

International trends in forestry education

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Some have claimed that forestry as a profession faces a global crisis and its collapse is imminent. Recent statistics by the Food and Agriculture Organisation of the United Nations (FAO) indicates that this is not likely. Globally, student numbers are rising steadily. However, in some parts of the world forestry programmes are closing and the forestry and wood processing sectors in these areas are facing shortages in their workforce. This article looks at the global and local situation, provides comments from forestry educators at various locations around the world, asks if there is a problem, and reports some of the actual and potential solutions for addressing the problems that have been identified in the literature.

Introduction

Within 30 years, or the equivalent of one rotation for a radiata pine plantation, the world's population is expected to jump by 25 per cent to around 8.9 billion people. This population growth will put increasing pressure on global forests to provide a wide range of non-timber services such as clean water, biodiversity conservation, carbon sequestration, wildlife habitat, recreation opportunities, aesthetics and scenic values.

At current per capita wood consumption rates of 0.52 cubic metres a year (FAO 2010), the population growth can also be expected to cause a rise in annual timber harvest volumes from 3.4 to 4.6 billion cubic metres. Sutton (1999) comments that much of the increase in timber harvest volumes will come from intensively managed plantation forests.

It would be logical to expect that these competing and expanding pressures on forest lands due to population growth would result in increased demand for forestry and wood processing professionals and technologists. C T S Nair, Chief of the Forest Economics Service for the FAO, has argued that demand is not likely to increase greatly in the long term for three reasons –

- The diminution in the role of the public sector, and the expansion of the role of large multinational corporations, continues to reduce the number of forestry professionals and technologists required
- As the prices for most primary products continue to decline, the profitability of forestry will also continue to go down, further reducing the willingness to invest in manpower
- Productivity-enhancing technologies will improve the use of existing manpower resources (Nair 2004).

Many of Nair's comments on demand are echoed by Ferguson (2012). Nair (2004) also comments that the supply of forestry professionals will probably decrease as

the forestry sectors in many countries are 'less attractive than other fields in terms of remuneration and working conditions.'

The global situation supply

Temu and Kiwia (2008) estimated that since the 1990s there has been a 30 per cent global decline in the number of individuals seeking to study a traditional forestry programme. Some have referred to this decline as a global crisis facing the forestry profession (Innes 2010).

However, based on their global assessment of the forest sector, the FAO (2010) have reported that 'general trends in education numbers do not suggest an imminent collapse in the [forestry] profession'. Between 2000 and 2008 the total number of forestry graduates with bachelors and masters degrees steadily increased for most regions of the world by two per cent to eight per cent a year and globally by almost 12 per cent. The global figure is strongly influenced by China.

The trend was less positive for forest technician graduates. Africa and South America showed a negative trend of minus 0.5 per cent and minus 6.0 per cent a year respectively, while the United States showed the greatest increase with 16 per cent. The percentage of female students entering the sector increased between 2000 and 2008, rising from 30 to 34 per cent.

Trends and numbers

What about total numbers? In 2008, 125 countries representing more than 70 per cent of the total global forest cover reported that a total of 106,800 students completed an educational programme in forest sciences. Of these 62,600 were university students and 44,200 earned a forest technician's certificate of some sort (FAO 2010). Neither Australia nor New Zealand is included in these numbers as they did not submit reports to the FAO. One country dominates these numbers. In 2008, China graduated 51 per cent or 31,850 of the world's forestry professionals and 42 per cent or 18,563 of its forestry technicians.

While the general trends and total numbers do not suggest an imminent collapse in supply, this is certainly not the case for some parts of the world. For example, Cooper (2006) comments that there is growing evidence that forestry organisations in the United Kingdom are seriously concerned about the recruitment of qualified people to the profession. He reported that the number of applicants for diploma and BSc courses almost halved between 1996 and 2004.

