

The Research Group
Ecology and Biodiversity

has the honor to invite you to the public defense of the PhD thesis of
Aymere Awoke ASSAYIE
to obtain the degree of Doctor of Sciences

Title of the PhD thesis:

Development of monitoring tools for short and long-term changes
of ecological water quality of Ethiopian rivers

Promotors:

Prof. Dr. Ludwig Triest

Prof. Dr. Peter Goethals (co-promotor, UG)

Dr. Abebe Beyene (local promotor, Jimma Univ.)

The defence will take place on

Wednesday October 4 2017 at 16.00h

in Auditorium D.2.01 at the Campus Humanities,
Sciences and Engineering of the Vrije Universiteit
Brussel, Pleinlaan 2 - 1050 Elsene, and will be
followed by a reception.

Members of the jury:

Prof. Dr. Nico Koedam (chairman)

Prof. Dr. Bram Vanschoenwinkel (secretary)

Prof. Dr. Marc Elskens

Dr. Luc Janssens de Bisthoven

(Royal Belgian Inst. Natural Sciences)

Dr. Christine Cocquyt (Botanical Garden, Meise)

Curriculum vitae

Aymere Awoke Assayie (born in Ethiopia, 1979) obtained a BSc in Environmental health from JU, Ethiopia in 2004 and MSc degree in Environmental Sanitation at Ghent University in 2009. In 2012, he was awarded a sandwich-PhD scholarship by VLIR and pursued his doctoral study, under the supervision of Prof. Dr. Ludwig Triest, Dr Abebe Beyene (JU, Ethiopia) and Prof. Dr. Peter Goethals (UGhent), in the Ecology and Biodiversity Lab of the VUB. During his PhD study period, he has participated in several workshops and supervised 10 MSc thesis students. Aymere was involved, as main and co-author, in the publication of 9 peer-reviewed papers and one book chapter.

Abstract of the PhD research

Anthropogenic stressors become a major threat to the aquatic ecosystem health. Hence, evidence based informed policy is required to prevent the alarming environmental damage. We analyzed the water resource management policy, legal framework and institutional arrangements of Ethiopia in relation to the gross river water pollution in major basins. The result showed, while concern over cumulative effects of multiple stressors is growing, lack of scientific criteria and monitoring tools is hindering the implementation of water policies. As part of the solution, this study introduced diatoms and macroinvertebrates as biomonitoring tools for the river systems of Ethiopia with the ultimate goal of detecting both short and long-term impacts. biological and water samples were collected from 178 sampling points distributed throughout the six major river basins of Ethiopia (Awash, Blue Nile, Genale-dawa, Omo-gibe, Rift valley and Tekeze), and relations between biological community composition and environmental variables was investigated. Both communities showed significant spatial variation along a land use gradient. The measures of diversity and richness of both communities were found very low in urban and high in forest landscapes. Based on the investigated relationships, a multimetric index using macroinvertebrates for general and ecological quality ratio based tools using diatoms and macroinvertebrates for organic pollution detection were developed and validated. This study also revealed that diatoms and macroinvertebrates are complimentary to each other because diatoms were good indicators in detecting and estimating degraded sites and macroinvertebrates were good in setting the reference sites. We anticipated that macroinvertebrates and diatoms can be used contemporaneously as a powerful indicator of environmental stress in streams and rivers in tropical countries.