

FINAL TECHNICAL REPORT / RAPPORT TECHNIQUE FINAL 107855-001 THIRD PROGRESS REPORT 02ND JANUARY – 31ST DECEMBER 2017

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Capacity for Agricultural Research for Development (C4R4D) in Sub-Saharan Africa

107855-001 3rd Interim Technical Report 02nd January – 31st December 2017

Project Title: Capacity for Agricultural Research for Development (C4R4D)

Project Number – Component Number: 107855-001

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Address of Research Institution: Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles/West and Central African Council for Agricultural Research and Development (CORAF/WECARD)

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1. Synthesis

The report should begin with a half-page to one-page executive summary of the project that situates the work in the period with respect to the project as a whole. The abstract of the project written when the grant was initially approved by IDRC and the objectives listed in the grant agreement should be useful inputs when preparing this part of the report.

The *Capacity for Agricultural Research for Development* (C4R4D) is a response to the challenge of developing research capacity in West and Central Africa (WCA). The C4R4D project is funded by IDRC, managed by CORAF/WECARD and implemented in association with IITA in four countries namely Chad, Democratic Republic of Congo, Sierra Leone and Togo. The overall objective of the Project is to strengthen the institutional capacity of National Agricultural Research Systems in the four Targeted countries through the increased number and quality of emerging agricultural science graduates and leaders in agricultural research for development and identify, generate and disseminate research output that meet the needs of smallholder farmers and other actors in the food chains. The specific objectives of the Project are as follows: 1. to facilitate rigorous training of 20 masters and doctoral students in applied field based research addressing agricultural research priority areas that include soil fertility and crop protection and post-harvest innovation systems; 2. to support students through a graduate studentship scheme to undertake 6-12 months laboratory and field research IITA's hubs to develop scientific and research expertise, and to finalize theses and dissertations under mentorship of scientists and in close collaboration with national supervisors; 3. to strengthen students' skills in research, teaching and mentoring by short courses at IITA in Ibadan in research methodology, scientific writing and communication skills, data management, and pedagogy, mentoring and research supervision; 4. to provide half of the scholarships to women thereby increasing their between scientists and increase research outputs through articles and other publications; and 6. to launch graduate scientists as potential leaders in applied agricultural research in countries which are at the bottom of the Economist's Global Food Security Index 2013.

The above objectives are expected to be achieved through four outputs: (i) Research, communication, and leadership capacities and skills of students to undertake quality AR4D sustainably strengthened; (ii) Delivery of research outputs in line with national priority research areas supported; (iii) Capacities and skills of women scientists strengthened for a better representation in AR4D and (iv) Collaboration and networking amongst NARS, CORAF, and IITA increased.

C4R4D commenced on January 12, 2015 with an expected life span of 42 month-years (January 12, 2015 – July 12, 2018). All the four activities planned for 2017 are fully implemented (monitoring of research projects, organization of training workshops, finalization of the MSc students, recruitment of MSc students in Sierra Leone, and supervision by CORAF). However, the search of MSc students in Sierra Leone was unsuccessful despite the use of various channels to find relevant students. Activities implemented permitted to deliver the following results:

- The research project of the 28 students (12 females) of which eight (08) are MSc students (05 females) and 20 PhD students (07 females) were all followed by IITA and national supervisors during 2017.

- Twenty articles were produced by students and reviewed by resource persons in preparations for a writeshop Cotonou, Benin in scientific writing.
- Capacities of 18 students were strengthened in writing scientific papers during the said writeshop. This made the students more confident and enabled them to improve and finalize their articles and submit for publication. The expected outcomes of the writeshop and the four training courses organized in 2016 is these students will be valuable scientists of tomorrow in their home institutions and countries.
- Three (03) articles from PhD students were accepted/published during 2017.
- Nineteen students attended the IITA annual Symposium held in Ibadan in July 2017 and three (03) of them received prize as best posters and communication.
- Nine (09) students have submitted their thesis (03 Chadians, 01 Sierra Leonean, 04 Togolese, and 01 Congolese) of which seven (07) MSc Students and two (02) PhD students.
- Twenty-five laptops purchased and distributed to students during the IITA symposium held in Ibadan in July 2017.

