

## **PhD Course**

APPLICATION DEADLINE: **18th October, 2016**

### **FOOD SECURITY AND MANAGEMENT: ENVIRONMENTAL LIFE CYCLE ASSESSMENT AND ECO DESIGN**

#### **1. PURPOSE**

Value addition in agricultural products has become impetus in Africa for business prosperity and benefits to value chain actors especially those actors in the upper stream of the chain who are mostly affected by low returns. Satisfying customers today is challenged by rapid and frequent changes in demands. One demand, in particular in export markets, concerns accounting for the environmental burden of food products throughout their life cycle from primary production to end consumers. Environmental life cycle assessment (eLCA) offers an internationally recognized and standardized methodology (ISO 14040:2006) enabling location of environmental impact origins in value chains as well as comparison of products. Applying the LCA methodology to improve the environmental performance of products and services most often save costs, as the consumption of energy and materials is reduced as a consequence of environmental performance improvements of value chains. Eco-design in product development is a recognized and widely applied application of eLCA, which helps value chain actors to anticipate, locate and visualize environmental impact origins, re-engineer processes for resource efficiency and comply with eco-labels.

#### **2. OBJECTIVE**

The overall objective of the course is to enable participants conduct a basic eLCA of food products on their own, including an evaluation of food products' consumption of energy and materials, and apply the assessment results in eco-design of production systems, packaging, distribution, and consumption scenarios.

The targeted learning outcomes are to enable participants after completing the course to:

- Demonstrate systematic fundamental understanding of life cycle thinking and application of this knowledge in the analysis and management of technological systems.
- Plan and execute a basic life cycle assessment of a product or a technological system in co-operation with a company or other type of organisation.
- Develop proposals for the application of the results and for further analyses based on the LCA.
- Interpret and use life cycle assessments performed by others and perform a critical review of an LCA study.
- Apply knowledge on the most frequent uses of LCA in food production and environmental regulation hereof and obtain concrete skills in the application of methodology and tools to perform an LCA.
- Critically interpret various uses of LCA results produced by other authors.
- Evaluate relevant steps of an LCA, covering goal and scope, inventory analysis, impact assessment and interpretation.

**DATE: 24<sup>TH</sup> – 28<sup>TH</sup> OCTOBER, 2016**

**TIME: 8.30AM – 4.00PM**

**VENUE: TRAINING ROOM 1, LECIAD, UG.**

### **REGISTRATION**

Click this link to register: <https://goo.gl/forms/RFOcurEPRreWYCMiY2>

### **COURSE FACILITATORS**

- Professor Daniel Bruce Sarpong, University of Ghana
- Associate Professor Morten Birkved, Technical University of Denmark (DTU)
- Associate Professor Arne Wangel, Technical University of Denmark (DTU)

### **COURSE COORDINATOR**

- Dr Mawuli Dzodzomenyo, School of Public Health, University of Ghana

### **DELIVERY METHODS OF THE COURSE**

- Participants will be expected to come to class prepared (private reading is imperative).
- The conceptual part of the course will be itemized in the outline which will be delivered using the normal didactic methods i.e. lecturing by an instructor, video lecturers.
- Pedagogies will be adopted through involving participants' in in-class exercises and in delivering short presentations to peers. Group assignments will be given for groups to work on and thereafter present to the rest of class colleagues. Some topics on the outline may also be assigned to groups and be treated in the same manner i.e. having guided 'participant' lecturers.
- Work in project teams applying the theory in practice in a life cycle assessment of a product or system

### **EVALUATION METHODS**

Several individual exercises and a group assignment are given. Final student performance will be assessed on case study writing and presentation at the final term exam seminar. The course exercises will take 20% of the total score, and 80% for the final examination on a case study.

The exam seminar involves presentation of a group work of own LCA report and critical review of the LCA report from one of the other teams.

# COURSE OUTLINE

## DAY 1: MONDAY, 24 OCOTOBER, 2016

TIME	ACTIVITY	FACILITATOR
08:30 – 09:00	Registration	All Participants
09:00 – 09:45	Lecture: Intro to LCA and the LCA history	AW&MB
09:45 – 10:00	Tea Break	
10:00 – 10:45	Lecture: LCA - Goal and scope	MB
11:00 – 12:00	Case discussion	
12:00 – 13:00	Lunch break	
13:00 – 13:45	Lecture: LCA - Inventory analysis	MB
14:00 – 14:45	Exercise: The product system	
14:45 – 15:00	Tea Break	
15:00 – 15:45	Lecture: Intro to Ecodesign	AW
15:45 – 16:00	Summing Up	

## DAY 2: TUESDAY, 25 OCOTOBER, 2016

TIME	ACTIVITY	FACILITATOR
08:30 – 09:00	Recap	All Participants
09:00 – 09:45	Lecture: Eco design guideline	AW
09:45 – 10:00	Tea Break	
10:00 – 10:45	Lecture: The need for LCA of food products	MB
11:00 – 12:00	Exercise: Life Cycle check of product case	
12:00 – 13:00	Lunch break	
13:00 – 13:45	LCA: The functional unit	AW
14:00 – 14:45	Exercise: Define functional unit for selected food products	
14:45 – 15:00	Tea Break	
15:00 – 15:45	Lecture: LCA impact assessment and interpretation	MB
15:45 – 16:00	Summing up	

## DAY 3: WEDNESDAY, 26 OCOTOBER, 2016

TIME	ACTIVITY	FACILITATOR
08:30 – 09:00	Recap	All Participants
09:00 – 09:45	Lecture: Life Cycle management	MB
09:45 – 10:00	Tea Break	
10:00 – 10:45	Lecture: Hot spot analysis	MB
11:00 – 12:00	Exercise: Hot spot analysis	
12:00 – 13:00	Lunch break	
13:00 – 13:45	Presentation of food product cases	
14:00 – 14:45	Group work on food product case	
14:45 – 15:00	Tea Break	
15:00 – 15:45	Group work on food product case	
15:45 – 16:00	Summing up	

**DAY 4: THURSDAY, 27 OCTOBER, 2016**

<b>TIME</b>	<b>ACTIVITY</b>	<b>FACILITATOR</b>
08:30 – 09:00	Recap	All Participants
09:00 – 09:45	Lecture: Carbon and water footprint	MB
09:45 – 10:00	Tea Break	
10:00 – 10:45	Group work on food product case	
11:00 – 12:00	Group work on food product case	
12:00 – 13:00	Lunch break	
13:00 – 13:45	Group work on food product case	
14:00 – 14:45	Group work on food product case	
14:45 – 15:00	Tea Break	
15:00 – 15:45	Group work on food product case	
15:45 – 16:00	Summing up	

**DAY 5: FRIDAY, 28 OCTOBER, 2016**

<b>TIME</b>	<b>ACTIVITY</b>	<b>FACILITATOR</b>
08:30 – 09:00	Group work on food product case	All Participants
09:00 – 09:45	Group work on food product case	
09:45 – 10:00	Tea Break	
10:00 – 10:45	Group work on food product case	
11:00 – 12:00	Group work on exam presentation	
12:00 – 13:00	Lunch break	
13:00 – 13:45	Evaluation of Course	
14:00 – 14:45	Exams: Discussion of case report	
14:45 – 15:00	Tea Break	
15:00 – 15:45	Exams: Discussion of case report	
15:45 – 16:00	Closing ceremony: Handing over certificates	

MB: Morten Birkved

AW: Arne Wangel