



Professional Education in Forestry

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Incorporating text from the first edition of *Commonwealth Forests on Technical Education in Forestry* by David Ward

The education of foresters in the Commonwealth has a long history. The earliest formal education appears to have been the programme established at the Royal Engineering College (Coopers Hill, England) in 1885 by German silviculturalist William Schlich, which was specifically intended to train foresters for the nascent Indian Forest Service. It was broadened in scope in 1905, when the School of Forestry was transferred to the University of Oxford (Burley *et al.*, 2004), where training was provided for forest officers serving throughout the then British Empire. Other programmes quickly followed, notably those at the Universities of Aberdeen, Edinburgh¹ (Scotland) and Toronto (Canada) in 1907, Bangor (Wales) in 1908 and Adelaide (Australia) in 1911; by the outset of the First World War in 1914,

¹ A lectureship was established in forestry at Edinburgh in 1889, with the BSc in Forestry first awarded in 1907.

many countries within what is now the Commonwealth had one or more forestry schools.

The rapid expansion in forestry education at the beginning of the 20th century was contrasted with a decline in forestry education at the close of the century. Falling enrolments and the changes in the skills sets needed by professional foresters has caused considerable uncertainty amongst forestry educators. Over the past 20 years, the university-based education of foresters throughout the Commonwealth has been undergoing major and, at times, radical change. This reflects the dramatic changes which have occurred in the roles played by professional foresters, and in the educational backgrounds of those practising in the forestry sector.

This review focuses on the professional education leading to degrees in forestry at Commonwealth

RIGHT AND OPPOSITE

RIGHT Dr William Schlich (*in the middle of the front row*) with forestry students on a visit to Saxony, Germany in 1892 and OPPOSITE contemporary students in Victoria, Australia.





universities². Although the distinction between many diploma courses and degrees has become blurred, a possibly artificial distinction was made in the first edition of *Commonwealth Forests* between programmes that lead to diplomas (considered as technical education) and programmes that lead to degrees (considered as professional education). The complexity is illustrated by the range of programmes that have been accredited by the UK Institute of Chartered Foresters. Their website lists 12 different types of qualification offered at 18 different UK institutions and University College Dublin, and many are now offered by the same institution. For example, Bangor University offers six Master of Science (MSc) programmes, two Bachelor of Science (BSc), two Post-Graduate Diplomas (PGDip), one

² A list of Commonwealth University Faculties and Departments offering training in forestry is at Annex 7.

Higher National Diploma (HND), one Higher National Certificate (HNC) and one Post-Graduate Certificate (PGCert), all of which are accredited. Of the 54 different programmes that the Institute has accredited, only 12 lead to a traditional university undergraduate degree.

■ Technical vs. professional education

The relationship between technical training and professional training is complex and becoming increasingly indistinguishable, particularly with the growing use of MSc programmes to provide either bridging training or to supplement an existing forester's knowledge. At what point does training in technical matters, traditionally taught in technical education courses, become training in knowledge-based skills, traditionally taught in professional schools? This debate is complicated by the increasingly fine distinction between forestry





professionals and trained technicians: for example, the Association of British Columbia Forest Professionals includes both Registered Professional Foresters and Registered Forest Technologists, although the two categories are kept very separate in relation to permitted activities.

The trend from technical school to university is illustrated by the teaching of forestry at Kwame Nkrumah University of Science and Technology in Ghana. According to its website, the Faculty of Forest Resources Technology (FFRT) started in 1922 as a three-year combined Agriculture and Forestry Training school at the Cadbury Hall in Kumasi, Ghana, to train forest technicians for the newly established Forestry Department of Ghana. In 1943, the Forestry Training School was moved to Sunyani and renamed Sunyani Forestry School (SFS) and offered a three year certificate course in Forestry. The School was upgraded to a three-year diploma College and renamed the College of Renewable Natural Resources (CRNR) in 1999 in affiliation with the Kwame Nkrumah University of Science and Technology (KNUST). In 2003 the College was transferred to KNUST. CRNR became the third faculty under the College of Agriculture and Natural Resources of the KNUST in August 2005. The Sunyani Campus has a Department of Silviculture and Forest Management, whereas the main campus of KNUST, in the Faculty of Renewable Natural Resources, has Departments of Agroforestry, Freshwater Fisheries and Watershed Management, Silviculture and Forest Management, Wildlife and Range Management and Wood Science and Technology.

The artificial distinction between diploma-based and degree-based programmes fails to take into account that many universities will provide credits to those with a diploma, enabling them to enter into the later years of a degree programme. In some cases, such courses have been successful but, in the case of Makerere University, Uganda, the programme designed to enable diploma

students to upgrade to a full degree has not been well-received by students. On the other hand, the first jobs of many university-trained foresters are in technical positions, and the skills that they have learnt at university may quickly be lost. The relatively low pay and often difficult working conditions associated with such positions can also act as a disincentive to those entering the profession. Many practising foresters consider that there is too much superfluous material taught in degree programmes, whereas the material (particularly the field skills) they really need is not taught in sufficient depth.

Technical education in forestry is facing the same problems as professional education, with declining enrolments (see below), declining resources and the closure of some schools. For example, Temu *et al.* (2003) argue that technical training in forestry in Africa has almost disappeared since 1999. This has created problems for the recruitment of trained forest technicians, particularly in Africa, where the problem seems to be most acute. The number of colleges offering such training has been in decline for some time, and the further occurrence of skills shortages seems likely.

At the same time, there is growing recognition amongst professional forestry associations that there is a need for continuing education amongst their members. This is hardly surprising given the pace of change in the forestry profession – not only in its breadth but also in its depth. As argued in *Chapter 4*, the professional associations need to ensure that the skills of their membership are continuously updated, and the educational capacity at universities and training colleges seems a logical way of achieving this.