Ellis et al (2006) noted that skilled staff shortages and competitive pressures were nominated as the two most important factors restricting growth in the Canadian

wood products industry. They also noted that most high school students were not interested in pursuing a career in the wood manufacturing industry, and this lack of student interest was affecting the institutions offering relevant vocational and professional training.

Personal examples

Three personal examples from other parts of the world help illustrate the situation.

A few years ago, as an Australian National University graduate, I found it disheartening to lecture to the final year forestry class where student numbers were less than 10 per cent of the graduating year in 1974. This university is not alone, and other forestry institutions are facing challenges in Australia as well. Ian Ferguson, Emeritus Professor at the University of Melbourne, has written 'there is a need for the major timber and reserve management organisations to collectively identify and support their educational needs ... if the forestry profession is to survive [in Australia]' (Anon 2013). Roberts (2007) reports that Australia also has a critical shortage of high quality [wood processing] graduates and this is having a substantial negative effect on the competitiveness and productivity of the industry as a whole.

For more than 20 years I have collaborated on research with colleagues, recruited graduate students from, and lectured to forestry classes at Universidad Austral de Chile, but that association is about to end. The last intake of undergraduate forestry students is now working its way through this university. Smith (2012) comments that there is a very substantial drop in student numbers coming to study in forest engineering programmes in Chile and the present outlook for forestry education is very bad.

Over the last 11 years I have regularly visited the College of Forest Resources at the University of Washington, once one of the premier forestry schools in North America. I watched it slowly lose student numbers, amalgamate with other programmes, go into survival mode, and finally lose Society of American Foresters accreditation for most of its programmes. Only a few years ago, Green (2006) reported that of the 21 schools rated and approved by the society in 1935, only 12 of these were still accredited. The University of Washington used to be one of those schools, and Washington employers now look to forestry schools from other states to supply their new graduates.

Other trends

Forestry educators in South Africa, Oregon, south east United States, Fiji, Korea and Ireland were recently asked by me about trends in their countries or regions. The replies indicated that, for most of them, undergraduate student numbers are holding steady or slowly rising. For example, Oregon State University's website reports rising student numbers with more than 1,000 undergraduate and graduate students registered in forestry and wood processing programmes.

In some cases numbers are rising substantially. For example, educators in Ireland have seen a move to forestry courses as a direct result of the collapse of the construction industry and the Irish economy. Students saw that although pay rates in forestry were lower, the sector was more able to weather an economic crisis and employment opportunities continue to exist. Irish educators comment that this trend may be reversed once their economy picks up again.

The global situation demand

Statistics on demand for forestry graduates are harder to obtain than those on supply. As expected, however, the situation is not the same everywhere.

As noted above, some regions already have a situation where demand exceeds a dwindling supply and foresters may have to be recruited from other parts of the world. Some of the forestry educators who were contacted commented that, although there was sufficient supply to meet demand at the moment, there was some concern about meeting the spike in demand expected over the next five to 10 years because of the retirement of baby boomers. For example, estimates of 25 per cent and up to 40 per cent replacement of a retiring workforce have been given for Korea and south-east United States respectively.

In some regions supply exceeds demand. For example, a recent survey of forestry education in Finland, Austria, Germany and The Netherlands found that although universities in these countries had no problems in attracting sufficient numbers of students to their programmes, the chances of them finding jobs were not good, but also not terribly bad. Those surveyed reported 'the traditional forestry profile did not offer employment opportunities for university graduates in their countries anymore, but that there were many new jobs in peripheral areas' (Schuck 2009).

Moving for employment

Some students will obviously move to regions where there is a demand for their services. I recently encountered young foresters working in New Zealand who had graduated from universities in Germany and The Netherlands. De Fegely (2010) also reports that the industry has responded to the lack of graduates in Australia by recruiting foresters from New Zealand and South Africa.

The total numbers of students entering the labour market is not a sufficient indicator alone of the ability of supply to meet demand. As the world becomes more urbanised we see a growing estrangement from the countryside of urban youth, with greater numbers of potential students often being ignorant of how forests are used productively and sustainably by our societies. This can lead to greater interest by those students who do decide to study forestry in forest management for conservation or preservation reasons and less interest in production forestry. Greater interest in conservation work, environmental studies and general resource

management was indicated by, for example, forest educators contacted in Fiji, Oregon, Korea and South Africa.

