

PROJECT: STDF/PG/300

Developing a Combined e-Learning Curriculum and Information System on Food Standards as a Contribution to Up-grading the Quality Infrastructure in Developing Countries



FINAL REPORT

JULY 2014

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY	5
2 BACKGROUND	6
3 PROJECT GOAL	7
4 PROJECT IMPLEMENTATION AND MANAGEMENT	8
5 PROJECT OBJECTIVE, OUTPUTS & ACTIVITIES	11
6 FINANCIAL OVERVIEW	14
7 OVERALL PROJECT RESULTS AND LESSONS LEARNED	14
8 RECOMMENDATIONS	16
8.1 Specific recommendations to the project	16
8.2 Broader recommendations	17
9 ANNEXES	17

PROJECT INFORMATION

Title Developing a Combined e-Learning Curriculum and Information System on Food Standards as a Contribution to Up-grading the Quality Infrastructure in Developing Countries
Implementing Agency University Of Cape Coast (UCC), Ghana
Partners Food and Agricultural Organization of the United Nations (FAO) German Development Cooperation (GIZ)
Start Date December 2010
End Date November 2013
Beneficiary Ghana
Budget Project value: US\$ 410,732 STDF contribution: US\$ 262,246

LIST OF ABBREVIATIONS

CCE:	Centre for Continuing Education
FAO:	Food and Agricultural Organization of the United Nations
GIZ:	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
SAIDE:	South African Institute of Distance Education
STDF:	Standards and Trade Development Facility
UCC:	University of Cape Coast

1 EXECUTIVE SUMMARY

The UCC-FAO-GIZ STDF-funded project was in response to challenges in today's competitive global market environment that necessitates provision of support to small-scale farmers (final beneficiaries) to help them integrate into local, regional and global markets for fresh and processed fruit and vegetables. This helps to ensure pro-poor growth and enhance sustainable livelihoods.

The underlying rationale of this project was to strengthen the quality and safety of food by ensuring more competent and cost-effective compliance with local, regional and global standards by:

- improving the education of students (future staff of public and private organisations in Ghana that are involved in setting, enforcing, certifying and/or adopting and applying mandatory and voluntary standards); and
- providing access to web-based information on mandatory and voluntary standards applied in potential target markets.

A project management team, led by the University of Cape Coast (UCC) Ghana with the support of participating agencies—the Food and Agricultural Organization of the United Nations (FAO) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH – worked to bring the project to fruition. Considerable support was obtained from the following consultants: Bill Knock (UK); Eugene Adarkwa Addae (Ghana) and Brenda Mallinson and Maryla Bialobrzaska, both of the South African Institute of Distance Education (SAIDE).

The project has achieved several results including the development of a student-centred e-learning curriculum on food safety and quality standards that is available for students on Moodle¹ on the internet at <http://ucms.ucc.edu.gh/course/view.php?id=120>. The e-learning process is mediated by e-tutors. The curriculum has been adapted for practitioners with organized information as well as links to useful websites where practitioners can find additional information.

The curriculum comprises six Course modules or units:

- Unit 1: The Role of Food Safety and Quality Standards
- Unit 2: Food Safety Threats, Their Prevention and Handling
- Unit 3: Food Standards (International)
- Unit 4: Private and Social, Environmental and Other Food Standards
- Unit 5: Ghana's National Food Standards and Laws
- Unit 6: Compliance with Standards

The course units or modules have been uploaded as e-learning materials on a Moodle platform on the internet. Four trained E-tutors are available to facilitate student learning of Food Safety and Standards material as web-based learning using Moodle. The student materials are currently targeted at Bachelor of Science (BSc.) Agriculture students in UCC. However, UCC students from other Faculties and Departments where food safety and standards are taught will benefit tremendously from the materials.

- Four other public universities in Ghana—the University of Ghana, The Kwame Nkrumah University of Science and Technology, The University for Development Studies, and the University of Education, Winneba (Mampong Campus) have been involved and have participated in the program. These institutions intend to use the materials for the benefit of their students and have been invited to do so. Seventeen (17) higher agriculture programs in Universities and Colleges in 9 African countries (Benin, Burkina Faso, Ghana, Ethiopia, Mali, Malawi, Nigeria, Tanzania and Uganda) under the auspices of the Sasakawa Africa Fund for Extension Education (SAFE) have been invited to freely take advantage of the e-learning course materials. The University of Cape Coast is part of the SAFE program. The course is available as an open educational resource (OER) and can therefore be freely accessed by all interested in it. The University of Cape Coast will appreciate acknowledgement for the use of the course.

¹ Moodle is a web-based learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalised learning environments. Moodle is provided freely as Open Source software.

- To facilitate the process of open access and broad use of the materials, the materials are being made available as Open Educational Resources (OER). This will ensure free access and use of the materials.
- A sensitization workshop to expose students to project activities and to build their competencies in the use of the Moodle platform for e-learning in food safety and standards has been completed for over 300 students covering two year groups at the University.
- A special computer room equipped with 10 computers has been set up at the Centre for Continuing Education (CCE), University of Cape Coast, as part of the project activities to provide students who do not have computers with access to the internet and information support for e-learning on food safety and standards. The CCE oversees distance learning at the University of Cape Coast (UCC). The experiences gained from this project, when shared with others in UCC will contribute significantly to CCE's distance programme as efforts are made to make it more web-based.
- UCC is supporting the ongoing operation of the e-learning curriculum delivered under this project after the end of project funding. Two UCC Moodle specialists have been permanently attached to the e-learning curriculum as part of sustainability arrangements. These technicians will work with e-tutors and students to enable smooth implementation of the course.

