

m) *Internship programs for all students*. The CEA-MEM requires that all of its enrolled students to spend significant time in industry and relevant field sites (e.g. 3 months +) through their studies and research. More to the point, the Center is planning to open a mining field school in the near future to provide more practical training opportunities to its students.

n) The Center's doctoral students (11) are carrying out research that is relevant to the development of a national mining sector. The CEA-MEM research activities are structured around applied themes to address important and relevant national problems including 1) "Géologie structurale appliquée à la recherche minière", 2) "Télédétection appliquée à la recherche minière", 3) "Utilisation des rejets miniers pour les travaux du génie civil" and 4) "Etude du drainage acide dans l'environnement minier".

Although the CEA-MEM has made significant progress in the development and implementation of its education and research programs, it is facing a number of critical challenges and deficiencies that need to be addressed including:

o) *Lack of understanding of the Center's vision and mission by the students*. During our meeting a discussion with the students, they expressed the need to understand (i) the overall mission of the CEA-MEM and (ii) how the education/training that they are obtaining will impact their professional life and future.

p) *Student housing*. During our meeting and discussion with the Center students, they communicated the needs for better living conditions on the INP-HB campus including more functional dormitories; i.e. a number of students reported spending their own funds to paint their rooms or replace the locks.

q) *Regional student support*. During our discussion with the students, the Center regional students communicated their special needs including (i) adequate financial support with scholarships during Year 3 of their Master studies and (ii) institutional support to secure industrial internships for the completion of their final projects ("Memoire de Fin d'Etudes").

r) *International accreditation*. The CEA-MEM has yet to develop a plan to initiate and complete the work required to gain international accreditation for its new Master's degree programs.

3. Partnerships, revenue generation and partnerships

During our site visit, we were pleased to learn that the CEA-MEM is making progress in building its network of national, regional and international academic partners. Active academic partners include: 1) Université Cheikh Anta Diop du Sénégal, Takoradi Technical University, 2) Université Abdou Moumouni du Niger, 3) Ecole Supérieure Polytechnique de Nouakchott and 4) Ecole Nationale Supérieure d'Ingénieurs de Fada N'Gourma (Burkina Faso). Active sector industrial partners include: 1) SODEMI, 2) Taurus Gold CI (Acquired by Teranga) and 3) Newcrest (Bonikro Mine CI) and Perseus Mining (CI). The Center's active international partners include: 1) Ecole des Mines Goodman de L'Université Laurentienne (Canada) and 2) Ecole Nationale Supérieure de Géologie de l'Université de Lorraine (France). It is noteworthy that each of the Center's active partners has a representative on the CEA-MEM Steering Committee with the SODEM Director serving as Chair. In December 5-8, 2017, the Center Steering Committee held its first meeting at the INP-HB along with a joint international workshop devoted to sustainable mining. This workshop was hosted by the CEM-MEM in collaboration with the "réseau AMEDEE" (Activités Minières, Environnement, Développement Economique et Ethique). The Center reported a total attendance of 30 sector project leaders from 14 countries including Ivory Coast, Senegal, Mali, Niger, Mauritania, Ghana, Burkina Faso, Cameroon, Morocco, Tunisia, Madagascar, Brazil, New Caledonia and France.

In the areas of revenue generation and overall project implementation, the CEA-MEM is facing a number of critical challenges and needs to address the deficiencies listed below:

c) *Slow progress in revenue generation.* In 2016, the CEA-MEM reported no revenue generation. For 2017, the Center reported a total of 22,000,000 CFA (~$41, 513). At this pace of revenue generation, the Center is unlikely to achieve its revenue generation target and the corresponding DLI milestone. Revenue generation can be attained from contract research consultancies, private sector donation, donor funding and selected tuition fees for graduate programs. It is important that a focal point is identified to work on these activities and that there is a strategic and credible plan to generate revenues by leveraging its expertise, facilities and sector partnerships.

d) *Slow pace of project implementation*. The overall extent of project implementation is slower than other centers, with only 11% of proportion of results achieved, fund utilization rate of less than 10% with disbursement rate of 20%. There are considerable funds disbursed to CEA-MEM that have not been executed towards the main activities. The team recommends a full implementation team to be identified and if necessary to hire a project consultant to facilitate the implementation and coordination of the CEA-MEM plans. Such arrangements of a project consultant/coordinator has helped some of the other centers push implementation of activities.