■ Enrolment

A trend that is apparent in some parts of the Commonwealth is the falling numbers of individuals seeking to study for a traditional forestry degree. This trend is not restricted to the Commonwealth and, with an estimated



30% decline in enrolment globally (Temu and Kiwia, 2008), it is now recognised as a global crisis facing the professional education of foresters (Van Lierop, 2003, Miller, 2004). While many Commonwealth countries, particularly the small island nations, have no forestry education capacity, others have closed their institutions (the Oxford Forestry Institute has been “suspended”), and more closures are anticipated in the near future. The UK has seen a dramatic drop in applications for traditional forestry courses, from 325 in 1996 to 156 in 2003 (Burley *et al.*, 2004). Figures for Canada also show a decline. The number of students enrolled in forestry programmes decreased from 1,881 in 1995-1996 to 1,463 in 2003-04 (Innes, 2004), and if the students studying in areas such as natural resources conservation and wood science and technology were excluded, the drop in numbers would be far greater. At the same time, there is still a demand for trained foresters, and some countries are beginning to report shortages of suitably qualified forestry graduates.

■ What’s in a name?

The reasons for the decline in forestry enrolments are complex. They have occurred at a time when the demand for university-based education has been increasing, although enrolments in many of the sciences have been decreasing. There are two possible groups of reasons for the decline. The first is that prospective students are simply not aware of forestry. Forestry is not generally taught at the secondary level, and many students are unaware that there is even a discipline called “forestry” and so do not actively seek it out on on-line application websites.

The second set of reasons is based on the premise that students are aware of the discipline, but are making a conscious decision not to enter it. Various reasons have been put forward for this. For example, Temu and Ogweno (2007) consider that it can be attributed to the



purported failure of forestry education to respond to the rapidly changing social, economic and political environments within which forestry is practised. Added to this, the current character of forestry education is not market-orientated (Temu and Kiwia, 2008). Luckert (2004) relates the decline to reduced job opportunities for professional foresters. Weston and Whittaker (2009) propose a more subtle explanation, arguing that students associate the discipline of forestry with an activity undertaken by technicians rather than university graduates. Yet another explanation is that the term forestry has become irreversibly associated with the destruction of forests, rather than with their care and nurturing.

Is forestry a discipline worthy of a university education, or is it a technical subject for which a non-university diploma is sufficient? Forestry as a broad academic discipline includes the full range of forest-related natural and social sciences. However, in most universities, forestry has never been considered sufficiently important to rank its own Faculty. Where it has, these faculties are often small relative to the rest of the

ABOVE
Students in the
International
Forestry course at
the University of
British Columbia,
Canada.



university and in danger of amalgamation with other faculties. This partly reflects the decline in enrolment into traditional forestry programmes, and a number of different approaches have been adopted in an attempt to shore up student enrolment. Some universities have changed the names of their forestry departments in the belief that the terms “forestry” and “forester” have too many adverse connotations. Others have lowered their entrance standards, a policy that has repeatedly been shown to be ill-advised.

Where it is still used in an institution’s title, the term forestry is often paired with other activities. For example, the University of Port Harcourt (Nigeria) has a Faculty of Forestry and Wildlife Management, Makerere University (Uganda) has a Faculty of Forestry and Nature Conservation, the University of Calabar (Nigeria) has a Faculty of Agriculture, Forestry and Wildlife Management, Sri Jayawardenepura University in Sri Lanka has a Department of Forestry and Environment Science, the University of Chittagong in Bangladesh has an Institute of Forestry and Environmental Sciences, and the University of Ibadan (Nigeria) has a Faculty of Agriculture and Forestry. Sokoine University of Agriculture in Morogoro, Tanzania, has a Faculty of Forestry and Nature Conservation that still contains many of the Departments that have largely disappeared elsewhere, namely Forest Biology, Forest Economics, Forest Engineering, Forest Mensuration and Management, Wildlife Management and Wood Utilisation.

A few forestry schools have been able to avoid the trend for reduced enrolments, but generally, forestry faculties have been amalgamated with other faculties, or forestry has been dropped altogether. In Australia, for example, there have never been separate forestry departments (Kanowski, 2004) and the Department of Forest and Ecosystem Science at the University of Melbourne is a part of the Melbourne School of Land and Environment. The forestry programme at the

Australian National University is based in the Fenner School of Environment and Society, whereas the forestry programme at Southern Cross University is based in the School of Environmental Science and Management (which is now responsible for the leading four-year undergraduate programme in forestry in Australia). At the University of Queensland, the forestry programme is based in the School of Integrative Systems.

There have been many changes since the first edition of this book. In one of the few examples where forestry has been “promoted”, the Department of Forestry and Range Management at the University of Arid Agriculture Rawalpindi (Pakistan) was formerly located within the Faculty of Livestock and Range Management, but is now in the Faculty of Forestry, Range Management and Wildlife. In most cases, Faculties and Departments of Forestry are being subsumed into other academic units. In the UK, the Department of Forestry at the University of Aberdeen merged with the Departments of Agriculture, Zoology and Plant and Soil Science to form the School of Biological Sciences: programmes in Forestry, Forest sciences and Forest Conservation are offered. The School of Agricultural and Forestry Sciences at the University of Wales in Bangor was renamed the School of the Environment and Natural Resources (and then School of Environment, Natural Resources and Geography) and located in the College of Natural Sciences. Like the University of Oxford, the University of Edinburgh no longer offers an undergraduate degree in forestry (although an honours degree in Ecological Science, with a specialisation in forestry, is available), and the MSc in forest ecology and management offered by the School of Geosciences has been dropped since the first edition. Similarly, the University of Kwa-Zulu Natal in South Africa offers a specialisation in forestry within its BSc in Agriculture (College of Agriculture, Engineering and Science).

