



**HIGHER EDUCATION AND CAPACITY DEVELOPMENT FOR SUSTAINABILITY AND
CLEAN TECHNOLOGIES IN THE FOREST SECTOR IN MOZAMBIQUE
“VAGALHÃO”**

TRAVEL REPORT
6 – 16 June, 2013



Project board meeting, 10.6.2013, at the UEM campus in Maputo.

**PROGRAM FOR THE FINNISH TEAM
6 – 16 June, 2013**

Finnish team:

Prof. Olli Dahl
Dr. Roope Husgafvel
MSc. Mikko Martikka

Local organizers:

Prof. Andrade Egas
Prof. Valério Macandza

Program:

Fri – Sun 07.06 – 09.10 Meetings with the STIFIMO project

Mon 10.06 08:00 – 09:00 Meeting at Finnish Embassy
09:30 – 12:30 Board meeting
12:30 – 13:00 Visit Wood Technology Lab
14.00 – 15:00 GAPI

Tue 11.06 08:30 – 10:00 Meeting at MICOA
13:00 – 14:30 Meeting at Swedish Embassy

Wed 12.06 08:00 – 10:00 Visit sawmill in Maputo (J. M. Construções Lda)
14:00 – 15:30 Meeting at Green Resources

Thu 13.06 06:30 – 11:00 Travel and visit Madeirarte sawmill in Xai-Xai
11:30 – 17:00 Travel back to Maputo, including stop for lunch at Bilene beach
19:00 – 20:00 Meeting with Prodeza II at Polana Hotel

Fri – Sun 14.06 – 16.06 Meetings with the STIFIMO project

1. Introduction

The Higher Education Institutions Institutional Cooperation Instrument (HEI ICI) supports collaboration projects between higher education institutions in Finland and developing countries. The programme seeks to enhance higher education capacity in the developing world. The aim of the HEI ICI Programme is to strengthen developing country HEIs as developmentally responsive institutions by enhancing administrative, field-specific, methodological and pedagogical capacity. This purpose will be achieved through institutional cooperation in selected result areas. The programme is administered by Centre for International mobility (CIMO) and funded by Ministry for Foreign Affairs of Finland. The main objectives of our project are:

- To develop a study module and associated curriculum on sustainability and clean technologies.
- To design and implement staff/expert training for sustainability and clean technologies.
- To develop UEM capacity to provide services for and to establish strong links with industry, national sustainable development efforts and initiatives and other HEIs in the field of sustainability and clean technologies.

What is more, this project will strengthen the capability of UEM to meet the foreseeable educational and training requirements in the field of sustainability and clean technologies at the university level. As an objective, there will also be an initiative to establish links between industry, governmental actors and other educational institutes. The UEM-AALTO approach (Fig 1) to sustainability will be comprehensive, inter-sectoral and coherent covering both broader sustainability performance aspects and company level control of environmental factors.