4. Governance, management and communication.

Because the CEA-MEM serves a test case for the ability of INP-HB to successfully complete a trans-disciplinary and performance-driven project involving many of the institution's independent schools and programs, its success and long-term sustainability could provide a model for carrying out and scaling up the institutional reforms that are being discussed by the Ivory Coast Ministry of Higher Education, the World Bank and the INP-HB leadership. We find that the slow pace of the CEA-MEM project implementation can be attributed for the most part to issues related to governance, management and communication including:

7) *A cumbersome budget system that needs to increase financial and operational autonomy*. Compared to most of the STEM ACEs that we have evaluated during the last 3 years, the CEA-MEM does not have the financial/operational autonomy and agility needed to move fast in the implementation of its work plan. More to the point, the management and disbursement of the Center funds are carried out by the INP-HB designated accountant within the RICI system of management of public funds (e.g. a World Bank loan) in Ivory Coast. This includes additional checks and

balances that seem to have slowed down the purchase of big-ticket items such as the advanced analytical instruments that are needed to achieve the DLI 2.8 milestones and targets. It is worth mentioning this lack of financial autonomy is also impeding the use of externally generated funds to incentivize Center faculty.

8) *An ad hoc management system with limited institutional support.* Compared to many of the STEM ACEs that we have evaluated during the last 3 years, the CEA-MEM is being operated by an "ad hoc" group of faculty with no official appointments within the institution. More to the point the INP-HB administration has yet to provide the CEA-MEM with its own space to build 'Centerness' and promote interactions and collaborations among its various core programs (e.g. Mining and Geology, Civil Engineering, Chemical and Process Engineering). Conversely, most STEM ACEs have invested significant resources in either allocating a space/area that houses the CEA-MEM team or the construction of integrated education and research facilities with office space for the faculty and doctoral students.
9) *A limited understanding of the peculiarities of a performance-driven ACE project.* We were surprised to notice that key Center stakeholders (e.g. students) and staff (e.g. INP-HB designated project accountant) have a very limited understanding the ACE project after 1.5 years of implementation. We attribute this to the lack of a concerted effort and plan by the CEA-MEM leadership to communicate the Center's vision, mission and impact to stakeholders within the INP-HB community including faculty, students, staff and administrators.

5. Summary and overall recommendations

Since it became operational as a World Bank (WB) Africa Center of Excellence on February 17, 2016, the CEA-MEM has made significant progress in the implementation of its education and research programs. However, the overall pace of the project implementation needs to be accelerated., The Center has the potential to be a true regional leader in Mining. In order to accelerate implementation the following is recommended::

Work Plan Implementation: The CEA-MEM needs to accelerate the implementation of its work plan (e.g. international accreditation, procurement and revenue generation) to achieve all the DLI milestones within the project period. This will require strong and continuous support from the Ivory Coast Ministry of Education and the INP-HB leadership to simply/streamline the governance and management of the CEA-MEM and provide it with the financial and operational autonomy required to successfully complete the project within the ACE I closing project date of December 2019.

Appointing and hiring project administrative manager/consultant to support work plan implementation. This person can be hired under project to support the project coordination under the center leader. A number of other centers have hired such consultants and resulted in strong implementation.

Student Affairs: The CEA-MEM leadership needs to address critical issues related to student education and welfare. We recommend that the Center should designate a faculty that will be in charge of "Student Affairs". In addition to helping address the student needs for housing and improved education experience, the Center faculty leader for Student Affairs will help the students develop a deeper understanding and appreciation of the unique education/training opportunities that CEA-MEM is providing them as they work to become the next generation of scientists, engineers, entrepreneurs and leaders to advance the mining and extractive industry in Africa.

Revenue Generation and industrial partnerships: The CEA-MEM needs to develop implement a detailed and focused strategic and business plan to (i) build its partnerships with local and international industrial companies and (ii) leverage its high quality education and research programs to generate revenues. We recommend that the Center looks into the development and implementation of a sustainable student support model through a combination of (i) external revenue generation (e.g. industrial/international sponsored

research), (ii) fees from short-term courses and (iii) a long-term fund raising program to build an endowed fund to provide full/partial scholarships to doctoral students.

Designated Center space: We recommend to the INP-HB administration to look into providing the CEA-MEM a working space to promote "Centerness" and promote interactions and collaborations among faculty, student and research staff from its various core programs (e.g. Mining and Geology, Civil Engineering, Chemical and Process Engineering). This can be, for example, within the existing School of Mines.