Among the recommendations made are the following:

- The Ministry of Food and Agriculture (MoFA) has embarked on developing an e-agriculture project with funding from the World Bank to support agricultural extension delivery in Ghana. The e-learning curriculum from the STDF-funded UCC-FAO-GIZ project should be linked with this MoFA effort to enable greater benefits to be achieved from the project.
- Efforts should be made encourage use of the e-learning course by practitioners in the field of food safety and quality in Ghana and elsewhere.
- It will be important to train additional e-tutors, especially from other Departments within UCC and staff from other public universities who may be interested in using the e-learning course materials as part of their curriculum. Locally, GIZ should be contacted to consider this.
- It is important to have a back-up server for the project output in view of power fluctuations and outages. It is also important to have laptop computers for e-tutors so they can provide more support from outside their offices and have the additional advantage of having a charged computer to work with in the event of power failures. The server and laptops should be procured with unspent funds from the project.
- The output from the project can easily be extended to develop an e-learning Master of Science (MSC.) program in the University of Cape Coast. This can be a collaborative programme that can be taken by students across Departments or institutions both within and outside UCC.
- The scope of projects should be carefully examined to ensure that they can be completed on time.

In terms of lessons learned, there is a need for adaptability and understanding, as well as patience in the implementation of projects. The project encountered some considerable challenges during implementation. These challenges were mostly responsible for the delays experienced and included:

- Considerable delays occurred with the final editing and technical clearance of the materials
- Substantial power outages over long periods meant that from time to time progress was held up

2 BACKGROUND

The numerous challenges in today's competitive global environment are ample proof of the need to provide needed support to integrate small-scale farmers (final beneficiaries) into local, regional and global markets of fresh and processed fruit and vegetables to ensure pro-poor growth and enhance sustainable livelihoods. Access to competitive markets implies that suppliers have to meet

mandatory regulations set by legislators and comply with voluntary standards introduced by industry and trade, respectively, in target markets. Recognizing that standards play an important role to achieving food security, assuring public health and facilitating consumer protection, developing countries are introducing ever-more stringent Sanitary and Phytosanitary Measures (SPS) both for imported and locally produced foodstuffs.

In response to widespread shortcomings in developing countries in the dissemination of up-to-date information on Food Standards, this project aimed to introduce an innovative approach to develop a combined e-learning curriculum and information platform for food quality and food safety standards as part of the quality assurance system. The project achieved this through:

- Enhancing the capacity of the food quality assurance system through the provision of better qualified young professionals for jobs in government , research, extension and food companies,
- Introducing innovative e-learning delivery methods for education and information services.

Formulation of this project involved UCC, FAO and GIZ. In anticipation of the project receiving funding, a meeting was held in Rome, Italy at FAO on October 12, 2009 to discuss the Project Proposal on Food Quality & Food Safety Standards e-Learning Curriculum and Information System which had been submitted to STDF. The meeting clarified some issues about the project and agreed that it was necessary to have a follow-up meeting in Ghana in the early part of the following year to, among others, discuss the details of the project as it would be implemented on the ground at UCC.

The meeting at the University of Cape Coast was held between 18 to 19 February 2010. Participants paid a courtesy call on the Vice-Chancellor to brief her, as the Executive Head of the University of Cape Coast, about the meeting and introduce the visitors to her and her administrative team comprising the Pro Vice Chancellor and the Registrar. Following this, the meeting by the participants over the next two days discussed key issues related to the project objectives, scope, target groups, baseline survey, curriculum and project activities and outputs set out in the STDF approved project. Significant time was invested in this early phase to determine the most suitable platform for the e-learning curriculum, and ensure that the baseline materials for the curriculum would be suitably adapted to on line learning. To this end, SAIDE was contracted through project funds to provide expertise on Moodle and instructional design.

There were also discussions on project implementation and approach as well as roles and responsibilities of each partner and allocation of resources. The outcome from these discussions was used to improve the project document.

The project application was approved by the STDF Working Group in December 2009. The Project contract was signed by WTO and UCC in November 2010. A separate Supervisory Assignment Agreement was signed between WTO and FAO, which agreed to provide supervision and oversight services for the implementation of the project. The project was to be implemented from 1 December 2010 until 30 November 2012

The project experienced delays in implementation linked in part to the involvement of additional partners in the project and time required to effectively involve international consultants who were helping with editing, review and design of the materials. In October 2012, UCC requested a twelve-month, no-cost extension from the STDF Working Group to be able to complete the project activities. The request for extension (until 30 November 2013) was approved at the Working Group meeting on 11-12 October 2012. The main need for an extension was to have time to test the curriculum with a test group of students and to incorporate improvements and changes.

3 PROJECT GOAL

The goal of the project was to contribute to pro-poor growth by enhancing access to local, regional and global markets through the provision of better qualified young professionals for government administration, research and extension and for food companies by providing a web-based e-learning curriculum on food safety and standards for students and practitioners as part of enhancing food quality assurance systems.

