

# **CHANGES IN THE FORESTRY LABOUR MARKET AND THE EFFECTS ON CURRICULUM DEVELOPMENT AT WAGENINGEN UNIVERSITY**

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## **Abstract**

Forestry as a profession in the Netherlands developed due to scientific and societal changes since the start around 1880 till now, 2014. These developments have been major drivers influencing the set-up of the forestry education at Wageningen University and its predecessors, next to changing ideas on academic education and national and EU education policy.

In the Netherlands KLV and Wageningen University have carried out job market research since 1973. One of the main motives of monitoring the job market's positions is to implement the results in education.

In this paper we present the main trends in forestry education and the outcome of the surveys of forestry graduates. Special emphasis is given to the present adaptations of the forestry programme and the role of alumni investigations in the process. It turned out, that the flexibility of the programme makes it possible to prepare students better for the changing job market, while keeping the high academic standards, and without changing the programme drastically.

Keywords: Forestry, nature management, graduate survey, curriculum development, education, competences, labour market, employability.

## **Introduction**

A very important reason to get educated is obtaining a paid job as the start of a career. This fact also counts for the alumni from Wageningen University (WU), in the Netherlands. Due to the permanent changes in the market, KLV (Royal Dutch Association for Agricultural Sciences; the WU alumni association) and WU have decided to set up a monitoring system in order to gain insight into the demands of the labour market for the alumni.

The question arises, how to implement these results in WU's study programmes. In this article the implementation is discussed on the basis of the Forest and Nature Conservation programme at WU.

After a short overview of both the history of the graduate surveys carried out by KLV, WU and others and the history of forestry education at WU, we will discuss some actual results of these surveys and the way the results are implemented in the study programmes, now and in the future.

### **KLV-WU Graduate surveys**

In the early 1970s KLV (the WU alumni association) and WU decided to set up a graduate survey due to the fact, that the unemployment figures rose sharply, and that both the job variety among Wageningen graduates and the number of curriculum specializations increased. In 1973, this survey was the first one carried out in the Dutch academic world, with a questionnaire, which could be used in following surveys too (Stichting MPW, 1976). Since then, the survey is repeated every five years for the complete body of MSc graduates at Wageningen University under the condition that they are still active in the labour market (not yet retired), with more or less the same questions, to which other, sometimes once-only, questions were added. In 2011 PhD graduates were included (KLV, 2013a).

The main reason to start these surveys was to evaluate the acceptance of WU graduates on the labour market. Answers to relevant questions can be formulated on basis of a survey among alumni (see Bakker Arkema, 1972; Bos-Boers and Schmidt, 2010; KLV, 2013a). Where do alumni find jobs and how can the market be served better? Are the expected jobs obtained, are unexpected jobs obtained? Are there many unemployed persons under the graduates? Are the competences of the graduates accepted in the market or should the curriculum be adapted?

The generated information is mainly used by KLV and WU. KLV uses it to inform its members about the labour market and to develop workshops to prepare its members for a better position on the labour market. WU study advisors use it to inform new enrolling students and to inform students when composing their own individual curriculum. Programme directors use it for visitations/accreditations of the programmes and – if necessary – to adapt the programme. Very important is that the information gives insight in the identity of the (Master) programme (Brown *et al.*, 2006; Scott and Lane, 2000), especially when measuring the competences and the connection of the programme to the labour market.

The graduates, of course, form the main source of information. The described graduate survey, which started in 1973, formed the basis. After that, other monitoring instruments are introduced. Nowadays, in 2014, data on WU alumni are collected in four ways:

- The *KLV/Wageningen University data base*: The alumni association KLV, in close cooperation with Wageningen University, keeps an enormous data base with all 40000 BSc, MSc and PhD graduates of Wageningen University. This database includes name, title, curriculum, address, email address, employer, and job. A lot of effort goes into keeping this database up-to-date. An up-to-date database is essential as a base for all surveys and all activities for alumni. This database which can be addressed and used at any moment, also gives some

latest information<sup>6</sup> of the labour market situation of specific groups of graduates.