The name change is quite subtle, and in many cases, the term “forestry” is being replaced by “forest”, or a

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compound thereof (e.g., forest ecosystem science). An example is provided by the University of Stellenbosch, South Africa, which has a Department of Forest and Wood Science (in the Faculty of AgriSciences) offering undergraduate programmes in Forest and Natural Resource Management and in Wood Products Sciences.

A trend that seems to be strengthening is the tendency for forest-related degrees to be offered by a range of other disciplinary departments. For example, the Faculty of Agriculture at the National University of Rwanda offers a Masters degree in Agroforestry and Soil Management. The Copperbelt University in Kitwe, Zambia, offers a Bachelor of Science (Agroforestry), as well as a Bachelor of Science (Forestry). Both are offered through the School of Natural Resources. The University of Uyo (Nigeria) offers a Bachelor of Agriculture (Forestry and Wildlife) through its Faculty of Agriculture.

Some forestry schools have maintained their connections to the discipline. The New Zealand School of Forestry at the University of Canterbury, New Zealand, the Department of Forestry at the Papua New Guinea University of Technology, the Department of Forestry and Wood Technology at the Federal University of Technology, Akure, in Nigeria, and the Faculties of Forestry at the University of British Columbia and Universiti Putra Malaysia are examples. However, very few Commonwealth universities have Forestry Faculties that integrate across the full range of forestry activities, from the forest to the product, and most universities now only provide education in a part of the range of forestry activities.

Should the last remaining Departments and Faculties of Forestry change their name? There are no clear answers to whether or not the discipline of forestry should remain distinctive. For some, there are advantages in maintaining the whole, especially with the rise of interest in environmental issues and origin of products. Wood products are increasingly linked to their

origin through the chain-of-custody requirements of certification – many people wish to know whether a product they are purchasing is derived from a sustainably managed resource. Those working in forestry faculties generally have a common interest, namely forests and their products, and the synergies that can be developed through people from different academic backgrounds working together on common problems is substantial. Those advocating the dissolution of forestry as a discipline point to the falling enrolments in traditional forestry programmes, the advantages of “forestry” students receiving training in a range of different faculties, and the advantages associated with having faculty members located throughout a campus rather in one single place.

■ The changing nature of forestry education

In a seminal report, Temu and Kiwia (2008) identify a number of areas where forestry education needs to change. They recommend a number of actions that are needed, including:

- Restructuring forestry education and practice to address environmental and other cross-cutting issues such as food security and poverty;
- Including the management of shrub lands and areas with low forest cover in forestry education;
- Reinforcing courses in forest governance and ethics;
- Initiating a global mechanism to stimulate stronger investment in forestry education, particularly the re-training of educators, review of curricula and development of new and relevant learning resources;
- Making forestry education strategic and relevant to youth and women through well-integrated programmes that reflect the broadened mandate of forestry;
- Strengthening human resources capacity in the management of trees outside forests; and
- Improving collaboration between higher institutions.



While the report was directed at forestry education in Africa, the recommendations are equally valid for many other developing countries in the Commonwealth, and also have relevance for the Commonwealth's developed countries.

Concurrent with the changes in the nature of the forestry profession, the background of those teaching forestry has changed (Nair 2004, Temu *et al.*, 2006). Traditionally, it was viewed as a discipline rooted firmly in the natural sciences. Key contributions to a programme were made by courses in biology, chemistry, physics and other natural sciences. This is because forestry was for long considered to be only about managing forests. However, with the growing recognition that forestry is actually about responding to the needs of forestry stakeholders (Luckert, 2006, Temu and Kiwira, 2008), a range of contributions from the social sciences has been increasingly incorporated. As a result, a teaching unit dealing with forest management might still contain silviculturalists, neo-classical economists and biometricians, but these would be augmented by geographers, anthropologists, psychologists, planners, business managers, hydrologists and engineers.

This broadening of the discipline of forestry has created problems. Many universities now offer a forestry degree that consists of an amalgam of courses provided by a range of departments and faculties across the university. Although there are notable exceptions, some such programmes have little cohesion and may lack teaching in some of the basic skills demanded of foresters (Temu and Kiwira, 2008).

A second problem associated with forestry's broadening mandate is that the range of material that a "general forestry practitioner" is now expected to know is so great that there is little chance of acquiring this within a three- or four-year degree programme, especially as the first year of many university programmes is spent trying to remedy some of the deficiencies of the

school system. One possibility may be to move to a new system of education, with the required basic social and/or natural science being offered in a three- or four-year first-degree programme, and a more specialised knowledge in a particular aspect of forestry being developed in a post-graduate degree. In Europe, there has already been substantial progress towards two-cycle degrees, as agreed through the Bologna Process³, and second-cycle degrees, such as the MSc programmes in Sustainable Tropical Forestry and Sustainable Forest and Nature Management offered through the European Erasmus Mundus programme⁴ are heavily over-subscribed (only one Commonwealth university, the University of Wales, is associated with this initiative).

Within the Commonwealth, a programme with some similarities to the European Union MSc programmes has been established in Australia. The National Forestry Masters Program represents a collaboration between the Australia National University, Southern Cross University, the University of Queensland, the University of Melbourne and the University of Tasmania (Bull and Kanowski, 2009). Students can enrol at any of the five universities, but can take courses offered by other universities in the partnership. A non-traditional course format has been adopted, and many of the individual courses are taught in intensive two-week blocks. This makes it much easier for those in employment to complete the programme. The approach is well-suited to the "Melbourne Model", in which students take a three-year general undergraduate degree, leaving any professional training to the MSc level, and indeed the majority of students enrolled in the National Forestry Masters Program have done so at Melbourne (Weston

3 The Bologna Process of reforms and standardisation of European higher education. See http://ec.europa.eu/education/policies/educ/bologna/bologna_en.html.

4 The Erasmus Mundus programme is a cooperation and mobility programme in higher education, which promotes the European Union as a centre of excellence in learning around the world. See http://ec.europa.eu/education/programmes/mundus/index_en.