Regular updates and follow-up by Ministry of Higher Education and WB country team. The team recommends close coordination and support from the Ministry of Higher Education and WB country team to provide support to unblock some of the cumbersome processes mentioned above. Additionally, webex with the AAU technical team is also recommended on a bi-monthly basis (ie every 2 months).

African Center of Excellence (ACE)
Pan African Materials Institute (PAMI)

Site Visit Report, March 19-20, 2018

Mamadou Diallo, Xavier Michel and GOS Ekhaguere

1. Introduction and organization of the report

The PAMI site visit took place on March 19-20, 2018 at the African University of Science and Technology (AUST) in Abuja (Nigeria). The site visit team consisted of: 1) Prof. Jonathan Mba (AAU and Team Leader), 2) Prof. Mamadou Diallo (WB/AAU STEM Expert), 3) General Xavier Michel (WB/AAU STEM Expert), 4) Prof. GOS Ekhaguere (NUC STEM Expert), 5) Dr. C. Nwosu (NUC), and 6) Mr. Obi Ukwuagu (NUC). Center Co-Leaders Prof. Peter A. Onwualu (AUST) and Dr. Shola Odusanya (SHESTCO) led the PAMI team. Other members of the PAMI and AUST teams that attended the review meetings included: 1) Dr. Abdulhakeem Bello (AUST and PAMI Team Leader for Energy Storage Research), 2) Mr. Ben Okonkwo (AUST Head of Accounts), 3) Mr. Morgan Leo Akpan (AUST Procurement Officer), 4) Mr. Adebowale Adeyemi (AUST Internal Auditor), 5) Mr. Atulomah Obioha Sampson (AUST Media Relations Manager) and Ms. Victoria Agbo (AUST Multilateral Projects).

The site visit was structured around the following activities:

s) **Courtesy call on University leadership.** We began our site visit with a courtesy call on Prof. Kingston Nyamapfene, President of AUST.

t) **Meeting and discussion with PAMI leadership.** We began our review with a meeting and discussion with the members of the PAMI team. During this meeting, Center Co-Leader Dr. Shola Odusanya gave an overview of PAMI's progress with a focus on the research/education achievements and DLI results.

u) **Visit of AUST education and research facilities.** We visited the facilities of AUST (AfDB Hall) including several laboratories dedicated to the preparation, characterization and evaluation of materials and systems to support the education and research activities of PAMI's Focus Research Groups (FRGs) on (i) Energy and the Environment [Focus on organic light emitting diodes (OLEDs), organic solar cells and perovskyte solar cells], (ii) Biomaterials (Focus on cancer detection and treatment), (iii) Multi-Functional Materials (Focus on materials for water purification and sustainable building materials) and (iv) Mining, Minerals and Manufacturing (Newly established program).

v) **Meeting with PAMI doctoral students.** We met with a group of PAMI students that were enrolled in various AUST doctoral programs (e.g. Materials Science and Engineering, Petroleum Engineering, Physics and Computer Science). During this meeting, five students from the different FRGs of PAMI gave oral presentations (5 minute each) on their ongoing research activities.

w) **Meeting with AUST President and PAMI leadership.** As final activity for our site visit, we met with the President of AUST and the PAMI team led by Center Co-Leader Dr. Shola Odusanya. During this feedback session, the site visit team shared its main findings with the AUST Leadership and PAMI team.

Below we summarize the key findings and recommendations that were derived from our site visit with a focus on three areas: 1) Education and research, 2) Partnerships, project implementation and revenue generation and 3) Program and institutional sustainability.

2. Education and research

During our site visit, we were pleased to learn and corroborate that PAMI has established high quality education, research and outreach programs. Key accomplishments include:

s) Enrollment of high quality students (MSc and PhD) that are conducting research on various topics critical to the success of PAMI.
t) Graduation of 30 PhD students in computer science, materials science, mathematics, physics and petroleum engineering.
u) Publication of 60 + peer-reviewed papers in international journals.
v) Achievement of significant research outcomes including (i) early detection and treatment of triple negative breast cancers in Nigerian women (FRG on Biomaterials), (ii) successful utilization of pressure and thermal annealing to improve the efficiency of organic solar cells (FRG on Energy and the Environment) and (iii) development of ceramic water filters and building materials using locally available raw materials as building blocks (FRG on Multi-Functional Materials).
w) Establishment of a new FRG on Mining, Minerals and Manufacturing with initial support from the PASET Regional Scholarship and Innovation Fund (RSIF).
x) Strong programs on student development, continuing education and STEM education outreach including (i) the annual PASMAT (Pan African School of Materials) workshops, (ii) 3-month visits and research training of PAMI students in the laboratories of US and Brazilian partners and (iii) participation in the MS4SSA (Mathematics and Science for Sub-Saharan Africa) program.