- *The KLV/Wageningen University graduate survey career monitor, started as the above described first graduate survey:* KLV and Wageningen University carries out this survey every five years among the complete body of Wageningen University MSc graduates (not yet retired). During the years, the survey changed somewhat, but not of character. The content was adapted to the time: from Dutch only to bilingual Dutch and English, from open questions to multiple choice ones, and to the changed titles of the curricula and the title of the degrees. Moreover the sampling technique changed, from 100 % to only the since the previous survey new graduates and the old graduates, who answered the previous survey. For more details see Bos-Boers and Schmidt (2010) and KLV (2013). This approach was changed in 2011 again: All alumni with known e-mail address (about 60%) were sent an e-mail with a code (for privacy reasons), which they could use to fill in a digital questionnaire. Alumni without known e-mail address received a hardcopy of the questionnaire (see KLV, 2013a). In 1973 the response rate was high, 68%, which diminished over the years to 43% in 2006. According to Bos-Boers and Schmidt (2010) this had to do with the loss of the connection of the younger graduates with their alma mater. In 2011 the response rate was 26%. This low response rate may have been caused by the change in the approach, e.g. the use of a digital survey and the fact, that all alumni got a survey, also the ones without strong connection with the university. An acceptable distribution over all curricula was assured every survey by a check on representativity, of gender, study programme and nationality. Some graduates from certain curricula or with other characteristics got an extra reminder, and were added.
- *The MSc programme evaluation, set up by KLV as the “Rector Magnificus” (= Vice-chancellor) evaluation,* It is a survey among students shortly before, after or at graduation and evaluates the MSc-programme. Questions about their job positions are also included (Bos-Boers and Schmidt, 2010).
- *The WO Monitor, a questionnaire about scientific education (WO) held among recent MSc graduates of Dutch universities.* This questionnaire is set up by the Ministry of Education and gathers information among all graduates of Dutch universities one year after graduation with emphasis on evaluation of the education and monitoring their jobs.

### **Forestry curricula at Wageningen University**

Since its start in 1918 the predecessors of Wageningen University offered two Forestry curricula, one aimed at tropical forestry and one aimed at Dutch forestry. The latter one was till the Second World War of minor importance. Due to declining enrolment in the early 1950's and the loss of the labour market in Indonesia forestry education at WU was reformulated extensively in 1956. Two

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<sup>6</sup> Actuality depends partly on the speed with which graduates inform on changes.

three-cycle curricula of in total five and a half year (respective 1 year “propedeuse”, 2.5 years ” kandidaats” and 2 years “ingenieur”) forestry were established, one curriculum concentrating on ecological and silvicultural aspects and the other on economic and technical aspects. Both aimed at (state) forest enterprises. Specialisation in tropical or temperate regions was possible by selecting restricted choice<sup>7</sup> courses.

After the students’ protest movements in 1968, new curricula for WU were formulated in 1971. The propaedeutics were skipped and new four- or five-year curricula were established (among the latter was Forestry). Inside Forestry three specialisations (Silviculture, Forest Management and Forest Exploitation Technology) were offered. This was enlarged to five (Forest Policy, Forest Use, Forest Development, Forest Management and Forest Products) in 1982. From 1983 to 2000 also a two-year MSc curriculum Tropical Forestry was offered to students with a (Forestry) BSc degree from other (applied) universities. Moreover a special two-year curriculum was offered to graduates from Dutch Universities of Applied Sciences. See for more details Jansen and Schmidt (2006).