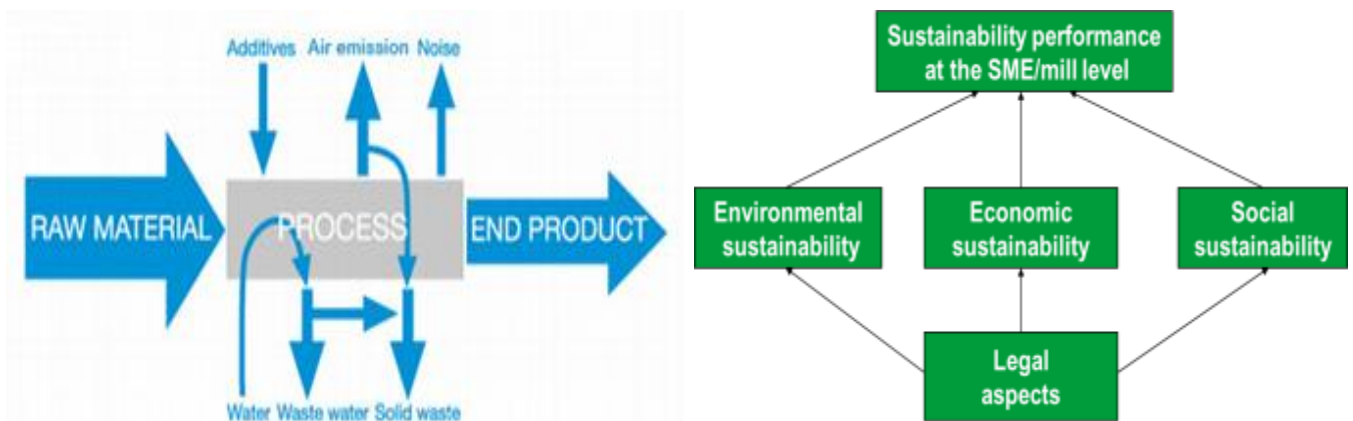


Figure 1. The UEM-Aalto approach.

- (a) Environmental performance at the company/mill level.
- (b) Broad approach to sustainability performance (small and medium-sized enterprise (SME)/mill level).

Our project has established links with other UEM partners such as the National Agricultural Research Institute of Mozambique (IIAM) and Finnish Forest Research Institute (METLA) project "Forest Research Capacity Strengthening in Mozambique 2012-14" and the Viikki Tropical Resources Institute VITRI, Department of Forest Sciences at the University of Helsinki, Finland project "Private Agricultural Investments and Land Use Change Impact on The Adaptive Capacity of Local

Communities to Climate Change in Mozambique -PAIMO". In addition, UEM is developing a study plan of M.Sc in Wood Technology in collaboration with the Swedish University of Agricultural Sciences (SLU) and Luleå University of Technology (LTU).

2. Travel programme – day by day

2.1 Fri 07.06 - Sun 09.06 Project meetings and meetings with STIFIMO project

Our team had several discussions with Mr. Teemu Seppälä who is working in the Cooperation in Science, Technology and Innovation Between Finland and Mozambique (STIFIMO) project. It became quite clear that the developed new study module is timely and that there is a clear demand for capacity-building in this field. Links with industry/business are essential and joint UEM-Aalto service production should be marketed. Module should cover process industry as a whole and be linked to key development trends and associated challenges in Mozambique. We concluded that the project brochure should be widely disseminated. The study book and maybe even the teaching materials should be translated into Portuguese.

Staff/expert training is very timely and essential to address existing and emerging sustainability challenges, the critical need for environmental engineering in process industry and lack of clean technology approaches and associated capabilities in industry. The training should be planned in a way that takes into account the needs of industry to make as relevant as possible. Training should engage and involve multiple stakeholders (e.g. industry and key governmental actors). The UEM staff visit to Finland should include both expert training (facilities, teaching, use of material and ICT and pedagogy in Aalto) and industry networking. Development of both stronger links with industry and UEM capacity to provide services to industry and national development efforts is timely and important. The project should aim at establishing a training package that could be sold to companies and other actors as a service. In general, Mr. Teemu Seppälä will facilitate project contact in Mozambique.

In addition, science, technology and innovation (within STIFIMO projects); experiences and challenges in the technological and financial sector that need to be prepared for in schedule planning, budgeting and project management comprise 1) decision of using Portuguese language where possible to reach wider audience, 2) gaining understanding of local conditions and possibilities and challenges of related eco-tourism themes, forestry, environmental management and access to technology and 3) overall picture of and an introduction to the on-going ventures and related development projects in Mozambique.

2.2 Mon 10.06 programme

2.2.1 08:00 - 09:00 Meeting at Finnish Embassy

Our discussions showed that the module on industrial environmental engineering is timely and important and that we have full embassy support for this project. It was noted that it is important to engage all development actors and improve university-industry relations. Embassy video conference facility can be used to link Aalto and UEM and UEM capacity development is important. Aalto-UEM linkage has potential to promote new initiatives and sustainable development including addressing key sustainability challenges. Mr. Juhana Lehtinen will facilitate project contacts in Mozambique. Broad-based networking and engagement in this field is important and linking university education with both

industry and national development needs is important.

Our meeting covered, for example, introduction and revision of on-going initiatives and projects by the Finnish government, comparing previous international and overseas experiences with noticeable similarities reflecting to structural planning. Clear coordination needs to come from one end only. Management of project and decision making needs to be clearly appointed so that projects proceed efficiently. Important issues comprise establishing close contacts at the

embassy to improve communication between Finland and Mozambique eg. possibility to use video conference room for staff meetings and brief trainings and establishing contacts between academic institutions and sustainability projects in Mozambique.