4 PROJECT IMPLEMENTATION AND MANAGEMENT

Project Management

The project was implemented by the University of Cape Coast (UCC), Ghana, in particular through the School of Agriculture. The UCC is a public university in Ghana founded in 1962. The University is organized into ten Faculties and Schools: School of Graduate Studies and research (SGSR), Faculty of Arts, Faculty of Education, Faculty of Social Sciences, Faculty of Law, School of Agriculture, School of Biological Sciences, School of Business, School of Medical Sciences, and School of Physical Sciences. By employing modern technologies and through distance learning, the University extends expertise and facilities to train professionals for the education enterprise, business and other sectors of the economy. The University is constantly seeking innovative ways to respond to the changing needs of society.

The Vice Chancellor and Registrar of UCC constituted the advisory body for the project. They also offered much needed leadership for the project. A project Co-ordinator oversaw the day-to-day running of the project. Four e-tutors wrote the curriculum materials and worked with three computer experts to mount the materials on Moodle platform after materials were edited and improved by designers.

As indicated in the table below, the following development partners provided technical support and advice on food safety regulations, curriculum development, e-learning approaches to the UCC Team:

- (1) Food and Agriculture Organization; Food Quality and Standards Service (AGNS).
- (2) Market Oriented Agriculture Programme implemented by GIZ.
- (3) the South African Institute of Distance Learning (SAIDE).

Roles of participating organizations

The following were the understood roles for participating organizations:

Participating Organization	Role
<u>STDF</u>	<ol style="list-style-type: none">1. Provide funding for project as approved in the project proposal2. Receive reports and provide feedback on reports
FAO	<ol style="list-style-type: none">1. Arrange an expert in food safety and food quality to work with relevant UCC staff to develop e-learning course materials2. Arrange an expert instructional designer (consultant) to train and work with relevant UCC project staff to finalise e-learning course materials3. Arrange an expert (consultant) in Moodle to train and work with relevant UCC project staff to support the uploading and use of e-learning materials in Moodle4. Provide support on quality assurance of the materials and to contribute towards the sustainability of the course.5. Provide necessary short-term supervisory visits to ensure overall project quality
GIZ	<ol style="list-style-type: none">1. Provide technical advice and support2. Monitor progress of the project based on established criteria3. Support UCC in report writing and reporting function4. Facilitate workshop to validate e-learning course materials
UCC	<ol style="list-style-type: none">1. Provide staff to implement the project2. Conduct national needs assessment of institutions which deal with food standards in order to determine the needs of future employers3. Design contents (outline) of e-learning tool4. Work with food safety and food quality expert to develop e-learning course

Participating Organization	Role
	materials 5. Work with SAIDE to integrate expertise on ID, and develop the moodle platform 6. Facilitate stakeholder workshop to content validate e-learning course 7. Purchase computers (including server) for project 8. Set up e-learning outfit 9. Provide efficient internet connectivity 10. Work with Moodle expert to have the e-learning course materials on moodle platform 11. Facilitate students use of e-learning tool through mediated use of tool 12. Facilitate practitioners use of tool through unmediated use of tool 13. Facilitate the publishing of the e-learning materials as OERs. 14. Support monitoring and evaluation of project and discuss project progress 15. Provide periodic reports as specified in project document 16. Disseminate project outcome to other institutions in sub-region
SAIDE	1. Provide expertise on instructional design 2. Provide expert to train on Moodle and also assist with upload of course units on Moodle

Acquisition of Office Space for Project

The UCC Authorities donated space in a brand new modern Distance Learning facility to house the project. The air conditioned space is ideal for the project and will accommodate the computers, server, comfortable seating for 20 students at a time when needed and a cubicle for e-tutors and a systems supervisor. The facility also houses an office for visiting experts. This space will continue to be available to operate and sustain the outputs of the project, after the end of the project.

Contact with Stakeholders

Some key stakeholders in Ghana were contacted to participate and made inputs at various stages of the project. These include:

No.	Institution
1.	The University of Cape Coast
2.	Food and Drugs Board
3.	Ghana Standards Board
3.	The University of Ghana
4.	The University for Development Studies (UDS)
5.	The University of Education (UEW), Mampong Campus
5.	Kwame Nkrumah University of Science and Technology
6.	University of Ghana
7.	Ministry of Food and Agriculture -WIAD-MoFA
8.	GIZ-Market-Oriented Agriculture Programme (MOAP)
9.	Private Sector Practitioners e.g. SPEG (Seafreight pineapple exporters of Ghana)

Needs Assessment Survey

A needs survey early in the process indicated that respondents perceived most of the component areas of the student e-learning curriculum to be relevant. Additional areas perceived to be relevant and recommended for inclusion in the curriculum included: accreditation and certification, Ghana's food law, information on the use and management of an e-learning facility and issues bordering on fair trade. A brief extract of needs assessment outcome is as follows:

- 100% of the respondents considered all components included in the curriculum to be important
- 100% of all respondents considered all components included in the curriculum to be relevant
- Respondents agreed that their organizations were adequately equipped or resourced to assess an e-learning facility
- All respondents agreed that their organizations had competencies necessary to assess an e-learning facility
- All respondents indicated that their organizations were willing to participate in the food quality and food safety e-learning program.