RIGHT
Waterlogged palm trees in Bangladesh – issues concerning land management are covered in the many new courses that refer to integrated resource management or integrated land management.



and Whittaker, 2009). This general type of undergraduate degree, which may presage the end of more specialised undergraduate degrees, has been adopted in the Commonwealth by the Universiti Brunei Darussalam, amongst others.

These problems have also created opportunities. The diversity of knowledge has enabled the broadening of the expertise in some departments and faculties, encouraging more inter-disciplinary research. The changing requirements have enabled the more adaptable universities to move forward and to explore new programme delivery methods such as on-line courses using some of the rapidly evolving teaching technologies. A range of new teaching techniques are being explored, and forestry lends itself to some of these. This in turn has pushed many forestry academics into exploring new technologies and new areas of research and teaching, to the benefit of all (Nair, 2004). However, many of these new

technologies have yet to be exploited to their full potential (Längin *et al.*, 2004).

There has been some progress in broadening the traditional field of forestry. This is evident in the many new courses that refer to integrated resource management or integrated land management. However, in many of these, the forestry component is minor, if it exists at all. There is also evidence that the educational institutes are beginning to recognise some of the special needs associated with particular segments of society within the Commonwealth. For example the University of British Columbia has recently introduced a “Specialisation in Community and Aboriginal Forestry” to its Forest Resources Management Major. The new specialisation allows students to gain a better understanding of the political and socio-economic context of Aboriginal forestry in Canada, and has the potential to fill a major gap in many other Commonwealth (and non-Commonwealth) countries.



■ Examples of forestry degrees on offer

Despite the rapid changes, there are still many potential opportunities for forestry degrees throughout the Commonwealth. For example, in addition to the South African programmes mentioned above, several universities in Kenya offer forestry and/or forestry-related courses. The programme at Moi University in Kenya appears to be particularly strong, with undergraduate degrees offered in Forestry, Agroforestry, and Wood Science and Industrial Processing. In addition, graduate programmes are offered in forestry and in wood processing, with the latter including specialisations in wood composites, wood bio-deterioration, wood preservation, pulp and paper science, sawmilling, wood mechanics and timber engineering. At Makerere University, Uganda, the Faculty of Forestry and Nature Conservation offers Bachelor's degrees in forestry, community forestry, and wood science and technology and post-graduate degrees in forestry and agroforestry. A degree in forestry is also offered by the Universidade Eduardo Mondlane in Mozambique while in Ghana, Kwame Nkrumah University of Science and Technology in Kumasi previously only offered a BSc in Natural Resources management but, in 2005, it introduced a new BSc programme in Forest Technology. In Nigeria, the Federal University of Technology, Akure, offers a Bachelor in Agricultural Technology in Forestry and Wood Technology.

Some universities offer degrees that incorporate one or more courses in forestry. For example the Faculty of Science and Agriculture at the St Augustine campus (Trinidad & Tobago) of the University of the West Indies offers a single course in Tropical Forest Ecology and Management, which can be taken as part of a non-forestry degree. Similarly, the BSc in Natural Resources Management offered by the University of Belize has a single forest-related course, in forest ecology and management. Such courses, while valuable, are clearly

not designed to train professional foresters in all the skills that they now require.

The Commonwealth countries in Asia also have a range of options although they differ markedly between countries. For example, in India, a number of state agricultural universities and general universities have started first degree forestry courses, based on the recommendations of National Commission on Agriculture. However, many forestry professionals are initially trained in a non-forestry subject, and then go on to study forestry at a post-graduate level at an institution such as the Indian Institute of Forest Management in Bhopal (which received an award as the best government business school in India in 2009), or to receive PhD training or postgraduate diploma courses in Pulp and Paper Technology, Wood Technology or Plantation Technology at the Forest Research Institute Deemed University in Dehradun.

The Department of Forestry and Environmental Science of the University of Sri Jayewardenpura in Sri Lanka offers a BSc programme in Forestry and Environmental Science. The University of Peshawar, Pakistan, partners with the Pakistan Forest Institute to offer both a BSc and an MSc in Forestry. In Malaysia, forestry degree programmes are offered by the Universiti Putra Malaysia and the Universiti Malaysia Sabah. Such opportunities ensure that there are a number of professional foresters being trained in the Asian Commonwealth countries.

A variety of forestry degrees are on offer in the United Kingdom, Canada, Australia and New Zealand. These range in content and structure, from very applied courses specifically designed for those entering a forestry career to more theoretical or science-based based courses designed for individuals pursuing careers in the forest sciences or other non-forestry careers. The New Zealand School of Forestry at the University of Canterbury offers a Bachelor of Forestry Science degree,

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The Virtual University for Small States of the Commonwealth (www.vussc.info) is committed to the collaborative development of open content resources for education, training and capacity building, and the use of information and communications technologies to broaden access to education.



and also offers a combined engineering and forestry degree (Bachelor of Engineering – Honours). In Canada, amongst many programmes on offer across the country, the University of British Columbia offers five distinct Bachelor of Science degrees, in Wood Sciences, Forest Operations, Forest Resources Management, Forest Science and Natural Resources Conservation. The University of New Brunswick offers two Bachelor of Science degrees, in Forestry and Forest Engineering, whereas Laval University (Quebec) offers three first-degree programmes: Forest Operations, Wood Science and Forest Management and Environment. A range of other degrees are available in Canada, depending on the university.

It is quite likely that the next few years will see major changes in the nature of programmes being offered at Commonwealth universities. The National Forestry Masters Program in Australia provides an example of one pathway. Courses are developed and given by individuals at multiple universities – students are able to move freely between the universities. However, the traditional face-to-face approach is still being used for the delivery of the courses. The Virtual University for Small States of the Commonwealth provides an indication of the potential direction in which specialised forms

of education such as forestry training may take. Open content resources are being developed and delivered remotely, using modern communications technologies to maintain contact between students and instructors.