Finnish and Swedish embassies in Maputo.

2.2.2 Mon 10.06 09:30 - 12:30 Board meeting

Project board:

Tomas Tchiconela, FAEF-UEM (Chair)

Andrade Egas, FAEF-UEM

Eugenida Manhica, DNTF-MINAG

Esperanca Chamba, IIAM-MINAG

Juhana Lehtinen, Embassy of Finland

Olli Dahl, Aalto University (Co-chair)

Roope Husgafvel, Aalto University

Mikko Martikka, Aalto University

During the board meeting it was established that the new module is important and timely and broad-based development of the module with multiple key stakeholders was encouraged. The developed new module will be a valuable addition to the new MSc programme of UEM and UEM will arrange a workshop on module development with multiple key stakeholders. The board agreed that the new module requires capacity development within UEM encompassing the capability of staff to address emerging sustainability challenges. Travel to Aalto University will take place in 2014 (UEM team) and broad-based approach to sustainability in essential and focus on process industry as a whole.

The involvement of industry stakeholders was considered important from the very beginning of study module development and related capacity building activities. The development of the new study module should involve and engage relevant governmental and HEI actors in Mozambique. Involvement and engagement of key stakeholders will contribute to the development of UEM service production capability. Links with industry should be enhanced e.g. in the field of thesis work and practical case study/projects (financing is an important incentive for students). Adult students should be encouraged to pursue/finalise MSc degree. Aalto team potentially needs more travel funds to network in Mozambique.



The UEM wood technology lab is not fully operational to provide services to industry and needs to be updated with relevant equipment. In general, current news of the existing education programme and its tuition respect to schedule planning for modules and planning and agreeing of organizing workshops for staff training, one at UEM by UEM and external parties, another one in the future with Aalto staff. Involving and having participants from other institutions for valuable contributions in module planning and technology and methods that can be used and is suitable in teaching events e.g. MICOA and National Directorate of Forestry Management.

Board meeting on UEM campus, Faculty of Agronomy and Forestry Engineering.

2.2.3 Mon 10.06 12:30 – 13:00 Visit to the Wood Technology Laboratory

The UEM will arrange a workshop on Industrial environmental engineering study module with broad-based stakeholder/interest group participation including module/MSc programme lecturers. The results of the workshop will be a signal to Aalto and guide the development of the lecture materials. Aalto will deliver the book on Industrial environmental engineering in both English and Portuguese. The module could be an intensive course max. 3 weeks or run 11 weeks. If the UEM video conference facility will be in order it could be used in the teaching of the module as well (Aalto-UEM linkage). MSc is a joint effort with the Faculty of engineering. There are 5 departments working with MSC: wood technology, silviculture/conservation management, forest economics, harvesting/transport and engineering (other faculty).

Aalto and UEM will collaborate and produce relevant materials to establish UEM capability to provide teaching in Industrial environmental engineering. UEM visit to Aalto will take place in spring 2014. Prof. Olli Dahl will look into possibilities of finding equipment from industry (no cost). Plantation forestry focuses on eucalyptus and acacia. Faculty has contacts with UPM (Niassa, forests there). Some important issues were raised such as ideas for simple measuring equipment that could perhaps be obtained through other project collaborations eg. Metla Finland or forest industry companies, depending on need and focus of teaching and implementation of all relevant Aalto staff knowledge in training sessions during visit to Finland.

Wood technology laboratory presented by Dr. Egas.



2.2.4 Mon 10.06 14.00 – 15:00 Visit at GAPI (Sociedade de investimento)

GAPI is a society of or more specifically a consortium of companies and individuals around a common theme in Mozambique. In the Vagalhão project these were environmental and forestry sectors. We had a discussion where the GAPI people were explaining about various projects in different parts of the country. Most of the projects at hand were dealing forestry management in regard to land ownership and technological

challenges in sustainable management. The discussion raised further interest in field studies

and possible involvement of students in such study projects possibly in the form of master's thesis work.



GAPI visit in Maputo.