Other components suggested by respondents to be incorporated into the Food Quality and Food Safety Curriculum were as follows:

- steps involved in applying for accreditation and certification
- marketing of produce at the local level
- food habits and safety standards
- food quality and food safety implications on health
- how to organise the local markets to upgrade their status to international levels
- local distribution practices and channels and food safety
- impact of the hospitality industry
- linkages with Ministries, Extension and other stakeholders

Workshops with the project team

At least 2 workshops were held on UCC Campus with the UCC technical and computer expert team, subject matter experts, and the SAIDE experts. These workshops were necessary to discuss and finalize project implementation details, curriculum details and other aspects of the project.

Writing the Units of the Curriculum

A curriculum review workshop was held on 2-3 November 2011 to review the relevant UCC curriculum that formed the basis for the e-learning materials. Stakeholders from across the country and representatives from FAO and SAIDE participated in the workshop. Views were sourced from the stakeholders to input into the curriculum for improvement. The UCC e-learning team met for several group writing sessions to prepare the initial drafts of the units. These were reviewed by an instructional designer from SAIDE and after repeated reviews by the writing team were edited by consultants provided by FAO. Prior to the writing a Moodle workshop was facilitated by SAIDE to ensure that materials were prepared along lines that made it easy to upload on the Moodle platform.

Editing the Units of the Curriculum

The FAO provided the main support for editing the course materials through the outstanding effort of Mary Kenny of FAO and consultants sourced by FAO. Other internal editing was carried out by e-tutors.

Workshop on Moodle

A workshop on Moodle was held on 28-31 August 2012 for e-tutors and potential users of the output of this project drawn from four public universities and from relevant Departments within UCC. The workshop was facilitated by a resource person from SAIDE. FAO representatives were in attendance.

Sensitization of Students about project and on Moodle use

A sensitization workshop was held for students on 23rd February 2013 to sensitize them about the project and its importance and to offer basic training in competency in the use of computers and moodle.

Practitioners' Workshop

A 2-day workshop for practitioners was held from 12-13th November 2013. The main purpose of the workshop was to find out how to adapt the content of the materials to suit the needs of practitioners in the food industry. At the end of the two-day workshop, the following recommendations were made:

- a) That the content of the modules were appropriate and should be retained. Aspects which were student oriented such as assessment, student activities etc. should however be removed by the ICT experts and E-Tutors working together.
- b) The ICT experts should create a "practitioners discussion forum" where practitioners would be able to interact with colleagues and the tutors on issues, ideas and challenges will arise from their study.
- c) The e-tutors and practitioners were to supply the ICT staff with more links to websites where current and relevant information could be obtained. FAO would also be contacted for more websites. The ICT staff will include these links to websites in the modules. This will help take care of information which keeps changing.
- d) In future, a separate module can be developed for practitioners that will take care of their learning styles and specific practical needs.
- e) There is need for regular meetings of this kind for e-learning staff and practitioners to brainstorm on relevant ideas and also sustain the link between the classroom and industry.
- f) Considering the role NGOs could play in food safety and quality assurance in the country, it was recommended that the project organisers should look for NGOs to support the programme with logistics and finance.
- g) Consideration should be given to forming an NGO to further disseminate, replicate and ensure sustainability of the programme.

5 PROJECT OBJECTIVE, OUTPUTS & ACTIVITIES

Project Objective:

The project aimed to introduce an innovative approach to developing a combined e-learning curriculum and modules, as well as a web-based information platform, for food quality and food safety standards as part of enhancing quality standards.

Output 1: Curriculum content and materials developed on food quality and safety standards to effectively support relevant university curricula.

Six Units have been developed, edited, reviewed and uploaded on Moodle. The units are as follows:

- Unit 1: The Role of Food Safety and Quality Standards
- Unit 2: Food Safety Threats, Their Prevention and Handling
- Unit 3: Food Standards (International)
- Unit 4: Private and Social, Environmental and Other Food Standards
- Unit 5: Ghana's National Food Standards and Laws
- Unit 6: Compliance with Standards

A curriculum review workshop was held at UCC from 2-3 November 2011. The first draft of materials based on the relevant UCC curriculum were reviewed and restructured in the workshop. Some 38 participants representing stakeholders from across the country and representatives from FAO and SAIDE participated in the workshop. Views were sourced from the stakeholders to input into the curriculum for improvement. The UCC e-learning team met for several group writing sessions to prepare the initial drafts of the units. These were reviewed by an instructional designer from SAIDE and after repeated reviews by the writing team were edited by consultants provided

by FAO. Prior to the writing a Moodle workshop was facilitated by SAIDE to ensure that materials were prepared according to good instructional design principles, and along lines that made it easy to upload on the Moodle platform.

A practitioners' workshop was held to review materials for the practitioners. Based on recommendation from the practitioners, the practitioners' materials were made ready by the writing team (e-tutors) and supporting computer team from UCC.