Due to decreasing enrolment and diminishing interest for forestry graduates on the labour market, the Programme Committee Forestry (ROC “Bosbouw”) decided in 1993 to abandon the pure forestry curriculum and offer a curriculum “Forest and Nature Conservation”, first in the old format of an “Ingenieur” (Ir) degree programme at MSc level, since 2000 (officially since 2002) in the format of a Dutch taught BSc degree programme (BSc Bos- en Natuurbeheer), followed by an English taught MSc degree programme (Forest and Nature Conservation). The BSc curriculum focused on management presently has two majors (Ecology & Conservation, and Policy & Society). The MSc curriculum has three curriculum specialisations (Ecology, Management, and Policy & Society), see for more details Boelee (1998); van Baren *et al.* (1998); van Baren (2004); Jacobs *et al.* (2004); Epema and den Ouden (2011). The official abbreviation for the MSc curriculum Forest and Nature Conservation is MFN. This abbreviation will be used below for all (also earlier) students in Forestry and in Forest and Nature management.

For the MFN education in Wageningen, till 2008 the labour market situation was of no real worry. The Dutch government funded the development and management of all kinds of nature areas and this resulted in enough employment possibilities in the Netherlands. Also the government financed these kinds of activities in developing countries, and as a result alumni found their jobs outside the Netherlands as well.

Since 2008, the economic situation worldwide and in the Netherlands changed. Due to this economic crisis the amount of money allotted to nature and forests in the Netherlands and the tropics diminished. Consequently, the number of available jobs diminished as well. In addition, retirement age has been raised and people have to

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<sup>7</sup> Students have to choose a number of courses from a given list.

work longer. Moreover, more alumni are starting on the labour market. All these factors make it more difficult and competitive for the freshly graduated to find a job (Wageningen World, 2014).

Another effect of the diminishing attention and funding for forest and nature conservation and management is the fact, that the intrinsic value of nature, which is addressed in ‘conservation and preservation’, became more and more under pressure, and had to compete with more instrumental functions for nature, like the increasing demand for sustainable energy (wood), the increasing demand for forests and nature for recreation (Bosschap, 2013) and the CO<sub>2</sub> sequestration problem.

All this resulted in more attention inside WU to strengthen the position of forest and nature conservation alumni. In 2013 the situation became urgent. Discussions about the needed skills and knowledge to get and maintain a job on this labour market are on-going in the programme committee “Forest and Nature Conservation”, while the first measures have been taken.

### **Reasons for change in forestry curricula at Wageningen University**

The first change, in the 1950s, was caused by the loss of a labour market in the former colonies. This had consequences for nearly all curricula at WU. Even without a graduate survey, it was clear, that something had to be done, quite simply because no jobs were available anymore and the focus was changed to European land use including forestry.

The second major change was the consequence of the student protest movement of 1968. The last author was personally involved in the – for the first time organised – discussions in 1969 and following years between teachers, alumni and students about the renewal of the curricula. The push for this curriculum revision came from the students, who pressured the Dutch government to act. And it was the government, who supplied the guidelines. The first KLV survey was launched in that period as well, in the early 1970s.

The third major revision was started, about 1993, with again the third author personally involved. Teachers saw the movement in the Dutch society and politics away from forestry, which became less important, towards nature management, the latter becoming more and more important. Moreover they perceived the consequences for the labour market and noticed the drop in the number of first-year students (see Figure 1). Hence, the Programme Committee (a curriculum education commission) for Forestry changed the name and the content of the Forestry curriculum into a Forest and Nature Conservation curriculum, with perhaps later on some informative support from graduate surveys.

The fourth major change, in 2000, was started by the European Council of Ministers of (Higher) Education with the Bologna Declaration. It was clearly politically

motivated with perhaps some thoughts about a Europe wide labour market for graduates and a larger exchange of students within Europe and between programmes. At WU, this proposal was well received. The BSc-MSc system resulted in more exchange and flexibility within and between universities in the Netherlands and Europe. This had a major influence for the graduates in forest and nature conservation, as was shown above. The BSc and MSc in Forest and Nature Conservation have different learning outcomes. Both programmes again deal with international and Dutch aspects of forest and nature conservation. But internationalisation has quite a different meaning than before.