■ Accreditation⁵

The proliferation of degree programmes containing an element of forestry has presented a challenge to those trying to ensure that the standards of forestry education are maintained. The Institute of Foresters in Australia, the Institute of Chartered Foresters in the UK and the Canadian Forestry Accreditation Board are examples of organisations that specify the requirements of forestry education. Should attempts be made to suppress such courses, thereby both ensuring that standards are maintained and protecting the more traditional forestry programmes from competition? To a certain extent, this is already occurring within the profession. Within Canada, for example, a number of provinces have right to title legislation that states that only registered professional foresters have the right to use the title “forester” or practise forestry. This can be problematic, as what constitutes the required training for a forester

⁵ See also *Chapter 4* for a description of professional forestry institutes and associations.



Stellenbosch University is an academic institution of excellence, and a respected knowledge partner, which contributes towards building the scientific, technological, and intellectual capacity of Africa. The Department of Forest and Wood Science is the oldest forestry and wood science university department in South Africa with a proud history going back nearly 80 years. It prides itself in the role that it plays in the development of the South African forestry industry through the education and training of forestry graduates, internationally recognised research, and support to national forestry initiatives.

The Department serves as an integrated research and education centre where national and international researchers and students work together on forestry and wood product research and development issues. It is well positioned within Africa to provide academic services, an aspect is recognised by our international academic partners who see the Department as an entry point into Africa and by African students who see Stellenbosch University as a preferred place of study.

The Department prides itself in the fact that it can provide academic services based on the full forestry and wood product value chain from raw material to final product. These services are provided by a core staff compliment of nine academics, and nine support staff. It also relies on six extraordinary visiting professors to assist with research and teaching

The Department offers a four-year Bachelor of Science degree in forestry as well as Honours, Masters and Doctoral programmes. Students can choose within these academic programmes between directions in Forest Sciences and/ or Wood Products Science. Postgraduate academic and research activities are tailored to each student's research interests and foreign students are encouraged to focus on research pertaining to forestry problems in their home countries.

Research at the Department of Forest and Wood Science focuses on:

- Precision forestry.
- Integrated land use management initiatives.
- Biomass and bio-fuel production initiative.
- Wood quality from the plant to the product.

These focus areas are used to strengthen collaboration between researchers responsible for different aspects of the forestry value chain. Central to the research activities at the Department, is collaboration with international partners. The Department has collaborative agreements with a large number of universities and research institutions in Africa, Europe, the USA and Canada.

Stellenbosch University is recognised as one of the four top research universities in South Africa. It takes pride in the fact that it has one of the country's highest proportions of postgraduate students of which almost ten percent are international students. The Department of Forest and Wood Science aims to be the preferred supplier of world-class education, research and outreach in Africa. It offers post-graduate degrees tailored to the individual research interests of students who enroll in the following post-graduate degree programmes:

- Honours in Forestry and Natural Resources Science (BScForHons)
- Masters in Forestry and Natural Resources Sciences (MScFor)
- PhD in Forestry and Natural Resources Sciences (PhD(For))

Students can specialise in Forest Science and/or Wood Product Science within these programmes. From 2012 a Post Graduate diploma in Forest and Wood Science will also be offered. The one-year Honours programme has a 75% coursework component while the Masters and PhD programmes have a 100% research focus.

The Department of Forest and Wood Science welcomes prospective students and researchers from across the world who are interested in joining our small but dynamic forestry family at the southern tip of Africa.

Students interested in studying at Stellenbosch University can contact Ms. Ursula Petersen:

Tel: +27 21 808 3323

Fax: +27 21 808 3603

E-mail: wood@sun.ac.za

www.sun.ac.za/forestry





Learning Outcomes

TABLE
5.1

The following learning outcomes are required by the Canadian Forestry Accreditation Board before a particular university programme can be accredited:

- An understanding of the science of forest ecosystem structure, dynamics and processes;
- An ability to identify, formulate and solve forest problems;
- An ability to communicate orally and in writing with a variety of audiences including foresters, other professionals, Aboriginals, politicians, groups with special interests and knowledge concerning forestry and the general public;
- An ability to understand the relationships among the natural resources and possess the skills and knowledge to integrate a variety of uses and values in land and resource management plans;
- An understanding of professional and ethical responsibilities, including membership in professional associations;
- A broad global perspective of forestry issues and challenges;
- A recognition of the need for and the ability to engage in lifelong learning;
- A recognition of the need to participate actively in the overall community in which the graduate is a part;
- A general knowledge of contemporary issues affecting forestry;
- An ability to work well with others;
- An ability to work as a team member;
- An ability to lead and supervise effectively; and,
- An ability to work in the forest.

in one jurisdiction may not count in another. Much the same applies to universities. For example, the Faculty of Graduate Studies at the University of British Columbia does not recognise the degrees and certificates issued

by the Indian Institute of Forest Management, but does recognise the Indian Forest Service qualifications issued by the Forest Research Institute Deemed University in Dehradun.

Expected Competencies

TABLE
5.2

Standard 3 of the Canadian Forestry Accreditation Board deals with forest management. Under each heading, there are a number of specific tasks – only those from the first heading are given. Readers are referred to the original document for the remaining tasks (source: www.cfab.ca/English/PDF/Standard3-3.pdf).

The basic principle being espoused is that forest ecosystem management balances ecological, social and economic demands with the capacity of forest resources to provide for present and future values.