2.3 Tuesday 11.06 programme

2.3.1 08:30 - 10:00 Meeting at MICOA

We had a meeting with the head of department Josefa Jussar and we concluded that there is a big demand for the module due to growing industry and that MICOA wants to take part in the UEM workshop on the new module. The law of environment and decree on EIA are important (in internet in Portuguese). There are national regulation on forests and lands also. We discussed about, for example, the fact that EU standards are in the internet in Portuguese and that these can be used as reference in national standardization efforts in Mozambique. Standards are very important and should reflect key processes, should be ready before big industry comes. The role of the Southern African Development Community (SADC) was especially noted.

Capacity building for environmental management and engineering including clean technologies and sustainability and EIA is very timely and important. Industry is growing and there is need for these skills and demand will be even bigger in the future. Standards are very important and should reflect key processes, should be ready before big industry comes. Links and services should be focused on actual industry activities and national development efforts and initiatives. Other discussed key issues were the necessity of clear information and simple translation of teaching material and book regarding environmental permitting, overview of environmental legislation in practical use and relation to land use. This information should be widespread and easily available to all counterparts. One part of environmental management and legislation aspects are to be delivered in a compact package. Emphasis on staff know-how on how to present these topics is essential for mutual understanding. Brief introduction material and documents needs to be published in English and Portuguese.

2.3.2 13:00 - 14:30 Meeting at Swedish Embassy

Discussion confirmed the fact that cooperation with UEM and particularly on MSc programme is important and timely. The focus has been on funding incentive for the last two years and scholarships and funding are highly relevant. The planned MSc Programme is 2 years (first year courses and second year thesis). It was noted that UEM does only research and that same teachers teach at different

universities typically. Swedish lecturers operate for 2,5 years and UEM and SIDA cooperate in funding machinery. Private universities are a business and catholic church is also involved in education (university). Public relations work and marketing sustainability and cleantech are important and timely. In Niassa, there is a forestry company involved in development and others should be contacted/linked to this project. There should be UEM donor coordination (UEM capacity focus) taking into account EU framework. Ministry of education (department) should be involved and the big picture requires that a UEM donor meeting should be arranged. Possibility and importance of establishing contacts with other academic institutions, in this case particularly with the two Swedish universities collaborating with our project companion as well as understanding the necessity of presence at project location as much as possible were recognised.



Discussing educational development at the Swedish Embassy. From left: João Jussar, National Program Officer, Research Cooperation, Natural Resources and Disaster Management, Professor Olli Dahl, Teemu Seppälä, Senior Expert in STI services for SME in STIFIMO project, Elisabeth Ilskog, First Secretary, Research and Infrastructure, Swedish Embassy, Lecturer, Mikko Martikka and Project Coordinator Roope Husgafvel.

2.4 Wednesday 12.06

2.4.1 08:00 - 10:00 Visit sawmill in Maputo (J. M. Construções Lda)

We had a long and fruitful discussion at the mill site and we noted that the developed industrial environmental engineering module is needed and timely. The staff was very interested in the module. It is important to develop UEM capacity to provide skilled experts for local companies. Capacity development is needed and timely. In addition, university and industry links are important and should be encouraged. The new module and service production could contribute to marketing and competitive advantage through sustainability. Clean technologies are among the key investment priorities and skilled staff is needed. This sawmill was interested in funding thesis work and also in more sustainable engineering/management approach to process, supply chain and products. Valuable experiences were shared by the mill staff relative to what is needed to be taught and how. Collaboration was created and they were willing to participate in the coming UEM workshop. Other key issues that were covered comprised the possibility to have more UEM staff to visit the mill and exchange ideas and the opportunity for student projects, practical training and theses. For example, contacts can be made more actively through our HEI ICI project focusing on planning of future student tasks and mill collaborations.