All activities in the initial project action plan have been implemented except the tracer study that is scheduled to be conducted in the first semester of 2018. While the expected number of students has been exceeded, the project has faced challenges in recruiting MSc students in all the four countries, especially in Sierra Leone. Recruitment of students has been particularly challenging in Chad, DRC and Sierra Leone. In Sierra Leone the project has not been able to recruit MSc students, despite several visits of IITA scientists to Njala University, the leading institution in agriculture and environmental sciences. Delays in students' thesis review or evaluation by universities is beyond the control of the nine students concerned. In Togo, the thesis evaluation and defense process has been suspended by the authorities of the University of Lomé until February 2018 (students concerned with the situation are Yawavi, Damigou and Kolani). In Nigeria and Kenya, the university staff were on strike several times in 2017 (students concerned with the situation are Theresa Dick, Tamba Bandabla, Ahadi Birindwa, Bintu Ndusha and Akintayo). The other students are still to finish their analyses and/or complete their data collection. However, we hope that all the students will defend their theses before December 2018.

2. Research problem:

The reader should be reminded of the basic rationale of the project and the research problem or problems being addressed. Often, the researchers' understanding of the problems will have evolved since the project was approved. The report should describe this evolution and the reasons behind it. Restate the objectives where necessary.

A well-educated agricultural research workforce that effectively applies professional competencies and skills promotes sustainable agricultural development. Investment in AR4D generates growth, reduces poverty and protects the environment. The World Bank World Development Report - Agriculture for Development, 2008 - indicates that agricultural growth is twice as effective in reducing poverty as non-agricultural growth. The same report underlines the necessity for more research to drive sustainable productivity growth into the future in which an increase of some 70 percent in food supply will be needed to feed anticipated population expansion and global food demand.

Agricultural development in Africa is hampered by a lack of sufficient investment in the human capacity required in agricultural research for development (AR4D). Recent studies and surveys found that in most countries in Sub-Saharan Africa (SSA) there are too few researchers and many of them lack key skills needed. In 2010, the International Association of Universities carried out studies in a group of SSA universities and the findings revealed that more support for both PhD and staff was a prerequisite for success¹ in AR4D. Another issue is the rapidly aging pool of scientists, many of whom will approach retirement within the next decade². Also, of concern is the low level of female participation in agricultural research despite the fact that the majority of those who produce, process, and market Africa's food are women; only one in four agricultural researchers is female³. A study by Africa Women in Agricultural Research and Development (AWARD) and the Agricultural Science and Technology Indicators (ASTI) on "Women's Participation in Agricultural Research and Higher Education" in SSA found that women are more represented in junior roles requiring only a BSc-level qualification. The benchmarking survey—which was conducted in 125 agricultural research and higher education agencies in 15 SSA countries by ASTI and the CGIAR Gender & Diversity—showed that only 14 per cent of the management positions were held by women. This is also confirmed by the weak level of women responses to call launched within this project.

The agricultural sector is changing rapidly and this has affected the context of capacity development. Threats from climate change and increasing resource scarcity are some of the new challenges affecting AR4D and smallholder farmers. With the technology revolution, new regulatory requirements and breakthroughs in areas such as nutrition, genetics, informatics, remote sensing, meteorology, precision farming, most of NARS management is confronted with how to ensure that the skills of both job entrants and existing researchers remain relevant throughout their careers. For example, several countries in SSA lack the necessary technical capacity to conduct or review risk assessment dossiers for GM crops and also to monitor for compliance⁴. These require new focus on developing research capacities needed to promote innovation and technology development and food security.

