



# ENVIRONMENT AND CLIMATE

BUILDING STRONGER UNIVERSITIES  
IN DEVELOPING COUNTRIES

## ACTIVITY COMPLETION REPORT<sup>1</sup>

ACTIVITY FACTS		
<b>Activity number</b> (from LFA)		
<b>Activity name</b> (from LFA)	PhD course on Simulation Modeling in the Environmental Sciences	
<b>South partner institution</b>	UDSM	
<b>Main responsible(s) for activity</b> (both North and South, where relevant) <sup>2</sup>	Senior Scientist Niels Holst, AU Prof. Amos Majule, UDSM	
<b>Start/end (dates) of implementation</b>	1 August 2012 - 15 March 2013	
BUDGET DETAILS (DANISH ASSIGNMENT HOLDER)		
<b>Original Budget (DKK)</b>	<b>94,370</b>	
<b>Actual expenses (DKK)<sup>3</sup></b>	<b>67,712</b>	
ACTIVITY DESCRIPTION		
<b>Brief description of planned activity<sup>4</sup></b>	Purpose	Conduct a PhD course at UDSM to equip the students with an understanding of the application of simulation models in environmental sciences, and how such models are parameterized, validated and applied in assessment studies, including limitations to their applicability.
	Content	Simulation models are extensively used to describe processes in ecosystems and in various parts of the environment. The course will have the following components, and this will be taught through both theoretical lectures and practical exercises: <ul style="list-style-type: none"> <li>• Introduction to simulation modeling (states and rates)</li> <li>• Parameterisation of simulation models (uncertainty analysis, model evaluation)</li> <li>• Validation of simulations models (comparison with observations)</li> <li>• Linking models at various scales</li> </ul>

<sup>1</sup> Must be filled and submitted to Platform Secretariat (cc to local South [BSU administrator]) no later than 2 weeks upon completion of activity.

<sup>2</sup> All must sign Activity Completion Reform before submission.

<sup>3</sup> If actual expenses (per budget line) deviate from original budget, this must be thoroughly explained and approval from Platform Secretariat attached to the Activity Completion Report.

<sup>4</sup> Use LFA and/or Monitoring Matrix as point of departure, where relevant



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		(temporal and spatial) <ul style="list-style-type: none"> <li>Downscaling of climate data for climate change impact analysis</li> <li>Tools for assessment of environmental impacts of changes (scenario analyses)</li> </ul>
	Contribution to research capacity building	
	Indicators	Number of students completing the course
	Other relevant details/comments	
<b>Number of participants</b>	Target	16
	Result	16
<b>Describe/explain deviations from planned activity</b> (timing, number of participants, content of activity, etc.)	<p>The content of the course was changed to a more basic level matching the students' skill level.</p> <p>Only 5 of the 16 students completed the course by handing in their course notes. Even though the requirements for acceptance of the notes were low, still one student tried in three rounds to have her notes accepted; unfortunately, they were meaningless, and she never succeeded.</p>	
<b>Main lessons learned</b> (list 3-5 issues)	<ol style="list-style-type: none"> <li>One should remember to ask the students registered for the course about their wishes and experience: this procedure caused drastic changes in the curriculum of this course.</li> <li>The students should not be allowed to receive a course certificate without demonstrating a minimum of understanding. In this course, this was achieved by demanding a copy of their notes after the course. There were no formal requirements for the notes, except they should seem useful to the student.</li> </ol>	
<b>Suggestions for follow up activities</b>	It would be interesting to find out, why ten of the students never completed the course by submitting their notes.	

Activity Completion Report submitted by:

NAME	CONTACT DETAILS <sup>5</sup>	SIGNATURE
<b>NIELS HOLST</b>	NIELS.HOLST@AGSCRI.DK +45 22 28 33 40	<i>Niels Holst</i>
<b>AMOS MAJULE</b>	AMAJULE@GMAIL.COM	

<sup>5</sup> Minimum e-mail address and phone number for all signatories.