Prior to arriving at this stage the following activities were undertaken:

- a template for laying out units and sessions of instructional materials to make them more user friendly was adapted for use from the Commonwealth of Learning (COL)
- A summary of needs assessment results was prepared based on the responses received from questionnaires. The results were shared at a stakeholders meeting to review the course materials (i.e. the course units and sessions)
- A Workshop on instructional design was held for the UCC authors, e-tutors and information technology staff on 31 October 2011 and 1 November 2011 at the University of Cape Coast, and was led by Maryla Bialobrzaska of SAIDE. The workshop concentrated on the design of the course with specific reference to making the course interesting for students who would undertake this course
- The Project Manager, Professor J.A. Kwarteng, visited Michigan State University from 6th to 8th June 2011 to observe and study advances and practices by MSU in e-learning in the sphere of food quality and food safety. He was hosted by Leslie Bourquin who arranged for him to interact with others. His experience was shared with colleagues upon his return and contributed to shaping the project in terms of didactic approaches and experiences in developing and implementing e-learning education courses.

Output 2: e-learning modules (linked to the food standard information platform) on food standards ready-to-use for students' courses

E-learning modules have been reviewed by instructional designer and Moodle expert from SAIDE and have been mounted on Moodle and ready for students' use as part of their Bachelor's degree at UCC.

A Moodle workshop was held at the UCC from 28th to 31st August, 2012. Mr. John Edumadze, the Head of UCC Computer Centre, spoke on online learning and indicated that educational technology has moved from residing in a place to existing on the information super highway. This, he said, has made it possible for people to access learning worldwide. He touched on Moodle and indicated that it could support synchronous and asynchronous learning. Brenda Mallinson facilitated the workshop. The objectives of the workshop were to help participants to:

- develop an understanding of and undertake initial activities regarding the functionality of the Moodle Virtual Learning Environment (VLE);
- develop an understanding of the steps and practice required to mount and implement an online course; and
- further develop strategies to prepare online courses for publication and taking cognizance of Open Education Resource (OER) licensing issues.

Participants learned about Moodle and how to access the Moodle platform at this address: <http://ucms.ucc.edu.gh/>. The exercise aimed at acquiring familiarity with the Moodle environment. Unit 1 of the Food Quality and Standards course was designed and refined and loaded on the Moodle platform. The workshop also looked at other courses already on Moodle at the University. Further clarifications were provided by Bill Knock on the importance of well designing the activities considering the type, the steps needed for its completion, the specific and detailed instructions that to be provided by the educators and, above all, that the time spent by the students in the

activities as this does not have to exceed in the total amount of time required for the completion of the session itself. A wrap up summary was provided by Mary Kenny.

As mentioned earlier, all who are interested in using the course may freely do so as it is offered as OER. To access the Food Safety and Quality Standards course on the UCC Moodle site, follow these instructions:

1. Request for a free account from food.safety@ucc.edu.gh. This will give you a username name and password with which you can always freely access the course as it is offered as an open educational resource (OER).
2. Go to the University of Cape Coast website at www.ucc.edu.gh
3. Click on Student Services at the homepage
4. Click on UCMS. UCMS stands for University Course Management System
5. Enter Username and Password and you will be in the course
6. Select to access student materials or practitioners' materials.

Output 3: an information platform on food standards to facilitate practitioners' access to up-to-date information including a practical maintenance system to ensure efficient updating of information

Moodle was chosen as the information platform to facilitate practitioners' up-to-date information. Practitioners' modules have been uploaded on Moodle. Trained computer specialists are available for system maintenance and will work with e-tutors for updates. Relevant **links** requested by practitioners have been provided. Also forums have been provided to allow practitioners to contribute to discussions. It was agreed from the outset that the materials would be made available for free access and use as open education resources (OERs).

Output 4: students are qualified to be recruited as professionals in the public and private food quality assurance sectors; Students who complete and pass the e-learning course will receive 3 credits towards graduation. This will appear on their transcripts and contribute to their qualification and getting jobs in the public and private food quality assurance sectors.

Output 5: teaching staff is better qualified for curriculum development and vocational training at the secondary and tertiary education sector

It is anticipated that teaching staff will be better qualified for curriculum development and vocational training at the secondary and tertiary education level after experiencing this e-learning curriculum process. The experience with the project has been valuable in contributing to the overall distance learning programme at UCC, and how tutors and students operate, teach and learn in this changing medium.

Output 6: additional partners, potentially capable of co-funding the maintenance of the e-learning module and food standard information platform, are identified.

Contact has been made with the Sasakawa Africa Fund for Extension Education to invite all the universities and Colleges in their programme to freely access and use the e-learning materials. Thus the following institutions and Colleges have access to the information platform and to the e-learning modules. These institutions are yet to communicate when they will begin using the course materials.