Although PAMI has made significant progress in the development and implementation of its education and research programs, it is facing a number of critical challenges and deficiencies that need to be addressed including:

y) *Lack of internships and industrial interactions for PAMI students*. The initial focus of PAMI has been on fundamental research to achieve international competiveness. Although this is a worthy goal, PAMI needs to also develop its engineering education and training programs to provide the students with internships and opportunities to carry out research projects that are supported by local and international industries in Nigeria and West Africa.
z) *Needs for more face-to-face supervision and mentoring of PAMI doctoral students*. The current AUST education model, which operates on the basis of a minimal number of full time faculty (currently six resident faculty including one full time Professor of Materials Science) supported by an international network of visiting faculty, provides very limited opportunities for PAMI doctoral students to have frequent face-to-face meetings and interactions with their research supervisors, who serve as full time faculty members in AUST's overseas partner institutions. During our meeting and discussion with the PAMI doctoral students, they communicated their needs for more face-to-face meetings and interactions with their research advisors.
aa) *Education and research facilities.* During our meeting and discussion with the PAMI doctoral students, they communicated their needs for improved Internet access and the continuous availability of power for the research laboratories, computing facilities and library. The students also requested access to key journals that are needed for their research work.
bb) *International accreditation*. PAMI has yet to obtain international accreditation for any of its programs.

3. Partnerships, project implementation and revenue generation

During our site visit, we were pleased to learn and corroborate that PAMI has established a broad network of national, regional and international academic partners. Key international academic partners that are providing research, education and training opportunities to PAMI doctoral students include Worcester Polytechnic Institute (WPI) [USA], Princeton University (USA), Rutgers University (USA), Arizona State University (USA) and University of Sao Paulo (Brazil). It is worth mentioning that Prof. Winston Oluwole (Wole) Soboyejo [WPI Dean of Engineering and Professor of Mechanical Engineering] continues to provide a strong support to PAMI. In addition to serving as doctoral thesis co-adviser for PAMI students

working on biomaterials, energy and environment and multi-functional materials, Prof. Soboyejo serves as the Chair of the PAMI International Advisory Board and is involved in the implementation of PAMI's outreach programs including the PASMAT workshops and MS4SSA program.

In the areas of industrial partnerships, revenue generation and overall project implementation, PAMI is facing a number of critical challenges and needs to address the deficiencies listed below:

e) *Industrial partnerships.* PAMI has only a tenuous link with industry. The Center has yet to implement its proposal to establish a Materials Industrial Advisory Board (MIAB). For the sustainability and long-term viability of PAMI, a robust linkage with industry is critical.

f) *Lack of revenue generation.* Except the recent funding from the PASET RSIF, PAMI has yet to report the successful generation of revenue from other sources. More to the point, PAMI has yet to develop a strategic and credible plan to generate revenues by leveraging its high quality students, faculty and education/research programs.

g) *Slow pace of project implementation*. The overall project implementation is 47%. It is worth mentioning that both the extents of procurement and achievement of the DLI 2.8 results are equal to 25%. Although PAMI has put together an ambitious work plan to accelerate its project implementation in 2018, it is unlikely to achieve all the DLI milestones within the project period based on the current pace of project implementation.

4. Program and institutional sustainability.

Because PAMI serves as the de-facto education and training program of the AUST Department of Materials Science and Engineering, its long-term sustainability will have a significant impact on the viability of the current AUST education model. We find that two overarching challenges to the long-term sustainability of PAMI and AUST are the lack of resident faculty (e. g. one full-time Professor of Materials Science and Engineering) and overall reliance on international visiting faculty to carry out their education and research programs. More to the point, the lack of resident faculty (who dedicate 100% of their time to AUST and PAMI) is a major impediment to the development and implementation of credible plans to (i) seek and gain international accreditation, (ii) develop competitive research proposals to seek funding and/or in-kind support from local industries and international agencies and (iii) design revenue-generating short term courses for civil servants, students and industrial scientists/engineers who are interested in learning and applying the principles of Materials Science and Engineering (MSE) to their daily works and assignments. Although the AUST President reported that the institution has begun addressing the fundamental issue of resident faculty deficiency by interviewing some candidates and has plans for more international professional recruitment, the action is yet to be concretely translated into full-time resident faculty at AUST.