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## ANNEXES:

- a) Accounts<sup>6</sup>
- b) List of participants/attendance register
- c) List of materials (Means of Verification)<sup>7</sup>

## Budgets

Ghana PhD Course	Ghana		Denmark	
	Budget (DKK)	Actual (DKK)	Budget (DKK)	Actual (DKK)
Salaries (Denmark) and emoluments (Ghana)	10,000		58,000	
Taxameter/educational grants				
Expenses for trips abroad and fieldwork (details below)			22,270	
Project and research equipment				
Project and research materials	10,000		10,000	
Publication, dissemination and communication				
<b>TOTAL</b>	<b>20,000</b>		<b>90,270</b>	

Ghana - Expenses for trips abroad (details)	Denmark	
Unit	Budget (DKK)	Budget for 2 weeks
International travel	9,000	9,000
Local travel, visa, vaccination, preventive medicine	2,000	2,000
Accommodation (nightly rate)	350	4,900
Per diem (daily rate)	455	6,370
<b>TOTAL</b>		<b>22,270</b>

Tanzania PhD Course	Tanzania		Denmark	
	Budget (DKK)	Actual (DKK)	Budget (DKK)	Actual (DKK)
Salaries (Denmark) and emoluments (Tanzania)	10,000		58,000	54,172

<sup>6</sup> Original receipts to be filed at main responsible institution(s); scanned copy of all receipts must be included.

<sup>7</sup> (Scanned) copy of all written output (fx. Power Point presentations, course materials, list of reading materials, course curriculum, etc.) must be included.



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Taximeter/educational grants				
Expenses for trips abroad and fieldwork (details below)			26,370	12,344
Project and research equipment				
Project and research materials	10,000		10,000	1,196
Publication, dissemination and communication				
<b>TOTAL</b>	<b>20,000</b>		<b>94,370</b>	<b>67,712</b>

<b>Tanzania - Expenses for trips abroad (details)</b>	<b>Denmark</b>	
<b>Unit</b>	<b>Budget (DKK)</b>	<b>Budget for 2 weeks</b>
International travel	11,000	11,000
Local travel, visa, vaccination, preventive medicine	2,000	2,000
Accommodation (nightly rate)	500	7,000
Per diem (daily rate)	455	6,370
<b>TOTAL</b>		<b>26,370</b>



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## **Appendix A. Accounts**

Accounts for the expenditures of the Danish partner are taken care of by Aarhus University account managers.



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## Appendix B. List of participants

S/N	Name of the participants	Research Title	Institution Registered
1	Elikana Kalumanga	Spatial-temporal use of habitats by African elephants in Ugalla ecosystem, Western Tanzania	Stockholm University/ Institute of Resource Assessment, UDSM
2	Harun Makandi	Monitoring Carbon stock and change in Tropical forests through remotely-sensed emitted and reflected energy	Institute of Resource Assessment, UDSM/Norway
3	Emanuel Henry Martin	Patterns of temporal and spatial variations of terrestrial mammal community in Mwanihana Forest, Udzungwa Mountains National Park	Sokoine University of Agriculture (SUA), Morogoro
4	William Andindilile	Impact of landscape change on native wood species	Geography Department, UDSM
5	Noel Amos Madalla	Assessment of economic value of agricultural land for community livelihoods within the context of REDD	Institute of Resource Assessment, UDSM
6	Atupakisye Samwel Kalinga	Impact of livelihood diversification on land use sustainability	Institute of Resource Assessment, UDSM
7	Zacharia John Lupala	Bio-economic modeling of Tanzanian Miombo woodlands	Sokoine University of Agriculture (SUA), Morogoro
8	Elias Kyando	Dynamics of farming in Iringa Region	Institute of Resource Assessment, UDSM
9	Angelingisi Akwilini Makatta	Assessment of forest governance shortfalls affecting REDD+ programme in Tanzania	Institute of Resource Assessment, UDSM
10	Selestina Lwanga	Spatial interaction of commuting, commodities and livelihoods	Geography Department, UDSM
11	Gwambene Brown	Agricultural production dynamics in the context of climate variability	Institute of Resource Assessment, UDSM
12	Bupe Kabigi	Forest degradation and fuel wood consumption	Geography Department, UDSM
13	Theresia Philemon Mvungi	Rural livelihood diversification: On farm and non-farm activities	Geography Department, UDSM
14	Mary Mtumwa Khatib	Mangrove forest dynamics (idea stage)	Geography Department, UDSM
15	Mshenga, Ameir Haidar	Natural resources and policy	Geography Department, UDSM
16	Mathayo Mpanda Mathew	Ecosystem service benefits and flows under climate change along an altitudinal gradient on Mt. Kilimanjaro, Tanzania	Institute of Resource Assessment, UDSM