In some regions students appear to have a closer link to the land, for example, those coming from families of landowners. Or they are more pragmatic and this affects the type of courses they take. One educator from Ireland commented

... the proportions of students studying forestry with a commercial or an environmental focus are changing all the time. From a pure commercial focus 20 years ago it changed to a 50/50 focus during the boom years, but now is moving back to a dominant production focus as students see better job opportunities in the commercial sector.

The local situation

Professor Bruce Manley of the University of Canterbury reports that incoming student numbers have fluctuated between 12 and 30 since the year 2000 with an average of 18. He believes that demand for graduating students is likely to rise due to the expanding harvest from plantation forests, and the increase in volumes harvested from steep terrain, as well as the increase in the annual area replanted. He also believes that there are employment opportunities for New Zealand graduates in Australia. Professor Manley notes that career prospects is the number one reason cited by incoming forestry students for doing a bachelor of forest science degree.

Jeremy Christmas at the Waiariki Institute of Technology reports a similar trend for first-year student numbers enrolling in the two-year diploma in forestry management. Numbers steadily fell from between 20 to 30 first-year students in the 1990s and early 2000s to a low point of 12 students in 2006. Since then, student numbers have been steadily increasing, and this year will see over 20 first-year students and a similar number of second-year enrolling in the diploma.

There is also a growing demand for courses related to the broader subject areas of resource management and environmental sustainability. However, student numbers enrolling for courses on sawmilling and timber processing continue to decline despite a demand from the industry for skilled timber workers such as saw doctors and timber machinists.

A recent report on New Zealand forest industry training requirements indicated that 3,600 people across all levels of the workforce needed to be recruited and trained each year to meet the forest sector's needs by 2011 (Sanderson et al. 2008). This number was based on the assumptions of –

- Growth in annual harvest volume increasing demand
- Annual turnover in the workforce maintaining demand
- Productivity enhancements reducing demand.

The report identified the need for applied technical skills and soft skills such as team leadership, communication and people management.

If the results of a survey carried out on senior secondary school students in the Wairarapa region of New Zealand in 2008 are indicative of student interest throughout the country, meeting the above requirements could be difficult. When students were asked what their career choices would be, or what interested them in terms of an industry or sector, not one student out of 343 respondents selected forestry and wood processing. This is despite the region being one of the centres for forest and wood processing activity in New Zealand (Anon 2008). A repeat of the survey in 2011 showed very similar findings. Only one student out of 397 respondents selected forestry and wood processing (Anon 2011).

Is there a problem?

At a global level, FAO statistics would suggest that there is not a problem for university graduating students where numbers are trending upwards, but there may be one for vocational graduating students where they may be trending downwards. At a country or local level, it is obvious that there are some problems with under-supply of students leading to closure of teaching institutions.

The reasons for the lack of students and the collapse of some forestry and wood processing programmes are many and complex. Cooper (2006) listed some of these for Britain and many of the same reasons are listed for other parts of the world (Innes 2010, Smith 2012). These include –

- A poor image of forestry. Various views about forestry contribute to this including a perception that as an industry it is exploitative rather than sustainable, as a university subject it is academically unchallenging, the sector is male-dominated and offers few opportunities for women, and that it is also 'primitive' technologically.
- A lack of awareness among school and local authority career advisors that forestry can be studied at university or that challenging jobs in the industry exist for graduates and school leavers
- A perception of poor career prospects in terms of finding jobs, levels of pay, conditions of employment, career advancement and job satisfaction
- The increasing debt of students which discourages applications for specialist applied courses which are seen to lead to limited employment prospects.
- A decline in student interest in studying science subjects at university compared with degrees in the arts, humanities and social sciences
- A growing estrangement from the countryside of urban youth resulting in a waning interest in working in the rural economy.