5. Summary and overall recommendations

Materials are the building blocks of a sustainable/healthy society (e.g. energy generation, water purification and pharmaceuticals) and economy (e.g. building materials, infrastructure and industrial manufacturing). Since its establishment as a World Bank (WB) Africa Center of Excellence, PAMI has developed and implemented high quality education, research and outreach programs in MSE. Although the Center has made noticeable and significant progress, it is not performing up to its potential in the areas of industrial partnerships and revenue generation. We therefore recommend the following:

Business Plan: PAMI needs to develop implement a detailed and focused strategic and business plan to (i) build its partnerships with local and international industrial companies and (ii) leverage its high quality education and research programs to generate revenues.

Work Plan Implementation: PAMI also needs to accelerate the implementation of its work plan (e.g. international accreditation, procurement and revenue generation) to achieve all the DLI milestones within the project period.

Full Utilization of Laboratory Infrastructure and Equipment: PAMI and AUST have built state-of-the art laboratories with advanced equipment [e.g. X-ray diffractometer (XRD), scanning electron microscope (SEM) and water quality analysis tools]. Because of the small size of AUST (~200 students), these instruments are likely not being fully utilized. We recommend that PAMI looks into the development of a strategic and focused plan to leverage its laboratory infrastructure/equipment and analytical capabilities to generate additional revenues through the provision of expertise, consultancy and lab services to industry, NGO, local/national government agencies and international organizations. PAMI and AUST should also consider ways to increase the number of students in order to increase utilization of its infrastructure and equipment, while maintaining quality standards (see next point).

Student Support and Revenue Generation: The current AUST model of student support (i.e. full scholarships with no fees) is not financially sustainable without significant generation of additional revenues. We recommend that AUST looks into the development and implementation of a sustainable student support model through a combination of (i) external revenue generation (e.g. industrial/international sponsored research), (ii) student fees (e.g. Professional Master's Degree Program for industrial students) and (iii) a long-term fund raising program to build an endowed fund to provide full/partial scholarships to PhD students.

Recruitment of full-time Resident Faculty: Finally, we would like to mention that the current AUST/PAMI education model [which operates on the basis of a minimal number of full time faculty (e.g. six resident faculty including one full time Professor of Materials Science] is not sustainable. AUST needs to recruit more full time faculty to support PAMI's mission and ensure its long-term sustainability as an African Center of Excellence in MSE.

In any case, we recommend that the WB, AAU and NUC continue to monitor closely PAMI's progress especially in the recruitment of full time faculty, international accreditation, development of industrial partnerships and revenue generation.

Professor Sebastian Maimako
Vice-Chancellor, University of Jos
Jos, Plateau State, Nigeria

1st April 2018

Subject: Report of African Center of Excellence in Phytomedicine Research and Development (ACEPRD) Supervisory Mission conducted by Representatives of the World Bank, Association of African Universities (AAU) and the Nigerian Universities Commission (NUC) on March 13 – 14, 2018

Dear Professor Maimako,

We want to first extend our sympathy to you on the loss of your esteemed graduate and philanthropist, Senator General John Shagaya, whose memorial you were obliged to attend during our visit. You were most ably represented by the Deputy Vice-Chancellor for Academics, Professor Nelson Ochekpe. The Center team under the leadership of the Center Leader, Professor J.C. Aguiyi, and the Deputy Center Leader Professor T. Alemika, were fully available, engaged and transparent throughout our supervision mission. They openly shared with us their successes and challenges. Their enthusiasm and dedication towards achieving the goals of their center are clearly apparent and merit admiration and support. We are grateful to you and the whole ACEPRD team for your generosity and hospitality in hosting us.

As you are aware, this is the fifth supervisory mission that has been conducted by representatives from the World Bank, AAU and NUC to assess ACEPRD's progress toward achieving the projects goals. Our discussions were comprehensive and robust and we are pleased to confirm that progress towards achieving the majority of the ACE's milestones continues. Although we assessed the program's general progress, the specific aim of this visit was to concentrate on the deficits that were identified on our last supervisory visit which occurred on September 28th and 29th, 2017. These deficits were outlined in the letter that was sent to you on the October 27th, 2017 and we will address each in turn. We can all note that significant progress has been made towards correcting some of the deficiencies but it remains clear that other areas continue to merit aggressive attention and improvement. Our observations in each of these categories are as follows.