The role of graduate surveys in these four major changes may have been minimal. How it is nowadays will be discussed below.

### Wageningen University Forestry graduates on the labour market

In the eighties and the first half of the nineties of the previous century, the influx of forestry students was relatively low (see Figure 1). This risk to the continuity of the forestry study programme led to discussions on the continuation or the change of the programme at different university levels. The reasons for maintaining forestry in any form were, that it was a programme with specific characteristics: a long and unique tradition in the Netherlands and important for sustainable management of large areas (long term thinking). The forestry chairs were able to convince the educative boards at WU and the Ministry of Education and a study programme Forest and Nature Conservation was developed and launched in 2000.

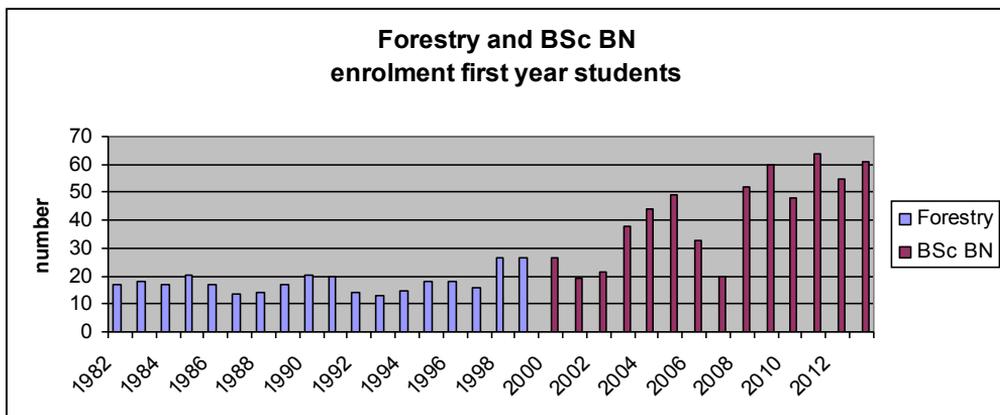


Figure 1: Enrolment of first-year students in the curriculum Forestry (N15 and L10) and the BSc Forest and Nature Conservation (BSc BN). Note that enrolment in the MSc Forest and nature Conservation is not measured here and that only students enrolled in these curricula are included, not in the curricula derived from these. Source: Jansen and Schmidt, 2006; WU, 2013.

The low number of students in 1987 and 1988 was a reaction to a change in publicity. In the early eighties many students enrolled in the forestry study

programme with other expectancy than was fulfilled. They arrived with a romantic sense of work in the field, and were faced with 'white-collar'-issues and features. In response to this, the public information about the forestry programme gave more and more a realistic view, and students, who want to work in the field, are referred to a more practical university of applied science (HBO) or senior secondary vocational education and training (MBO). The relatively low numbers of students in 2007 and 2008 are more difficult to explain and may possibly partly be related to a non-optimal publicity. In 2008 the policy of publicity was changed.

From the end of nineties, there was an increase of students' numbers. The small dip in 2001-2002 is an artefact, related to the administrative change from a 5 year programme (2000, 2001 2012) to a real BSc-MSc structure. In 2004, 2005 and 2006 numbers were high, followed by the already mentioned dip in 2007 and 2008. Since that time the number of enrolling first semester students fluctuated roughly between 50 and 60 a year.

The increasing numbers from 2009 onwards were seen in almost all WU study programmes, with the remark, that in some other programmes student numbers started to increase somewhat later and increased even more (biology, food technology related programmes, social sciences). The financial crisis (started in 2008) probably stimulated more high school graduates to enrol at WU in order to avoid the labour market.

Summarizing, first semester student numbers of BSc are nowadays around three times that of the starters in the eighties and nineties (60 versus 20).