Securing an adequate supply of suitably skilled researchers is important for optimizing agricultural productivity and outputs. This is recognized by initiatives and frameworks such as the Comprehensive African Agricultural Development Program (CAADP), as well as by research coordination bodies - FARA, CORAF/WECARD, ASARECA and ECOWAS under its Agricultural Policy for West African States (ECOWAP). The fourth Pillar of the CAADP calls for the improvement of agricultural research, technology dissemination and adoption. The workforce not only needs to be large enough to enable the sector to remain productive and competitive, it must also have the right skills to allow the NARS to grow and improve their performance by becoming more innovative and responsive to change. As such, it is important to develop and implement targeted capacity development programs to meet the demand for skills and competencies.

The Capacity for Agricultural Research for Development (C4R4D) is a response to the challenge of developing research capacity in West and Central Africa (WCA) and is coherent with the West and Central African Council for Agricultural (CORAF/WECARD)'s strategy for capacity strengthening. It is also coherent with the IITA'S Strategy 2012-2020 which identified capacity strengthening as among the critical cross-cutting areas that require greater attention. The project is also in line with IDRC Innovating for Development Strategic Framework 2010–2015

¹IAU, 2010, *Changing Nature of Doctoral Studies in Sub-Saharan Africa*, IAU.

²ASTI. October 2012. Global Assessment of Agricultural R&D Spending: Developing Countries Accelerate Investment.

³Beintema, Nienke M. and Di Marcantonio, Federica. 2010. Female participation in African agricultural research and higher education: New insights. IFPRI, 2010.

⁴Obonyo, D.N., Nfor, L.M., Uzochukwu, S., Araya-Quesada, M., Farolfi, F., Ripandelli, D., & Craig, W. (2011). Identified gaps in biosafety knowledge and expertise in Sub-Saharan Africa. *AgBioForum*, 14(2), 71-82. Available on the World Wide Web: <http://www.agbioforum.org>.

which seeks to strengthen research capacities across its five program areas, which include agriculture and the environment, in developing countries.

The C4R4D is targeting the following countries in WCA: Chad, Democratic Republic of Congo, Sierra Leone and Togo. Priority is given to these countries because they have more critical food security needs according to the Global Food Security Index⁵ released in July 2013. The Democratic Republic of the Congo is ranked 107 out of 107 countries in the Index. Chad, Sierra Leone and Togo are also at the bottom of the ranking.

3. Research findings

The main research results to date should be described and interpreted by highlighting the contribution to knowledge that this project represents from a scientific and policy perspective. The report should address the degree of progress toward the achievement of each objective specified in the grant agreement, including the general objective. Include any new or modified objectives.

Key results achieved in 2017 are as follows.

- ❖ the graduation of the selected 28 students is becoming successful;
- ❖ Nine (09) students have submitted their theses (3 from Chad, 5 from Togo, and 1 from Congo);
- ❖ Nine (09) other students have submitted their thesis which are under review or evaluation by their universities;
- ❖ Twenty articles produced by the students and submitted to International Journals;
- ❖ Capacities of 18 students enhanced in writing of quality scientific papers;
- ❖ Three articles accepted for publication or are published;

4.0 Project implementation and management

Briefly describe the activities supported under the project during the reporting period. Describe and discuss the research methods and analytical techniques used and any problems that arose. Indicate and explain any changes in orientation that may have occurred since the project was designed. Where applicable, comment on the financial variances which resulted from the activities of the project.

The main activities in 2017 were the following:

- Recruitment of MSc students in Sierra Leone,
- Monitoring and assessing the progress made by the awardees,
- Disbursement of research grants to the students,
- Finalization of the MSc program,
- Organisation of training workshop,

⁵The Economist (2013). Global food security index 2013: An annual measure of the state of global food security.

- Supervision by CORAF,
- Grant 2017 report,
- Grant 2018 work plan and budget.