1. Enrollment of Regional Students

The recommendation that ACEPRD actively and aggressively recruit regional student was clearly received and implemented. ACEPRD leadership conducted regional recruitment drives in Niger, Mali, Central Africa Republic, Togo and as far away as Kenya, Uganda and Zambia. This has resulted in increased regional applications and **49** new masters and PhD students from this pool have been admitted for the next academic year! As of the time of our visit, 8 Togolese students had already enrolled and were privileged to meet with 2 of them. As a result of the English instruction they have received in the 2 months since enrolling, we were able to communicate with them in English. They reported that administrative processes, including obtaining a resident permit were streamlined; that they had a contact person to whom they could address their issues and that they had integrated well with the other students.

Yet, the clear codification of organizational processes in regards to international students were lacking and this had resulted in haphazard delivery of services. For example, although a student handbook exists, it was not delivered to the regional students creating some confusion as to what some of their duties and

responsibilities were. With the increase in the number of regional students, the adequacy of their support system should be evaluated and improved processes established.

2. International Academic Accreditation

The center's prior challenges in identifying an appropriate accrediting body has been addressed through interactions with AAU and other ACEs centers and they have identified the Royal Society of Biology (RSB) as an appropriate accreditation agency. They have already completed and submitted the self-assessment and are awaiting the date for site visitation from the RSB. The center team was advised that they should provide the necessary documentation of the Self-assessment to World Bank and AAU because that activity is a disbursement linked result (DLR) that can earn ACEPRD some $100,000 if the self-evaluation meets international standards.

3. DLR 2.8 milestones

We were particularly impressed by Center's basic science laboratory that we visited. New equipment for conducting state of the art biotechnology and genomics have been installed and are in current use. The center has made explicit effort to cross-train technicians on several machines to meet manpower needs. We noted that equipment and other easily movable objects (such as chairs, computers and books) were all clearly and indelibly marked as belonging to the center.

We also visited the Center's farm where the mushroom growing areas had been erected, cultivation boxes were framed, rows for plants were demarcated and labeled and were happy to note that some shoots are coming in. The on-site tissue lab is largely constructed and the walls were being plastered. AECPRD leadership has assured us that both the lab and the farm would be ready for the next verification visit.

4. Sustainability

Certain conditions that are important for ensuring the center's sustainability, such as incorporation into the University overall budget and planning, have been satisfied. It is clear to all that this is not enough to fully sustain the Center in the future and its leadership is trying to identify external revenue sources. We are concerned that there are no tangible results from these efforts and that the long-term success of this program is in question if outside funding is not pursued. It is imperative that the Center's scientists are able to attract grant funding from national and international funding agencies and industries. To this end, we have advised them to form collaborations with and seek support from other ACE centers that have been successful in this arena.

In addition, the Center has produced several plant-based products in prototype. Some of these, such as a soap that exhibits promise in treating severe scabies, have elicited interest from industry representatives. Nonetheless, as we all know, the road from prototype production to market penetration can be fraught with problems and it is not clear to us that all the necessary preparations have been made to negotiate the process to the full advantage of the Center. In regard to product development, we suggested that each product should have a detailed business plan developed to maximize the chance that it will reach the goal of generating revenue for the Center.

In short, we have again insisted that specific short, medium and long-term plans for generating revenue be clearly outlined, timed goals be set and that a process of continuous monitoring of these efforts is established.

5. Internship

During the interactive session with the students, we were made to understand that several of them had completed an internship and overall, they found their experiences to be rewarding. Given that the aim of including the internship within the ACE program was to increase employment opportunities for graduates and foster relationship between academia and industry, we have encouraged the ACEPRD leadership to widen the internship opportunities to achieve these aims. As with the external revenue generation, we suggested to the leadership of ACEPRD to consult their peers from other ACEs to improve the quality of internship made available to their students.

6. Verification Process

As outlined in prior communications, the ACE project's "pay for performance" structuring depends on a viable and satisfactory verification process to warrant remuneration. The spreadsheet that was developed by the Center and shared with us reveals that in certain areas, reported results could not be fully verified and were therefore not eligible for remuneration. We have stressed to the Center's leadership that without meticulous documentation and reporting to World Bank and AAU, they would be unable to gain the DLR remuneration due to the Center.