The number of students entering the MSc Forest and Nature Conservation is even higher than the number of BSc students (Bos- en Natuurbeheer). From 2004-2008 the cohort size was around 60, from 2009-2014 around 80 with in 2010 and 2012 90 students. The population now roughly consists of one third of students from the WU BSc Bos- en Natuurbeheer, one third of international students and one third from other bachelor programmes in the Netherlands (mainly biology, environmental sciences, wildlife management and forest and nature management both from Dutch research universities and universities of applied sciences). The increase of numbers of international and Dutch MSc students with a non-Wageningen BSc is in line with other MSc programmes at WU. This implies that it can be expected, that in the coming years even more MSc students will graduate than students will enrol in the BSc Bos- and Natuurbeheer.

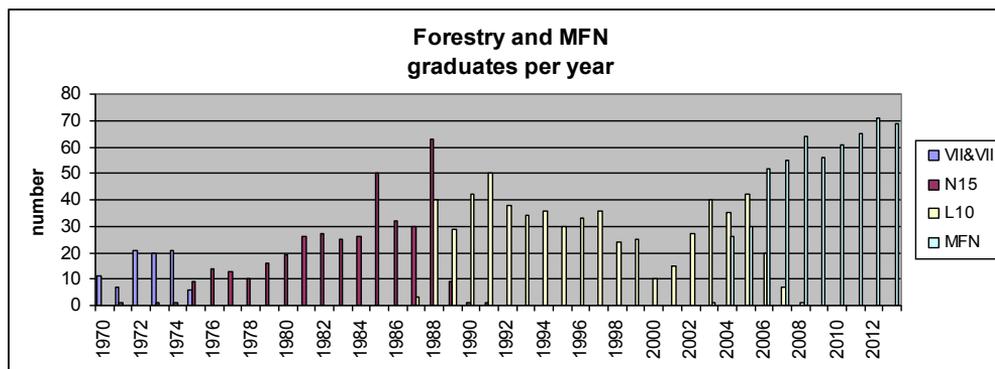


Figure 2: Number of Dutch and non-Dutch MFN graduates per year. Note that the forestry curricula VII and VIII ran from 1956 till 1975; the forestry curriculum N15 from 1975 till 1987; the forestry curriculum L10 from 1987 till 2003 and the forestry and nature conservation curriculum from 2003 till now. These numbers include also graduates from all curricula derived from the mentioned main ones. Source: Unpublished data KLV, derived from the KLV database, 2014.

In Figure 2 all graduates with an “ingenieur” diploma (1970-1987) and an MSc degree Forest and Nature Conservation (from 1987 onwards) are shown. All programmes are included in these data; a direct comparison with Figure 1 is hence difficult. The 1988 graduation peak is due to the necessity for the slow N15 students to graduate: that curriculum and its derivatives were cancelled at that moment. This peak was also present in most other WU curricula.

It can be expected, that the number of MFN graduates will be 60 or more over the coming years. Even if we correct the outflow figures for non-Dutch students leaving after graduation, it is still evident that more MFN graduates than before will enter the Dutch labour market. At the same time, as a result of the Dutch policy to delay the retirement age, it delayed the throughput on the labour market. For the time being, the economic situation is not so, that a recovery of the labour market can be expected. Due to the policy of allotting less money to forest and nature conservation the situation for the MFN graduates may be even worse.

The question arises, whether the current curriculum of the actual MFN programme, developed before this situation, is still optimal, or whether the curriculum should be adapted to insure this large group of graduates’ good possibilities on the labour market. In a few years from now, it is expected, that job possibilities will increase due to a combination of economic growth and the relatively high number of old employees in the sector. But even then, we have to take into consideration that competences needed for these jobs probably will change.