4.1 Status of the students

The total number of graduate students is 28 of which eight (08) are MSc students and 20 PhD students. The total number of female students is 12 (five MSc and seven PhD). With regards to the target to allocate 50% of scholarships to female students, the project achieved about 43%. The Project has exceeded the number of targeted students (20). The allocated number of scholarships per country exceeded in Democratic Republic of Congo, Sierra Leone, and Togo. However, in Chad, the number has not reached the target due to challenges in identifying students in this country. In Sierra Leone, efforts made to identify MSc students were unsuccessful.

The majority of students (19) have submitted their progress reports.

On 31 December 2017, seven (07) MSc students and two (02) PhD students have submitted their thesis (3 Chadians, 1 Sierra Leonean, 4 Togolese, and 1 Congolese); nine (09) have submitted their thesis and they are under review/evaluation (2 Congolese, 3 Sierra Leonean, 4 Togolese); 10 are to submit (1 Chadian, 4 Togolese, 3 Congolese, 2 Sierra Leonean).

Table 1. Students' thesis submission

Students who submitted their thesis	Delay in thesis review or evaluation of students by universities	Students to be submitted their thesis in 2018
1. Adele Noudjilembaye 2. Théophile Dessenbe 3. Denise Nanguianan 4. Essossinam Ali 5. Assani Neville Mapenzi 6. Roukeyatou Atarigbe 7. Essossolim Nadege Awade 8. Badjissaga Maba 9. Isata Kamanda	1. Damigou Bammite 2. Theresa Tenneh Dick 3. Oluyemi Titilola Akintayo 4. Kumba Karim 5. Tamba Bandabla 6. Bwihangane Ahadi Birindwa 7. Yendou-Gname Kolani 8. Yawavi Eyram Gnomou 9. Bintu Ndusha	1. Maglwa Tcha-Thom 2. Isaac Balume 3. Prince Norman 4. Georgiana Allie 5. Franchement Mukeshambala 6. Oumbortime N'nanle 7. Nideou Dassidi 8. Voemesse Kokou 9. Caroline Sibomana 10. Christophe Haouvang Laban

4.2 Capacity development of students

4.2.1 Writeshop

A writeshop was organized in Cotonou, Benin, from 03 to 08 July 2017. The goal of the writeshop was to strengthen the capacity of students to write up their research work confidently and publish these works in order to improve research capacity in their home institutions at the completion of their studies. The writeshop was also intended to strengthen the skills of the students to enable them to write draft articles and go through a peer review process to get their articles ready for publication in a standard journal format. Prior to the

writeshop organization, a call was launched inviting each graduate student to submit a draft article which resulted in the submission of 20 articles (16 in English and 4 in French). For more details on articles, see Annex 2. These articles were reviewed by external reviewers. The writeshop workshop combined the following activities: (i) revision of the IMRAD format for scientific writing; (ii) revision on choosing a journal to publish a research paper; (iii) reviewing of individual manuscripts and (iv) revision of the manuscripts by respective individuals during the writeshop.

At the end of the writeshop, participants were better able to:

- write scientific articles using appropriate journal formats;
- respond appropriately to reviewers' comments on their drafts;
- finalize corrected manuscripts for publication;
- prepare a plan of action to develop other available research material to full journal articles.

The writeshop equally consolidated the previous effort of the training courses in Research methodology, Data management and Scientific writing organized in Ibadan, Nigeria in 2016. The results of evaluation made by the students on the writeshop are available via the following link: <https://www.surveymonkey.net/results/SM-V5LR8RZP/>

4.1.2. Participation in IITA Symposium

All the students participated in the writeshop attended the annual symposium of the International Association of Research Scholars and Fellows (IARSAF) of IITA held at IITA -Ibadan, Nigeria from 10 to 14 July 2016. The theme of the symposium was "Contributions of IITA postgraduate students' research for transforming African agriculture". The symposium offered opportunities to students to share their research findings and interact and exchange ideas on their research activities with various participants. Three (03) of the students received awards from the Symposium as the best posters and oral presentation.