Graduates of an accredited programme are expected to be able to:

- 1** Describe the variety of values and competing interests in a forest.
 - a** Identify and describe the range of values (timber and non-timber) in a forest.
 - b** Identify the interests and rights present in a forest including Aboriginal Peoples' rights, claims and interests in forests and the importance of implementing processes to determine and address them.
- c** Describe the requirements of and interaction among these values.
- d** Describe the effect and implications of decisions aimed at a given set of objectives.
- e** Describe how values and competing interests are or can be weighed/balanced in decision-making.
- 2** Explain forest strategic and operational planning principles.
- 3** Analyse and apply a range of forest cover manipulation strategies that effectively achieve a given set of objectives while minimising negative impacts on other values.
- 4** Explain the legal and policy framework.
- 5** Discuss forest management concepts.
- 6** Describe how global trends drive and influence forest management.
- 7** Develop a resource planning document that incorporates current economic, environmental and social values into actions that lead to achieving the planning objectives and to future desired conditions and goals.



The Canadian Forestry Accreditation Board has recently reviewed its accreditation process. There is now a focus on learning outcomes (see *Table 5.1*), rather than rigid adherence to a particular set of courses. Each programme must ensure that its curriculum adequately covers each of seven areas of competence: tree and stand dynamics, forest to landscape, forest management, economics and administration of forestry, leadership skills, information acquisition and analysis and professionalism and ethics. Within each area of competence, there is a list of areas that are expected to be covered but, more significantly, there is now a list of expected competencies (see *Table 5.2*).

The diversity of expert skills is apparent in many other programmes. For example, a graduate with a BSc in Agroforestry and Development from Moi University in Kenya is expected to be able, amongst other things, to maintain and improve the quality of the environment through agroforestry, to manage agroforestry resources for multiple benefits on a sustainable basis, to plan, mobilise resources, implement, monitor and evaluate agroforestry development projects, to participate in the process of land use policy formulation and implementation, to identify community needs, and offer advisory and extension services, and to venture into entrepreneurship and marketing.

■ Networking

Traditionally, a large number of professional foresters in the Commonwealth were trained by the University of Oxford. However, with the decline and eventual demise of Oxford Forestry Institute, there have been questions raised about a successor. Interestingly, there is now an Oxford Centre for Tropical Forests, which appears to be filling the gap left by the closure of the Institute. Many universities are hampered by local forestry accreditation requirements, a system that has ensured that traditional standards are maintained but which have often resulted in priority being given to local issues. A notable excep-

tion is the School of International Tropical Forestry at the Universiti Malaysia Sabah. This school offers undergraduate degree programmes in "International Tropical Forestry", "Nature Parks and Recreation", "Forest Plantation and Agroforestry" and "Wood Fibre Industry and Technology", and an MSc in Tropical Agroforestry. It specifically caters to international students.

Some schools have succeeded in adopting a leadership role in the professional education of foresters, such as the forestry programmes offered in South African universities (principally the University of Stellenbosch). For countries such as Swaziland and Lesotho, this may be one of the few opportunities for professional forestry education. There have been some interesting networking opportunities that have developed. For example, using the Canadian University Partnerships in Cooperation and Development Programme, the Centre for Advanced Wood Processing at the University of British Columbia, Canada, has teamed up with Stellenbosch University and Nelson Mandela Metropolitan University to deliver first-degree educational programmes in value-added wood processing. A specific objective of this programme is to strengthen partnerships between South Africa's forestry educational institutions and the private sector and the communities they serve, and increase the educational opportunities for persons from disadvantaged backgrounds.

Outside South Africa, several forestry schools in Africa, including the University of Ibadan (Nigeria), Makerere University (Uganda) and Sokoine University of Agriculture (Tanzania) played important roles in educating foresters from a number of countries in the 1970s and 1980s, but the level of international recruitment at each of these institutions has declined since the 1990s (Temu *et al.*, 2006). Similarly, the degree of cooperation between the various forestry schools has declined, and efforts to revive cooperation and coordination have met with mixed success (Kiyiapi, 2004).



The International Partnership for Forestry Education

BOX
5.1

*By Hosny El-Lakany, Director, International Program,
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Management of forest resources has become an interdisciplinary task calling for a new "breed" of forest professionals qualified to address the three pillars of sustainable forest management (environmental, economic and social aspects) simultaneously. Forestry graduates need to be trained in outreach, cross-sectoral planning and adaptive management involving other sectors such as agriculture, rural development and energy. Traditional forestry is giving way to forests increasingly managed by communities for their essential goods and services within the context of national development strategies and global issues. As this task is believed to be beyond the capabilities and capacities of several forestry schools around the world, some modalities for advancing forestry education have been proposed, including collaborative partnerships. The International Partnership for Forestry Education (IPFE) has thus been created as a voluntary forum for coordinating efforts to improve forestry education, conceived as a new global network of networks to share information, experiences, resources and skills about forests and forestry education.

IPFE's Vision

Forestry education is responsive to global needs and contextualised in locally relevant social, economic and ecological settings.

IPFE's Mission

Helping institutions concerned with forestry education meet societies' needs, through facilitating forestry educators' and students' engagement with relevant knowledge and understanding among each other, and with society.

Currently, IPFE's Secretariat is shared between the University of British Columbia, Canada and the University of Joensuu, Finland. The partnership has nearly 40 members comprising universities, international research centres, inter-governmental organisations, international NGOs, regional research and education networks and the International Forestry Students Association (IFSA).

Some of the recent IPFE-supported activities included:

- Regional Forest Education Workshops in Africa, Asia-Pacific and Latin America;
- International Canada-China Forestry Education Symposia in Beijing and Vancouver;
- Forestry Education session at the 13th World Forestry Congress in Argentina, 2008;
- Development of e-learning in forestry in collaboration with Freiburg University, SILVA Net and others.

For more information about IPFE governance, membership and activities visit, www.ipfe.fi.

A special case that deserves mention is the Réseau des Institutions de Formation Forestière et Environnementale d'Afrique Centrale (RIFFEAC). This francophone network of Central African forestry training institutions includes the University of Dschang in Cameroon, and since its establishment in 2001, appears to have been reasonably successful in promoting cooperation in forestry education in the Congo Basin (Kiyiapi, 2004). However, like many such programmes, it suffers from inadequate resourcing.