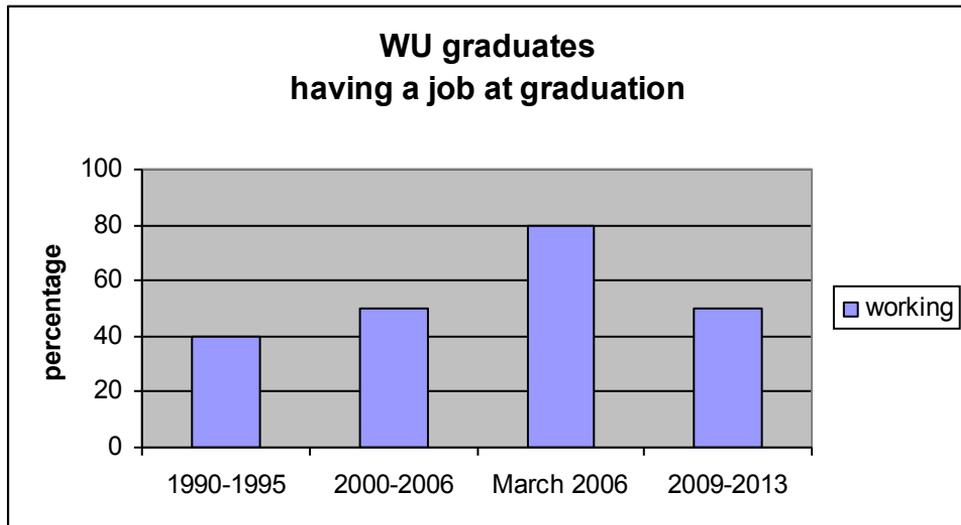


Figure 3: Percentage of WU graduates from all curricula with a job at graduation. Source: MSc programme evaluation KLV (2008-2014) and unpublished data by KLV/WU: Rector Magnificus enquête/MSc programme evaluation (1990-2007).

Figure 3 shows how the WU graduates are doing on the labour market at the time of graduation. Please note, this is an average, so it may fluctuate within the various years as is shown in March 2006 (see also KLV, 2013; Resource, March 2013; Resource, August 2013). But indeed the labour market for graduates in the years 2000-2013 seems better than in the nineties. These percentages for MFN graduates (Figure 5) are slightly lower than for WU graduates in general due to several reasons. The study advisers indicate that MFN students shortly before graduation focus on their study and graduation and do not yet bother with the labour market. After graduation the alumni start thinking about their future career. One reason is the labour market itself. In 2006 the labour market was good, i.e. it was easy to find a job. After this the financial crisis had a negative effect on the labour market. The average time between graduation and finding a job for MFN graduates is presently three to four months.

A general WU trend is that more and more graduates pursue a PhD after their Master. At the end of 2011, 20 percent of the Wageningen University alumni had obtained a PhD degree, 2 percent had started PhD research, but had stopped, and 6 percent were still working on a PhD project. Between 1970 and 2010 the percentage of alumni of Dutch origin, who completed a PhD or started PhD research outside the Netherlands rose from 8 to 22 percent (Mariën *et al.*, 2012). This trend is also in line with the already earlier (nineteen eighties) transformation of a management/practical-university to a more scientific/theoretical university and hence education (WU, 2012). For more details on the PhD study at Wageningen University see van Laar, 2014.

In line with the university trend also more MFN graduates, and also especially the non-Dutch, would like to enrol in a PhD programme than in the eighties or nineties, or indeed enrol. In Figures 4 and 5 some numbers are given for MFN. Numbers vary strongly from year to year and are difficult to estimate exactly due to the relative low response rate. The internationalisation of WU (WU, 2012) can be seen here too.