Conclusion

The ACEPRD Center has made significant improvement since our last visit. Attention to clarifying, disseminating and reviewing organizational processes, especially those that directly affect achieving the Center's milestones and DLRs need to be addressed. Only by implementing time bound, well managed process will the Center be able to achieve the desired results and benefit fully from the resources that have been allocated. It is imperative that specific short, medium and long-term plans for generating revenue be specifically outlined and aggressively pursued.

We want to emphasise to all concerned with the success of this Center, that the time to achieve these results is limited and progress should be appropriately expedited. With the Center's leadership, we have agreed to facilitate consultations with high-performing ACEs to help ACPRD develop targeted and tested interventions. The World Bank, AAU and NUC teams are fully available for further guidance and support to assist the Center management.

Sincerely yours,

Dr. Andreas Blom	Dr. Jonathan Mba	Dr. Joshua Atah
World Bank ACE Coordinator	AAU ACE Coordinator	National ACE Coordinator
The World Bank	Association of African Universities	National University Commission
Washington D.C., USA	Accra, Ghana Abuja,	Nigeria

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Professor Osasere Orumwense
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Benin City, Nigeria

1st April 2018

Subject: Report of University of Benin Center of Excellence in Reproductive Health Innovation (CERHI) Supervisory Mission conducted by Representatives of the World Bank, Association of African Universities (AAU) and the Nigerian Universities Commission (NUC) on March 15– 16, 2018

Dear Professor Orumwense,

This visit is our 5th visit to your esteemed institution and we would like to again thank you for your generosity and hospitality. We understand the many stressors on your time and we deeply appreciate that you met with us both at the beginning and the end of our visit. It is indeed a testament to the level of support and esteem that your University has towards CERHI and its leadership.

On this visit, our specific mission was to review and report on interim progress towards resolving the crucial issues outlined in the summary letter that was sent to you after our 4th supervisory mission, which was conducted in October, 2017. As you are aware, due to these issues and since the Center was not progressing towards its disbursement linked indicators (DLIs) in a timely fashion, its total funding was accordingly reduced. Therefore, in addition to providing an overall review of how the Center is progressing towards becoming a Center of Excellence in Reproductive Health Innovation, this mission was concentrated on defining areas of progress as well as impediments towards achieving the Centers DLIs.

In general, we can report that progress towards achieving the DLIs has accelerated but we feel it is crucial that the Center's leadership focus all their attention and resources towards these concrete goals. CERHI will only be able to achieve the goals that were set out for it to become an ACE if the leadership is able to provide concerted, organized and tangible results in several major areas. We are pleased to note that the Center's leadership is meeting on a regular basis to work on such processes and there are visible improvements in many of the Center's activities as a result of this. Two of the very important developments in the area of organization and reporting are that the Project Manager, Ms. Vivian Onoh, and the Monitoring and Evaluation Officer, Dr. Esohe Ogboghodo, were able to provide organized reports on both of these areas. Yet, as we stressed in all of our discussions, the time remaining to fulfill the Center's overarching goals and meet its remaining DLIs and even more importantly, to complete the work it set out for itself to establish a center of excellence, is limited! It is therefore, a matter of extreme importance that all of the Center's efforts be efficient, directed and measurable.

Regarding the areas of major deficiency that were outlined in our last letter, we noted the following.

• **Regional partner development**: CERHI continues to identify and form meaningful linkages with a variety of regional partner institutions. Since our last visit, CERHI has used these partnerships to conduct joint short course programs with institutions in Ghana, Malawi, Guinea and Sierra Leone. It is very important that these relationships grow beyond short engagements to elicit sustainable avenues for joint research, longer educational endeavors and other programs that can improve the general standard of scholarship and service in the region.

These linkages are also a prime resource for increasing revenue for the Center. For example research initiatives involving linked institutions could be used to form research consortia that might better attract grant funding from scientific or industrial organizations. Specifically, adding regional collaborators will probably enhance the Center's attributes, advance laboratory capabilities and attract world renowned faculty, and improve chances of attracting investment for research.

• **Short courses**: As mentioned above, short courses have been conducted both within Nigeria and in the region and we applaud the efforts and the successes that CERHI has had in this disbursement linked result (DLR).

• **Regional student enrollment**: Since our last visit, CERHI has reached out to students in the region through a variety of means, such as partner institutions and the representatives of regional governments, (eg. Embassy officials), to increase regional student enrollment. These concerted efforts have resulted in 16 regional students being admitted this academic year.