SAFE Universities and Colleges in Africa Invited to use Project Output

No.	Country	University/College
1.	Ethiopia	Haramaya University
2.	Ethiopia	Hawasa University
3.	Ethiopia	Bahir Dar University
4.	Ethiopia	Mekele University
5.	Uganda	Makerere University
6.	Nigeria	Ahmadu Bello University
7.	Nigeria	Bayero University
8.	Nigeria	Ilorin University
9.	Nigeria	Adamawa State University
10.	Mali	IPR/IFRA, Samanko Agricultural College

No.	Country	University/College
11.	Ghana	Kwadaso Agricultural College
12.	Tanzania	Sokoine University of Agriculture
13.	Malawi	Bunda College of Agriculture
14.	Burkina Faso	University of Bobo Diulasso
15.	Benin	University of Abomey Calavi

In addition, a number of other institutions and universities in Ghana were invited to use the output of the project as indicated below:

No.	Country	Institution/University/College
1.	Ghana	University of Ghana
2.	Ghana	Kwame Nkrumah University of Science and Technology
3.	Ghana	The University for Development Studies (UDS)
4.	Ghana	University of Education (UEW), Mampong Campus
5.	Ghana	Ministry of Food and Agriculture
6.	Ghana	Ghana Standards Board
7.	Ghana	Food and Drugs Board
8.	Ghana	Seafreight Pineapple Exporters of Ghana
9.	Ghana	Plant Protection and Regulatory Services Directorate

6 FINANCIAL OVERVIEW

	STDF contribution to UCC (US\$) for Project Implementation	STDF Contribution to FAO for Project technical Support	In-kind contribution (US\$) UCC	In-kind contribution (US\$) FAO	Total (US\$)
Total estimated Project Budget (US\$)	262,246.00	123,486 ²	35,000.00	20,000	410,732
Total amount transferred by STDF (US\$)	192,908.70	123,446	00.00		
Total expenditure at close of project (US\$)	192,908.70	124,398	35,000.00	-	
Unspent funds (US\$)*	69,337.3	-952	0.00		

The UCC in-kind contribution covered a large computer room where computers were set up for students' use as well as general services related to the maintenance of the facility. It also covered electricity and water costs, connectivity expenses, additional staff time committed to project activities and free use of conference and meeting rooms.

7 OVERALL PROJECT RESULTS AND LESSONS LEARNED

The project has developed a student-centred e-learning curriculum on food safety and quality standards that is available for students on Moodle on the internet. The e-learning process is to be

² Under the Supervision Agreement signed between WTO and FAO in 2010, the total contribution to FAO for technical support amounted to US\$93,486. In 2013, based on a request by FAO for additional funds to cover external expertise for curriculum development and e-learning necessary to complete the project activities, and the written agreement of UCC, the STDF agreed to transfer an additional US\$30,000 to FAO for this purpose. This amount was taken from STDF's estimated contribution to UCC, and did not therefore change the total STDF funds available for this project.

mediated by e-tutors. The curriculum has been adapted for practitioners with organized information as well as links to useful websites where practitioners can find additional information.

The following is a summary of the project's achievements:

Course Modules and E-Tutors

The curriculum comprises six Course Units uploaded as e-learning materials on Moodle on the internet. Four trained E-tutors are available to facilitate student learning of Food Safety and Standards material as web-based learning using Moodle. The student materials are currently targeted at BSc. Agriculture students in UCC. In addition, UCC students from other Faculties and Departments where food safety and standards are taught will benefit tremendously from the materials.

Collaboration with Other Departments within UCC

The following Departments had representatives involved in relevant phases of the project:

- The University of Cape Coast Medical School
- The Department of Hospitality and Tourism Management
- The Vocational Technical Education Department
- The Department of Laboratory Technology

This collaboration has paved the way for these Departments to use the outputs from the project in their own programmes.

Collaboration with Other Institutions in Ghana and Africa

Four other public universities in Ghana—the University of Ghana, The Kwame Nkrumah University of Science and Technology, The University for Development Studies, and the University of Education, Winneba (Mampong Campus) - have been involved and have participated in the program. These institutions intend to use the materials for the benefit of their students and have been invited to do so. Seventeen higher agriculture programs in Universities and Colleges in 9 African countries under the auspices of the Sasakawa Africa Fund for Extension Education (SAFE) have been invited to freely take advantage of the e-learning course materials. The University of Cape Coast is part of the SAFE program.

Sensitization of Students

A sensitization workshop to expose students to project activities and to build their competencies in the use of the moodle platform for e-learning in food safety and standards has been completed for over 300 students covering two year groups at the University of Cape Coast.

Food Standards E-Learning Coordinating/Facilitating Hub

A special computer room equipped with 10 computers has been set up at the Centre for Continuing Education (CCE), University of Cape Coast, as part of the project activities to provide students who do not have computers with access to internet and information support for e-learning on food safety and standards. The CCE oversees distance learning at the University of Cape Coast (UCC).

The University has improved its internet connectivity. For example, at the inception of the project, UCC had 10 Megabit per second for our Internet connectivity. Currently, two STM-1s from Vodafone Ghana, provides the main university with STM-1 (155Mbps) while MainOne Cable Company also supplies another STM-1 (155Mbps) to the CCE building at the north campus of our university. Again, when the project started, only 50% of the buildings on the north campus had fibre connectivity, but now all buildings have it. Finally at the start of the project the University had Wi-Fi linking both north and south campuses, but now the link is by fibre. These developments

have greatly improved the environment for the use of e-learning on campus, and are expected to significantly facilitate continued use of the e-learning curriculum.

Technical Support for Sustainability

Two Moodle specialists have been permanently attached to the Food Standards E-Learning curriculum developed through the project as part of sustainability arrangements. These technicians will work with e-tutors and students to enable smooth implementation of the course. These Moodle specialists are funded by the University, reflecting the University's commitment to the sustainability of the course.