J. M. Construções Lda sawmill in Maputo.

2.4.2 14:00 - 15:30 Meeting at Green Resources

Our discussion resulted in the conclusion that there is a need for this project and it should be linked to industry operations and include practical aspects such as addressing key challenges and opportunities in Niassa/Nampula regions. Capacity development and promotion of appropriate skills are important. There are a lot of plantation forestry activities in Niassa Province and in Nampula and links and services should serve these activities in an appropriate manner. There is a strong staff demand for MSC student and forestry experts (suitable skills needed). Many companies are involved in the development in Niassa. Green Resources is interested in thesis cooperation and willing to take part in the UEM workshop. Students are needed, for example, in tree breeding programme and cloning field studies (Eucalyptus and Acacia). Important issues were raised such as Green Resources can finance theses, potential to market pellets to EU markets, UEM could have role in bio energy tests and Charcoal R&D on e.g. caloric power and best species. The contact information on dalmann.com (forest management) was noted.

Current and coming focus areas encompass e.g. the following: 126 000 ha plantation, pulp mill 1.2 – 1.3 million tons / year, 4 million tons / year timber to the mill, within 2-3 years there will be a chip mill / pellet factory, charcoal first and bricks, regional market, panel board mill, 4000 hectares plantation, Niassa (pine for sawlogs, eucalyptus), Nampula (acacia) and the fact that 4-5 forest engineers are needed right now. Valuable information was received from the company staff for topics that would be required as practical knowledge in working life for forestry management, environmental technology and management in the future. Possibility exists for student projects in the future, particularly theses that could be under taken with expert supervision. Major chance was identified for UEM to put effort and establish collaboration with industry and associated external parties that already have vast technically advanced knowledge present in Mozambique.

[Green Resources, Maputo.](#)



2.5 Thursday 13.06 programme

2.5.1 06:30 - 11:00 Travel and visit Madeirarte sawmill in Xai-Xai

The lively discussions at the mill site verified the fact that the developed industrial environmental engineering module is needed and timely. The sawmill staff was interested in the module. It was concluded that it is important to develop UEM capacity to provide skilled experts for local companies. Capacity development is needed and timely in this field. University and industry links are important and should be increasingly encouraged. The new module and service production could contribute to marketing and competitive advantage through sustainability. Additionally, clean technologies are among the key investment priorities. Skilled staff is needed. This mill was interested in funding thesis work and in in more sustainable engineering/management approach to process, supply chain and products. There is great potential of contribution for module development based on several years of collaboration including students projects in the form of written and practical training. This mill could be an excellent practical example of comprehensive sustainability in small scale industry. Can be implemented as an example both in training and tuition. Other sustainability projects such as support of local communities in well structured operation should be studied in more detail.



Thorough mill tour and presentation of processes and environmental themes at Madeirarte sawmill in Xai-Xai.

2.5.2 19:00 Meeting with Prodeza II at Polana Hotel

Our long discussion with the project staff showed that the developed new module is important and timely. The current chief technical advisor was willing to take part in the UEM workshop. It was noticed that sustainability aspects of plantation forestry are important. Capacity development and more capability are essential. Furthermore, more practical approaches and skilled experts are needed. Promotion of university-industry-national development efforts linkages and collaboration is important. It was recognised that field trips to North (Niassa, Nampula ect) are needed and that extension work is important and needed. More focus on field studies and practical issues are also needed. In general, this meeting provided contacts and vast experience of similar projects in Mozambique that can be used to help in our current efforts. Invitation was given and a good possibility to visit local sites where projects in social, ecological and environmental sustainability and forestry exists. Possible site visits can be very informative as true insight into local conditions that is essential to understand when constructing on such a significantly important field of education. Straightforward information to be gained within UEM from other parties working in the field. UEM field visit can be combined with visits to other destinations for mutual benefits in gaining more information and putting to practice in developing education as well as links to sustainability initiatives, projects and industry.

2.6 Friday 14.06 – Su 16.06 project meetings & meetings with STIFIMO

Our meetings and discussion covered many important topics and we concluded that service production and marketing of training are important. Better links to practice and field level activities are needed. Thesis links to industry/companies are important. The new module should encompass forest licence and concession aspects (e.g. 20% should go to the local people according to law). More focus should be placed on funding of studies. Information is needed from Swedish MSc programme work. The MSc programme is taught in 4 periods. Skill should be developed to address better industry, company and national development efforts cooperation. Skills should cover forest licence/concession aspects. Focus is needed on company land ownership and associated issues. Focus is also needed on local people and their relations to land (e.g. forced relocation). In general, a board meetings is needed 1-2 times a year. New topics encompass e.g. embassy cooperation between Finland and Sweden, WWF forest initiatives, PLAN disaster and risk issues, development of forest applications, focus on normative framework (South Africa or else maybe), embassy helps in contacting and meetings arrangements, focus on species studies (few species available now), database development and capacity development, companies want to plant and identification of forest ministry norms in Mozambique. In general, in-depth discussions were held on ongoing projects, green and ecological tourism aspects and planning of next visit. Linking and finding new contacts for environmental and sustainability efforts, possible publishing routes and online documents covering project topics were also discussed.