Previously, a significant barrier to regional student recruitment was that the students' accommodation facilities were sub-standard. We are pleased to report that the renovations of these hostels are almost complete and this barrier should soon be removed. We urge CERHI leadership to make a concerted effort to greatly increase the numbers of regional students now that conditions are optimized.

• **International accreditation**: Since the last visit, the center has completed and submitted the self-assessment for accreditation to Agency for Public Health Education and Accreditation (APHEA) which is based in Belgium. CERHI has responded to requests for clarification from the curriculum committee of APHEA and is looking forward to a site visit. We have been informed by CERHI that they have also initiated the process to gain regional accreditation from the West African Health Organization (WAHO). We have made CERHI leadership aware that submission of a completed self-study is a DLR that could afford them additional funding. We have commended them on their progress towards international and regional accreditation. We have also impressed on them that the accreditation process can be a prolonged; it is important that they be very proactive, not just reactive in ensuring that the process reaches completion.

• **Revenue generation**: Revenue generation continues to be slow although 2 grants, from the Ford Foundation for US 25,000 and UNFPA for 100,000 respectively are in advanced stages of negotiation. Tuition from regional students is noted but this will not be a robust enough income source even if student numbers increase significantly. The Center is planning on generating income from a business center but the center, as it stands serves more as a photocopying and collating center for student papers and this too cannot be expected to provide significant support. Although CERHI is hoping to generate income from the Laboratories that are continuing to be updated with ACE funding, commercialization of the lab will probably not provide enough income to fund the Center in the long run. Even for short term use as a commercial lab, we did not see evidence of a cohesive business plan based on an analysis of the local or regional markets' needs for the services that the Center's diagnostic services would provide. Therefore, CERHI leadership must prioritize competing for, and obtaining funded research since it remains the best strategy for financially and academically supporting the center as a hub for world class scientific investigation, education and innovation. It should be noted that ACE's current funding structure, which allows for funds generated by CERHI to be matched with ACE funds, will expire in December 2019 and it is very important that CERHI leadership double their efforts. Therefore, to optimize the Center's revenue, CERHI leadership must develop and follow an aggressive campaign to attract outside funding.

• **Infrastructure milestones:** Some of the infrastructure milestones that were not in place on our last visit have been implemented and are waiting to be verified on the next verification exercise. Others, such as the student's and guest accommodation buildings are not fully completed. We have impressed upon CERHI leadership that without verification, matching funds cannot be released and they should pay particular attention to ensure that these funds do indeed come to them.

• **Incorporation of CERHI into the University's financial and administrative structure:** A previously noted barrier to sustainability, the lack of CERHI dedicated "line item" for CERHI in UNIBEN's yearly budget plan has been removed. As of this visit, we have been assured that the center is indeed incorporated into the University's budget and administrative structure and the University's commitment in supporting CERHI's drive to achieve excellence was reiterated by the Vice-Chancellor.

Conclusion: CERHI has made significant strides towards addressing the problems that were noted on our last visit. Excellent progress has been made in forging regional partnerships and conducting relevant short courses throughout the region. Regional student numbers have also improved but remain soft. We feel that the above-mentioned partnerships could be tapped to improve enrollment of regional, continental and even international students. This effort, in turn, will be greatly enhanced if international accreditation of the Center's academic programs is obtained. We suggest that the Center be proactive and ensure that the pace of the accreditation process is as fast as possible. If the currently engaged accreditation efforts stall, we suggest that additional reputable sources for international accreditation be pursued.

It is clear that if CERHI is to reap maximal benefit from the ACE program, the center's leaders must implement a structured, timed, aggressive work plan that is dedicated to achieving DLIs, generating external revenue and fortifying the Center as a regional hub for education, research and innovation in Reproductive Health. The time to achieving these results under the ACE program is limited and progress must be appropriately expedited. We feel that one of the most efficient ways for CERHI to strengthen itself would be to partner with leaders and officers in other regional ACEs that have already the achieved the results that CERHI is working towards. We assure CERHI's leadership that the World Bank, AAU, NUC teams are fully available for further guidance and support to assist the Center's management to our fullest capacity.

Sincerely yours,

Dr. Andreas Blom	Dr. Jonathan Mba	Dr. Joshua Atah
World Bank ACE Coordinator	AAU ACE Coordinator	National ACE Coordinator
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