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## Appendix C. Course materials

### 1. Student poll

Before the course, students were asked to formulate their wishes for the course. Nearly all students responded by filling out the form below.

<b>Name</b>	Your name...
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Skills	Current level	Learning outcomes	
		Course	PhD project
<b>Statistical analysis</b>	Your current experience with statistical analysis...	What you would like to have learnt on statistical analysis after the course has finished...	What you would like to have learnt on statistical analysis after you have completed your PhD project, or, if you are not a PhD student, 2 years from now...
<b>Simulation modelling</b>	Your current experience with simulation modelling...	What you would like to have learnt on simulation modelling after the course has finished...	What you would like to have learnt on simulation modelling after you have completed your PhD project, or, if you are not a PhD student, 2 years from now...

<b>Concrete task that you would like to have carried out, or at least started at, during the course</b>	Describe task...
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<b>If you bring your own data to the course, describe it shortly</b>	Describe shortly own data if any...
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Send to the teacher (Niels Holst) before 15 February 2013:

[niels.holst@agrsci.dk](mailto:niels.holst@agrsci.dk)



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From the response, it was clear that the course could not be carried out as originally planned: The students were too weak in basic statistics. Hence, the course was re-oriented covering the basics of statistics before turning to ecological modelling. This resulted in the revised course schedule below.

## 2. Revised course schedule

### Day 1

- Install R software
- Programming in R
- Statistical distributions, mean, variance, standard error
- Linear regression
- Multiple regression and ANOVA
- Lessons learned: Student report submitted to the teacher at the end of the day. Returned next morning, commented by the teacher.

### Day 2

- ANOVA and comparison of treatments
- Data management, use of database software
- Presentation of data. Producing figures with R
- Leslie matrix model of population dynamics. I. Introduction
- Leslie matrix model of population dynamics. II. Weed case
- Lessons learned: Student report as above

### Day 3

- The matrix model continued.
- Wish list; poll of students' wishes for topics on Day 4.
- Lessons learned: Student report as above

### Day 4





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- Topics chosen based on students' wish list from the day before. *Eventually, the students chose these topics: introduction to databases (Microsoft Access), regression analysis.*
- Lessons learned: Student report as above

## Day 5

- Student's own project. The students bring their own problem, maybe even data, and use the techniques learned during the course.
- Lessons learned: Student report as above

### 3. Teaching materials

Due to the free form of the course, there were no pre-written course notes. There was not shown even a single slide either. In stead, the students were learning-by-doing in a mixture between introduction-by-example by the teacher and assignment-solving on their own with the help of the teacher.

The students were required to take daily notes which they could optionally send to the teacher by the end of the day. The students were informed that it would be a requirement for course completion to hand in their notes for all five days. The students were given two weeks to submit their notes.

The rationale of this procedure was that the next iteration of the course could be planned based on the students' notes, as they would provide evidence of the students' needs.

### 4. Example of student notes

The remaining part of this report consists of the report handed in by one of the students. It provides the examples taught during the course, mixed with the student's own comments and observations.