One global organisation that offers some potential is the International Partnership for Forestry Education,

established in 2006. This has the mandate to support and improve forestry education, but is critically under-resourced. A description of the network is provided in *Box 5.1*.

■ The perspective of forest students

In any discussion of forestry education it is important to consider the views of students. There is no organisation in the Commonwealth solely devoted to forestry students, but there is a global organisation for forestry students: the International Forestry Students Association. In a document prepared for the World Forestry



Congress in 2009, the *Global action plan for forestry education*, IFSA (2009) recognises four major issues: lack of societal recognition of the importance of forests and their management, lack of forestry and environment education institutions, lack of financial means to implement an efficient education within already existing institutions, and a need for adaptation of the curricula and methods to changing requirements.

IFSA (2009) goes on to recognise a number of other problems, noting the decline in enrolments discussed above, the inadequate investment in the forestry sector, and the poor integration of emerging themes such as biodiversity, climate change, environment and agroforestry into traditional forestry curricula. While their action plan is a work in progress, it does contain an important conclusion, namely that forestry education will only succeed if it is integrated with a well-recognised, interesting and performing forest sector.

■ Professional forestry education at Commonwealth universities: outlook

The teaching of forestry at Commonwealth universities faces some significant challenges. In countries such as the UK, Canada, Australia and New Zealand, forestry has for some years no longer had the attraction for students that it once did, despite the availability of jobs. Similar trends are reported from the African forestry universities (Temu *et al.*, 2006). The universities have tried various tactics to stop this decline, with varying degrees of success. It is apparent that many programmes at traditional forestry universities are failing to adapt to the changing requirements for foresters, creating an opportunity for new programmes to develop. In Canada, for example, the forest management programmes at the Universities of British Columbia and Northern British Columbia are experiencing difficulties with local recruitment (although international recruitment is increasing at UBC), whereas a new programme in Natural Resource

Management developing at Thompson Rivers University appears to be successful.

Forestry programmes in some of the African countries face a range of problems, including poor enrolments, lack of teaching capacity and lack of equipment in some universities (Dyer and Wingfield, 2004). Many of the African forestry programmes have adapted to the changing needs of forestry professionals, strengthening the social aspects of forestry and providing better opportunities for fields such as agroforestry. In some quarters, there is a strong feeling that forestry education should better address the needs of individual countries in sub-Saharan Africa, specifically poverty eradication and food security, in addition to the global needs of employment and a clean environment. Temu and Kiwia (2008) point out that many global policy fora have affirmed the importance capacity, yet funding of education remains well below the level needed to generate that capacity.

A major problem facing the forestry programmes in most Commonwealth universities is the way in which they are viewed within their respective universities. Forestry is often seen as little more than technical training, and is sometimes viewed as a subject taken as a last resort by struggling students. This view has not been helped by some schools dropping their entry standards in an attempt to bolster applications. There is little evidence of forestry being seen on an equal footing to other disciplines, a problem that is particularly acute because of the affinity of most programmes with the natural sciences. The need to incorporate more social science in forestry programmes may aggravate the problem, and a fundamental re-evaluation is needed of the place of forestry in the academic world.

It is always difficult to look into the "crystal ball", but it is apparent that the forestry education in the Commonwealth will have to change from its current approach. What will be the nature of those changes?



There are mis-matches between the demand for graduates and enrolments, between teaching capacity and teaching demands, and between what is currently being taught and the skills needed by graduates. There are solutions to some of these issues, although low enrolments will remain a challenge. Students located at any particular university face the challenge of acquiring the diversity of skills needed to practise forestry from a limited, and potentially shrinking, number of instructors.

Several options exist to resolve this. They could make greater use of on-line teaching resources, if they were available. However, there needs to be a better system available for the exchange of course materials among universities, and a suitable mechanism in place to ensure that appropriate payments are transferred between universities for the use of such materials. Such courses are greatly enhanced by having a "real" person supervise a student's learning experience, and this may present challenges for faculty members. However, they should not be insurmountable. Modern technologies, such as distance education, have opened up enormous opportunities in this area, but to date have not been properly exploited.

Students could also be more mobile. There are currently no opportunities such as the Erasmus Mundus programme of the European Union, despite the clear possibilities for developing such exchanges. The National Forestry Masters Program in Australia has shown that student mobility is feasible, at least within a country, and most universities in the developed world have strong academic exchange programmes. There is a need to ensure that all Commonwealth universities engaged in forestry education can offer such opportunities. This will require a greater awareness of what is available at each institution offering a forestry education, and also some form of international course and university accreditation.

The other element of mobility surrounds faculty members. While most universities have established

systems for awarding sabbatical leave, this is unlikely to resolve the issue of getting the right people to the right location at the right time. Innovative solutions are required for this, as universities (and education administrations) generally give little credit to individuals who are willing to devote time to such work. In many cases, it may be necessary to move away from the traditional term or semester approach to education and instead adopt a system of short, intensive courses, as used for example in the Australian National Forestry Masters Program.

Another issue concerns the training of university-based educators. Many have been trained in traditional forestry, and are ill-equipped intellectually to deal with the new types of problems and issues that today's foresters need to resolve. For example, we have not been successful in training students with an international perspective who could play an active role in some of the critical discussions surrounding the future of the world's forests (El-Lakany, 2004). Greater networking is required to ensure that individuals better understand what is needed, and how they can best meet those needs.

The Commonwealth provides a huge potential for networking, yet this is hardly been developed and there is a significant lack of cooperation and coordination amongst the forestry programmes offered by Commonwealth universities. Establishing a system for coordination and collaboration amongst the different universities offering professional forestry programmes throughout the Commonwealth would be an invaluable starting point in meeting many of the challenges that forestry education faces.