Funding and relevance

Reduced government funding for education in some regions has also been cited as a reason for the collapse of forestry programmes. Administrators look at low student numbers and high costs per student, compared to other disciplines, and demand for changes. Pyles and Douglas (2007) have contended that cost per student is a poor indicator of the benefits to society of forestry education.

Some have argued that many forestry programmes no longer adequately address the needs of society, including those of the forest sector itself, and are losing or have lost their relevancy. This has resulted in the drop in interest by students and administrators (Cohen and Maness 1995, Innes 2010, Temu and Kiwia 2008, Smith 2012). It has led to considerable thought and discussion about what are the roles of foresters, wood processing professionals and technicians, and what should be included in forestry education programmes (Vanclay 2007).

The International Union of Forest Research Organisations has recently set up a task force on Education in Forest Sciences. Among its aims is to assess the needs of the stakeholders and society, analyse the relevancy of existing assumptions and foundations of forestry curricula, and identify innovative mechanisms which meet the demands of the 21st century (IUFRO 2010).

The solutions

Innes (2010) provides an excellent review of what has been happening internationally to address the problem where it exists, of falling interest in forestry and the collapse of forest education programmes. These include –

- Changing the name of the programme to change its image. For example, pairing forestry with other activities such as the School of Forestry and Natural Resources, University of Georgia, or changing forestry to forests as with the Department of Forest and Wood Science, University of Stellenbosch.
- Amalgamating forestry programmes with others to boost student numbers, and subsuming the name such as the College of Natural Sciences, University of Wales Bangor
- Restructuring programmes to broaden the discipline and make them more relevant, such as adding more business courses, communication and leadership, and social courses
- Using new teaching techniques such as distance learning to share resources between teaching institutions. For example, I currently teach courses for Oregon State University via the web while located in New Zealand. This solution was also noted by Langin et al (2004) from South Africa and Cooper (2006) from the United Kingdom. This solution is more suited for courses with a small

field component.

- Requiring students to be more mobile to gain specialist training, for example, National Forestry Masters Programme in Australia.

Other solutions proposed include –

- Highlighting the use of technology in the sector to counter the image of being primitive technologically
- Expanding the programme to incorporate an additional year of industry placement as part of the educational process (Cohen and Maness 1995).
- Recognise that, when choosing a career, students make decisions with economic objectives based especially on future income. Look at ways to reduce the time students spend at their training institution and reduce the gap between the academic and managerial world (Smith 2012).
- Accept that fewer, but perhaps stronger, institutions will provide forestry and wood processing education programmes for regional or international markets. These may have the resources to reinforce concepts taught in lectures via application in labs and field trips.
- Bring in outside specialists, when needed, to support teaching and reduce costs
- Target parents and families of potential students when promoting forestry and wood processing as careers. The Wairarapa secondary school survey highlighted that these were the most influential vocational advisers for 60 per cent of students leaving high school (Anon 2008).
- Shifting the focus of training from initial to continuing education and reducing turnover at all levels within the workforce, that is, ensuring that well-trained workers remain in the industry.

Final comments

Although some have claimed that forestry as a profession faces a global crisis and its collapse is imminent, recent statistics by FAO (2010) indicate that this is not likely. Despite increasing pressures on the use of forests and annual timber harvests due to growing population pressure, the demand for vocational and professional graduates will probably not rise greatly because of institutional changes in the forest and wood processing sectors and the application of productivity-enhancing technologies.

Supply exceeds demand for graduates in some parts of the world. In other parts, the reverse is true and their forest and wood processing sectors face significant workforce shortages unless changes are made. Shortages will probably be accentuated in the near future due to the retirement of baby boomers, but in some regions may be partially met by excess supply from other regions.

Collaboration between forest education providers, the forestry and wood processing sectors, and government organisations will be necessary to address the challenges each faces in meeting society's expectations. A variety of solutions have been proposed by forestry educators around the world for meeting these challenges.

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