2.7 Itineraries and nature aspects

During our visit we were lucky enough to have a chance to see some of the beautiful nature of the Southern African region. With STIFIMO we visited neighboring South Africa and Swaziland briefly. Entire travel itinerary is shown on the following maps (Source: GoogleMaps).



Places visited within the green square included locations in Mozambique, South Africa and Swaziland.

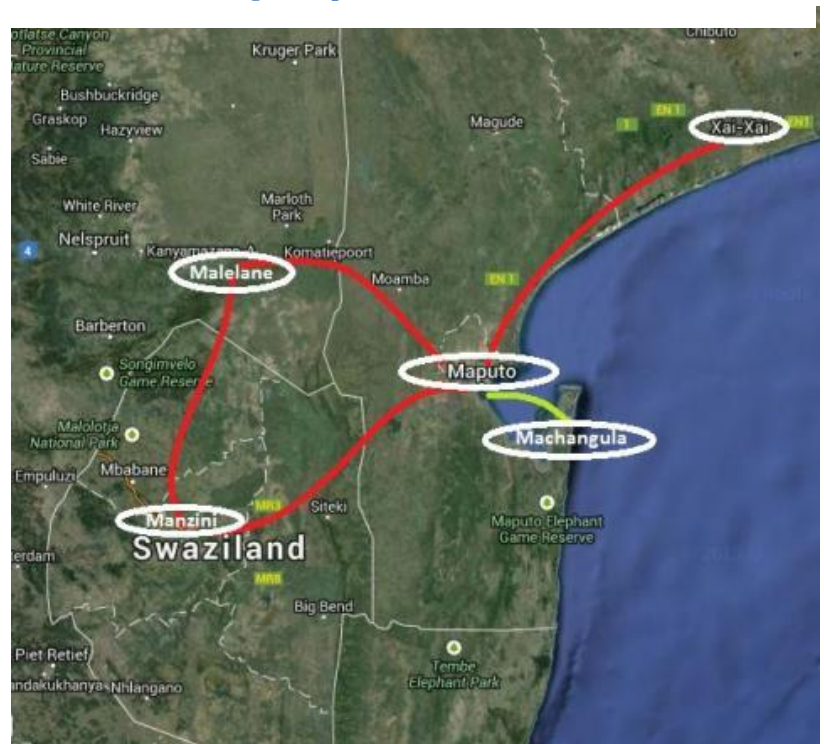
Starting in Maputo our first excursion headed to Malelane region in South Africa, bordering the Kruger National Park. We saw the greater Maputo province towards the border of South Africa with mostly typical Mozambican countryside area and lifestyle. On the way to the border we also noticed some of the local practices for waste management which are not always sustainable. There are possibly several reasons for this but it reminded us of some of the focus points we need to consider when constructing the educational module. Across the border in South Africa we saw the undulating landscape of the Mpumalanga province and its fruit production areas. Kruger Park

presented an example of sustainable eco-tourism and its practical aspects how the nature is maintained in clean condition. In many environments such as this one it may however require strict monitoring.

The next leg of the journey took us to Swaziland and up through the higher hill range of Malolotja National Park and Hawane Nature Reserve. There are a lot of tree plantations in the hills of Swaziland owned or used by the South African forestry processing industry. This is mainly because of the very suitable temperature and soil conditions up in the hills. The views of these plantations are not very natural but very visible and areas are practically right by the roadside in many places. For future reference it would be interesting to visit the plantations and see how they are maintained on a yearly basis. Descending from the hills led us into the administrative capital of Mbabane and the Finnish consulate in Manzini. After the quick consulate visit we continued back to Mozambique via Lomahasha-Namaacha border station arriving at Maputo late in the evening.