Practitioners Materials

The project sought the input of practitioners into adapting the students' materials into Practitioners' materials. The practitioners' materials have also been uploaded onto Moodle with links to useful sites where practitioners can find specific information they might require. The involvement of the South African Institute of Distance Education (SAIDE) and their expertise on Instructional Design and Moodle has been a strong asset.

Lessons Learned

In terms of lessons learned, there is a need for adaptability and understanding as well as patience in the implementation of projects. The project encountered some considerable challenges during implementation. These challenges were mostly responsible for the delays experienced and included:

- Substantial time is required to develop e-learning materials and curriculum, particularly when several different partners are involved. The project document did not accurately estimate the amount of effort and time that would be required, in part since experience with the development of e-learning curriculum was limited. In particular, considerable delays occurred with the final editing and technical clearance of the e-learning materials and curriculum.
- Substantial power outages over long periods meant that from time to time progress was held up.

8 RECOMMENDATIONS

8.1 Specific recommendations to the project

- The output from the project can easily be extended to develop an e-learning Master of Science (MSC.) program at the University of Cape Coast. This can be a collaborative programme that can be taken by students across Departments or institutions both within and outside UCC. This recommendation will be put before the Faculty Board of the School of Agriculture in the near future for consideration.
- It is important to acquire a back-up server for the project output outside the main UCC server to safeguard project materials. This should be funded from unspent funds from the project.
- E-Tutors and the two-man UCC computer support Team should be supplied with laptop computers to facilitate the actual implementation of the project with students. Stationary desktop computers in offices (as is the current situation) simply will not help. The inconsistent power (electricity) situation absolutely demands that six laptops be purchased from project funds to enable the smooth implementation of the project with students. Laptops offer lecturers the flexibility of working from home.
- While some effort has already been made to disseminate information on the output of the project, much more can be done to enable wider dissemination of the project's output both within and outside Ghana. A sensitization workshop for media practitioners (including both the print and electronic media) would go a long way to get the information to other universities and food safety practitioners in Africa.

8.2 Broader recommendations

- The Ministry of Food and Agriculture (MoFA) in Ghana has embarked on developing an e-agriculture project with funding from the World Bank to support agricultural extension delivery in Ghana. The e-learning curriculum from the STDF-funded UCC-FAO-GIZ project should be linked with this MoFA effort to enable greater benefits to be achieved from the project. The project coordinator, Prof. J.A. Kwarteng, has had some informal contact with MOFA and will continue to interact with MOFA about this.
- It will be important to train additional e-tutors, especially from other public universities who may be interested in using the e-learning course materials as part of their curriculum. Locally, GIZ should be contacted to consider this.
- The scope of projects should be carefully examined to ensure that they can be completed on time.

9 ANNEXES

Logical Framework

	Project description	Measurable indicators	Sources of verification	Assumptions and risks
Overall objectives (goals)	Contribute to pro-poor growth by facilitating the integration of small-scale farmers (final beneficiaries) into local, regional and global markets	Increase in income of small-scale producers (long-term).	National statistics; evaluation by international organisations, such as FAO and WTO.	Stable demand for Ghanaian agricultural products in potential target markets at fair prices.
Immediate objectives (purpose)	Introduce an innovative approach to developing a combined e-learning curriculum and modules, as well as a web-based information platform for food quality and food safety standards as part of enhancing quality systems in the private sector.	E-learning curriculum, modules and the web-based platform are developed and operational. Requirements and issues identified in the needs assessment of the national food sector are included in the curriculum. Assessment of shift in employability of students within the food quality assurance system, either increased numbers or range of employers. Value chain oriented standard information services	Documented results of the needs assessment among the national food sector on: knowledge students should have to seek employment Baseline study of employment rate and type of employers for students qualifying from the School of Agriculture, compared with predictions at the end of the project. Inclusion and integration of strengthened curriculum on food standards within relevant	Employment opportunities for qualified students in the food sector will continue. New curriculum will be effectively integrated to University curriculum and students will elect to follow this course. UCC Food standards course 407 – needs to be authorised within the University. Professors and students will have adequate online access to the e-modules and information platform. Once created,

	Project description	Measurable indicators	Sources of verification	Assumptions and risks
		accessible to practitioners in the public and private sectors.	UCC courses. Access rate to the food standard e-modules and the information platform in the Internet. Questionnaire on the satisfaction of users with the e-learning modules and information platform.	the e-modules and information platform on food standards will be maintained. Awareness of public and private sectors of need and willingness to use information on standards to improve their working efficiency.
Expected results (outputs)	<p>a) curriculum content and materials developed on food quality and safety standards to effectively support relevant university curricula;</p> <p>b) e-learning modules (linked to the food standard information platform) on food standards ready-to-use for students' courses;</p> <p>c) an information platform on food standards to facilitate practitioners' access to up-to-date information including a practical maintenance system to ensure efficient updating of information;</p> <p>d) a didactical procedure for continuous updating of the information platform (to ensure information on food standards is</p>	<ul style="list-style-type: none"> • Final curriculum content and information platform developed, reviewed and agreed by the project team; • Percentage of lecturers, researchers and students using the e-learning module, first at UCC, later at other universities and training facilities; • Users inside and outside the universities access the e-learning modules and the food standard information platform and find the information useful; • A methodology for updating the food standard information platform is agreed and 	<p>Progress report to STDF and MOAP (monitor). Record of contacts with potential future users, sponsors, co-owners. Internal monitoring and evaluation system established in UCC. E-learning module and food standard information platform available on the internet for public scrutiny and use. Feedback and experiences from University staff and professors teaching courses on food standards. Feedback and experiences from University students taking relevant courses. Survey and interviews with</p>	<p>Interest of potential end users for the information platform and the e-learning modules (curriculum) and their willingness to support the continuous development of the modules. Integration of food standards into the curricula of Ghanaian universities will not be reverted. Interest to replicate the same elsewhere in the region (sub-region, Africa). Sufficient IT support and online capacity is feasible and maintained. Sufficient funding and human resources are identified to support the ongoing use of the information platform and e-</p>