Photo 1: Mr Neville MAPENZI ASSANI, a MSc student receiving his prize.

4.1.3. Supervision of students by CORAF

The writeshop held in Cotonou from 3 to 7 July 2017 provided a great opportunity for the CORAF Project Leader to meet and exchange with all the 18 students present. As results of exchanges with students:

- All the students who attended the workshop are at an advanced stage of their research work. Out of the 18 students, three (03) students (02 women) defended their masters dissertations and one student, his doctoral thesis, in total four (04) students defended their dissertations and thesis to date;
- Five (05) students will be able to defend their dissertations and thesis before the end of the year 2017 and the nine others than in the first semester of 2018.

The students were all very satisfied with the scholarship program. The financial contribution of the program has been instrumental in speeding their research work. The networking set up through the program was greeted by all, and according to them it is facilitating information sharing among them. The writeshop organized enabled them to improve their skills in scientific writing, using of statistic software, in communication, etc. The students appreciated the quality and fluency of the communication between them and IITA.

The main concerns of students are: (i) Low collaboration between internal (university) and external Supervisors (IITA); (ii) Insufficient funding for research works such as analyses.

Considering the first challenge, a recommendation to be considered in a future supported project is the establishment of contracts between (i) the external supervision (in this case IITA), (ii) student, and (iii) and the internal supervision (university) with clear responsibilities and roles to facilitate the collaboration between the supervisors.

4.3. Research support

Twenty-five laptops procured by the project were distributed to the students during the IITA symposium held in July 2017.

5.0 Project outputs and dissemination

Provide a listing of project outputs to date. Identify any outputs that are planned, but which have yet to materialize. Please specify what dissemination efforts were made wherever relevant.

To date the main outputs are:

- 28 students of which eight are MSc students (three men and five women) and 20 PhD students (13 men and seven women) supported by the project to conduct their research work. The Project has exceeded the number of targeted students (20). Women represent 42.8% compared to the target of allocating 50% of scholarships to female students.
- Articles accepted/published by students and supervisors:
 - **O. N'nanle**, Amivi Tété-Bénissan, K. Tona, A. Teteh, K. Voemesse, E. Decuyper and M. Gbeassor.
Effect of in ovo inoculation of Moringa oleifera leaves extract on hatchability and chicken growth

performance. Europ.Poult.Sci., 81. 2017, ISSN 1612-9199, © Verlag Eugen Ulmer, Stuttgart. DOI: 10.1399/eps.2017.213

- **Laba Christophe Haouvanga**, Ngakou Alberta, Yemefack Martin, Mbailao Mbaiguinam. *Growth response of Moringa oleifera Lam. as affected by various amounts of compost under greenhouse conditions*. Annals of Agricultural Sciences 62 (2017) 221–226
- **Prince Norman**. *Pollination Success in Some White Yam Genotypes Under Polycross and Nested Mating Designs* accepted by International Journal of Biological Sciences and Applications.

6.0 Impact

Describe and assess any development impact that the project may have had or might be expected to have. A useful distinction can be made here between the concepts of reach and impact. Reach refers to the reception and use of the knowledge produced. Impact refers to the influence of this new knowledge on decisions or on development more generally. Special attention should be paid to the expected impact on marginalized social groups.

The writeshop organized in Scientific Writing especially articles enhanced the capacities of students in writing quality papers. The acquired skills will be very useful once in their respective institutions and countries in writing winning research proposals.

The student networking set up through the program is a key asset for tomorrow building partnerships among institutions and countries.

7.0 Recommendations: *Include in this section a summary of any recommendations that you would like to make to IDRC with respect to the administration of the project, related to the scope, duration, or budget.*

By 30th June 2018 when the project is expected to close, the tracer study component of the project will not be done due to the delay in some students completing their thesis research. This activity is, however expected to be completed within a six-month period. In view of the importance of this activity, there is a need of a no cost extension of the project from 1st July to 30 December 2018.