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Forestry Development in Africa: An AfDB Perspective

Africa's total forest cover is estimated at 650 million hectares (ha), accounting for 21.8% of the land area and 16.8% of global forest cover (FAO, 2001)¹. These forests have immense potential to contribute to the continent's social and economic development as they provide a range of ecological, economic and social services, including the protection of water and soil resources. Forest products form the foundation of many local and national economies across the continent. They provide about 6% of GDP in many African countries, the highest in the world, although the share of forest products in trade is only about 2%.

Africa's forests are, however, threatened by a combination of mutually reinforcing factors which include agricultural expansion, commercial harvesting, increased fuel wood collection, inappropriate land and tree tenure regimes, uncontrolled livestock grazing, and accelerated urbanization and industrialization. FAO estimates that Africa loses four million

hectares of its forest annually. Throughout Africa, there has been an increase in demand for wood products, especially fuel wood, charcoal and round-wood. As a result, the consumption of forest products nearly doubled from 1970 to 1994.

The production and consumption of firewood and charcoal alone rose from 250 to 502 million m³ during the same period (FAO, 1994)². Recent projections by FAO estimate that consumption will rise by yet another 5% by 2010. Over the last 20 years, about 300 million hectares of mainly tropical forest have been converted to other land uses on a world-wide basis, such as farms and pastures or large-scale plantations of oil palm, rubber and other cash crops. The rate of deforestation on the continent is currently estimated at four times the world's average.

A number of constraints make it difficult for the majority of African countries to implement sustainable forest management practices. Against a wide range of

priorities, the forestry sector is often assigned low priority compared to food security, health, education, and other sectors. As a consequence, insufficient budgetary allocations are provided to the sector. Many African countries, in their day-to-day struggle to satisfy the most basic needs of their populations, are unable to take a long-term view, which is the time-frame, required for the successful implementation of sustainable forestry management programmes.

The existence of weak forestry institutions in many African countries is another reason for the failure to achieve adequate conservation and sustainable management of the continent's forest resources. In addition, mutually reinforcing market and policy failures promote unsustainable management and use of forest resources. A mechanism to promote the participation and involvement of local communities and the private sector in sustainable forestry management initiatives is lacking. Furthermore, budget support from national governments and the international community is inadequate. It is also clear that some of the available financial instruments are not responsive enough to address challenges in the sector.

It is in the context of the foregoing that the Bank began its interventions in the continent's forestry sector. Although the interventions began as far back as 1978, it was in 1994 that the Bank adopted a specific forestry policy to guide its lending to the sector and to assist its regional member countries in their efforts to arrest deforestation and environmental degradation. The Bank's forestry policy emphasizes the need for the sustainable management of Africa's forest resources to ensure environmental protection, sustainable wood supply and a steady flow of non-wood forest products. The forestry policy provides

1 FAO Forest Resources Assessment, 2001

2 FAO Forest Products Yearbook, 1994



Destroying the forest for agricultural purposes, Uganda 2007



Pine plantation establishment, Tanzania, 2008

for a strategic framework to enable the Bank to play an effective role in the protection, conservation, management, and sustainable use of forests in its regional member countries.

Lessons learnt from past and current projects show that there are strategic opportunities for the Bank to continue to expand its engagements with its regional member countries in the forestry sector. Some of the identified gaps include weak institutional capacities, limited responsive policy and legal frameworks, and minimal community and private sector participation that are essential for the sector to make its rightful contribution to development. The Bank's interventions can play a catalytic role in encouraging governments and other development partners to invest more in the sector.

The current Bank forestry portfolio comprises 12 projects with a commitment value of UA 189.59 million (about US\$288.7 million). The 12 projects are located in nine countries, namely; Benin, Burkina Faso, Burundi, Cameroon, Ghana, Kenya, Niger, Rwanda and Uganda. The focus of these projects includes: natural resource conservation and management, rehabilitation of degraded indigenous forests, agro-forestry, community fores-

try, and institutional capacity building. Almost all the on-going projects adopt a participatory approach in their design and implementation. In addition, most of the projects are designed as integrated programs with other sectors such as agriculture and water resources. Overall, these projects are having positive impacts through the provision of wood and non-wood forest products as well as environmental benefits. Between 2006 and 2008, for example, a total area of 484,560 ha was reforested while 844,111 seedlings were produced. The projects have also supported over 360,000 beneficiaries, including organised associations and groups through training and capacity building to enable them manage their natural resources sustainably and benefit from them financially. It is clear that other bilateral as well as multilateral donor agencies, non-governmental organisations (NGOs), community-based organisations and private sector operators are also providing support to some of the Bank's regional member countries. There is a need for closer collaboration among various stakeholders in order to avoid a duplication of efforts.

Building on the positive impacts of its current portfolio of projects, the

Bank's future interventions will focus on sustainable forest management at the national and regional levels. Regional interventions will be in line with the Bank's regional public goods strategy. In addition, the interventions will contribute to the development of forest management infrastructure. The Bank is now incorporating climate change concerns into its forestry projects particularly taking advantage of the relatively peaceful situation in the forest nations of Central and West Africa that are emerging out of conflict. Recognising the common African position on the inclusion of Reducing Emissions from Deforestation and Degradation (REDD) in a post-2012 climate change agreement, the Bank will support capacity building, including bankable projects design, monitoring, reporting and auditing to enable Africa take advantage of opportunities under this and other mechanisms for adaptation to and mitigation of climate change.

There is a potential to improve the forestry sector's contribution to Africa's socio-economic development, including poverty reduction, especially in rural areas of the continent. The forestry sector is in a dynamic state and it is undergoing rapid changes in response to challenges brought on by climate change; demand for domestic and industrial wood; and pressures to meet demand for agricultural land, food and environmental services. These changes are impacting the forest cover and the sustainable flow of goods and services therefrom. The future of the sector will depend on the severity of the impact and how society, as a whole, adapts to such changes in terms of policy and fiscal responses. In addition, the future will also depend on the response and budget allocation from national governments as well as support from the donor community.