The second excursion out of Maputo took us to Madeirarte saw mill and furniture manufacturing close to Xai-Xai town in Gaza province. Attached to the mill unit there is the Honeypot resort which is a great example of sustainability in relation to the saw mill. The staff of the mill also operates the roadside resort offering accommodation and recreational facilities for travelers as well as students doing their thesis or practical training periods at the mill. This is a popular destination for university student excursion groups. On the return trip from Xai-Xai we visited the gorgeous Bilene Beach for lunch. Bilene is also an excellent holiday destination and very popular particularly among Mozambican and South African tourists. Local seafood is also abundant and fresh there and the

Travel itineraries during the trip.



village is located relatively close to the main road and all this makes it a suitable settlement for sustainable tourism.

On the third mini excursion we took a boat from Maputo Marina towards the spectacular Machangula peninsula and Inhaca Island on the other side of Maputo Bay where UEM University has a marine environment research station. The strong tidal waters and the vast Indian Ocean make the area very interesting for environmental study and recreation such as observing marine life, diving, fishing and bird watching. In the sustainability sector there is also the Maputo Elephant Reserve further south from that works as an excellent example of sustainable nature conservation in Mozambique. It was proclaimed in 1932 and currently its extent of 77400 hectares forms part of the Usuthu-Tembe-Futi Transfrontier Conservation Area. A future target for conservation purposes is to link the reserve to eventually form part of the Lubombo Transfrontier Conservation Area, which includes national parks from South Africa, Mozambique and Swaziland.









VAGALHÃO - Higher Education and Capacity-Development for Sustainability and Clean Technologies in the Forest Sector in Mozambique

Background: This joint development program in Mozambique is a collaboration of Aalto University, School of Chemical Technology, Department of Forest Products Technology and Universidade Eduardo Mondlane (UEM), Faculty of Agronomy and Forestry, Forestry Department. The two universities from long-time development partners Finland and Mozambique are working together in higher education capacity development for sustainability and clean technologies.

Why? The outline of the collaboration is to develop the UEM Master's education program in wood technology by adding a study module on industrial environmental engineering. The existing M.Sc. Program offers studies in forestry, agronomy and mechanical wood processing.

Introducing a new module on environmental Technology and engineering will supplement to provide a perspective with comprehensive understanding of environmental matters in clean technologies and dimensions of sustainability related to forestry. Further objectives are to develop UEM capacity to provide services for and to establish links with industry, national sustainability efforts and other higher education institutes.

How? Study program is developed through collaborative workshops with participants from the educational and agricultural forestry sectors as well as the industry and attracted interest groups. Representatives from the areas give their comments and proposals on educational topics and development targets for teaching. Workshops will provide essential information on local aspects to be utilised in curriculum development, so that the tailor-made education can meet the careers' and future needs. Pedagogy and didactics are carefully considered in the curriculum to provide best possible learning environment and outcomes for students. Additionally to contact teaching the module can be constructed. Flexible including excursions and interactive study.

Internationalism, working with different cultures and various styles of teaching as well as project tasks and high pedagogical quality in general are in the core focus of Aalto University. The project aims to continue on these aspects while gaining contact and sharing common ground with local society and nature.

WHEN? Project is running from April 2013 through December 2014. This period will include specialist training in Mozambique, visit by UEM staff and teachers to Aalto for interactive training and workshops and implementation of study module development in Mozambique with field trips and engagement of stake holders and interest groups.






Aalto University
School of Chemical Technology
<https://blogs.aalto.fi/vagalhao>

UNIVERSIDADE EDUARDO MONDLANE
FACULDADE DE AGRONOMIA E ENGENHARIA FLORESTAL

Project coordinator: Dr. Reijo Huggéval [reijo.huggelval@aalto.fi]
Professor, Faculdade de Agronomia e Engenharia Florestal, Dr. Andréia Egos Jaegas [jaegas@gmail.com]
Professor, Clean Technologies Research group, D.Sc. (Tech.), Olli Dahl [oli.dahl@aalto.fi]
Lecturer, M.Sc. Mikko Martikainen [mikko.martikainen@aalto.fi]

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