	Project description	Measurable indicators	Sources of verification	Assumptions and risks
	<p>up to date) with participation of students is established as part of the university curriculum;</p> <p>e) students are qualified to be recruited as professionals in the public and private food quality assurance sectors;</p> <p>f) teaching staff is better qualified for curriculum development and vocational training at the secondary and tertiary education sector;</p>	<p>documented with roles and responsibilities , to ensure updating of the information contents and viable access persist beyond the project life.</p> <ul style="list-style-type: none"> • Survey of the fate of students in their professional life. • Number of students indicating interest or signing up to undertake the new course on food standards. • Demonstrated new skills among teaching staff in curriculum development and provision of on-line courses. 	<p>practitioners accessing the information platform on food standards.</p> <p>Record of website hits and an online questionnaire.</p> <p>University records on students attending courses.</p> <p>Reports provided by the School of Agriculture.</p>	<p>learning modules.</p>
Expected results (outputs) (continued)	<p>g) additional partners, potentially capable of co-funding the maintenance of the e-learning module and food standard information platform, are identified.</p>	<ul style="list-style-type: none"> • Necessary funding identified and human resources to ensure maintenance and use of the e-learning course and information platform. Demonstrated interest and agreement with at least one other African University to offer this e-learning course to students. 		
Activities	<p>a) Improve understanding of</p>	<ul style="list-style-type: none"> • Meetings and discussions 	<p>Progress report to STDF and</p>	<p>Effective identification of</p>

	Project description	Measurable indicators	Sources of verification	Assumptions and risks
	<p>the requirements of curriculum content on food standards;</p> <p>b) Design and development of curriculum content on food standards;</p> <p>c) Preparation of the curriculum materials in suitable online format.</p> <p>d) Design and development of the information platform on food standards</p> <p>e) Establish an internet platform for access to the developed curriculum with e-learning modules and food standards information platform;</p> <p>f) Establish a suitable process for monitoring, evaluating and updating the contents of the e-learning module/information platform;</p>	<p>held with key representatives of the public and private sector and findings documented.</p> <ul style="list-style-type: none"> • Report of project kick-off meeting to clarify key roles and final workplan for the duration of the project. • Documented description of scope and contents of the curriculum and linkages to relevant UCC courses • Description, layout and content of the information platform targeting practitioners • Materials and resources to be included in the curriculum and information platform finalised. 	<p>MOAP (monitor), final project evaluation.</p> <p>White paper for the curriculum development.</p> <p>Reports of experts.</p> <p>Final materials for inclusion on information platform and e-modules.</p> <p>Information and reports from IT team at UCC.</p> <p>Documented findings on exploration of partnerships and future collaborations.</p>	<p>qualified key personnel for project implementation as defined in Appendix 9.</p> <p>Interest and demand (in UCC) for the outputs of the project should be maintained.</p> <p>Continued and increasing priority among the public and private sectors to food standards and food safety.</p> <p>The risk of inadequate equipment, facilities and computer infrastructure to support the online information platform and e-modules. .</p>

	Project description	Measurable indicators	Sources of verification	Assumptions and risks
Activities (continued)	g) Involve additional partners to ensure sustained maintenance and use of the e-learning modules/information platform;	<ul style="list-style-type: none"> • Software and server requirements identified and operationalised to ensure sustainable and effective online access. • Information and modules finalised and available online. • Suitable option for continual updating of the information platform agreed and documented. • Proposal for monitoring and evaluation of the e-learning modules and information platform agreed and implemented. • Demonstrated communication with relevant partners and conclusion at end of project on key partnerships to maintain and build upon. 		

Financial Report

**SCHOOL OF AGRICULTURE
UNIVERSITY OF CAPE COAST
STDF PROJECT ACCOUNT**

	\$	\$
PROJECT FUND RECEIVED		192,908.70
EXPENSES :		
WORKSHOPS AND MEETINGS	28,923.53	
Travel & Transport	960.87	
PERSONNEL AND EXPERTISE (curriculum development, e-tutors, programming, services, etc.)	138,091.39	
PASSAGES (external trip to MSU & trip expenses)	2,213.80	
IT equipment	19,496.58	
FUEL	127.86	
TELEPHONE	558.15	
PRINTING & STATIONERY	117.21	
LUNCHING OF PROJECT OUTCOME	<u>2,419.31</u>	
TOTAL EXPENSES		<u>192,908.70</u>
BALANCE AS AT 30/6/2014		<u><u>-</u></u>

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