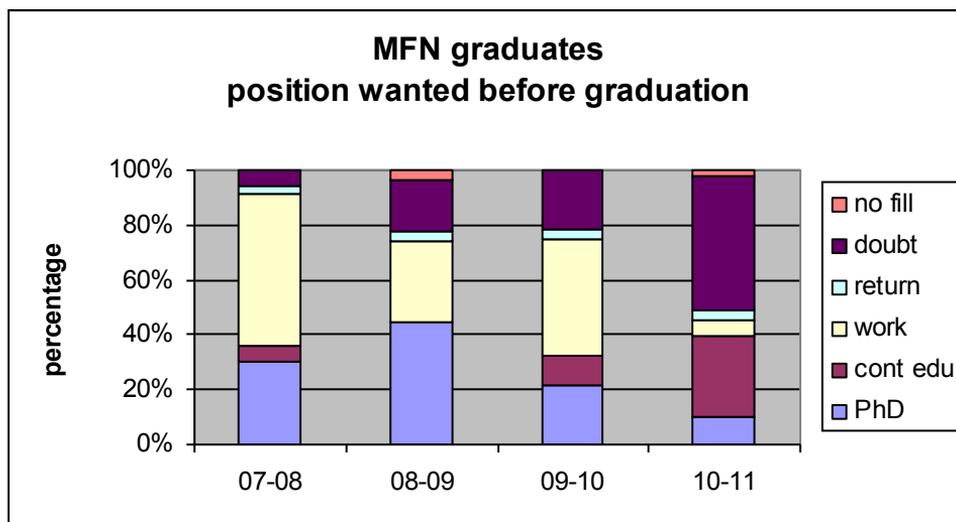


Figure 4: Percentage of MFN graduates, who – before graduation – want to work in a specific job. Legend: PhD: PhD; cont edu: continue in some education programme; work: permanent job; return: return to previous job; doubt: does not yet know; no fill: line not filled in. Source: Unpublished data by KLV/WU, derived from MSc-programme evaluation 2007-2011.

The percentages, ' jobless ' at the time of MFN graduation, and a year after graduation (Figure 6) are quite high. Around 10% of the MFN alumni have no job, while also quite a few (30 %) have a job below MSc graduate level. Accepting a function lower than MSc level may be partly explained by the fact, that employers try to place MSc graduates on a lower position, which is cheaper for them, partly by the fact, that the MFN graduates prefer working in a 'green' job both above being unemployed and working outside the 'green' environment. It is expected, that these graduates will obtain a better suited function/position/job in some years. This is confirmed by the data in Table 1: 69% of the MFN alumni from 2000 to 2011 are employed in a position, that requires at least an academic qualification, which conforms with the average of the WU graduates (71%).

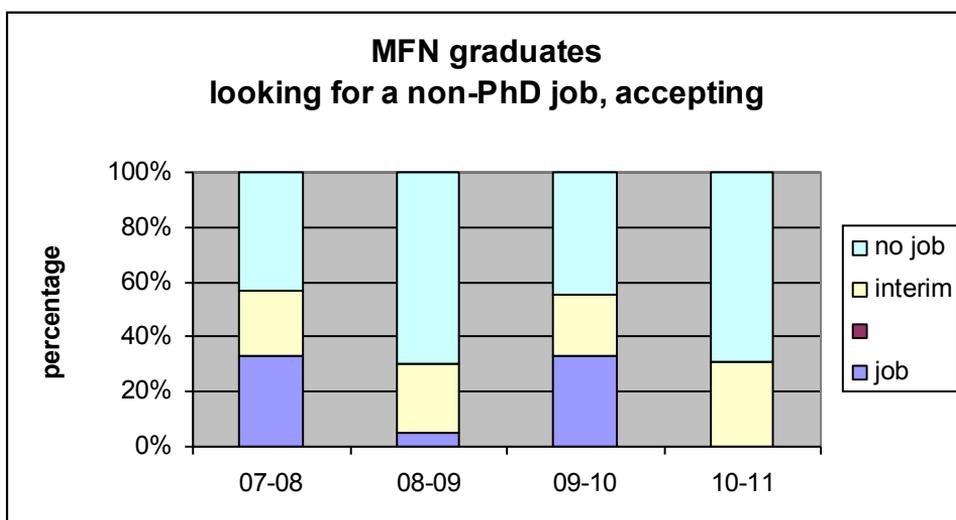
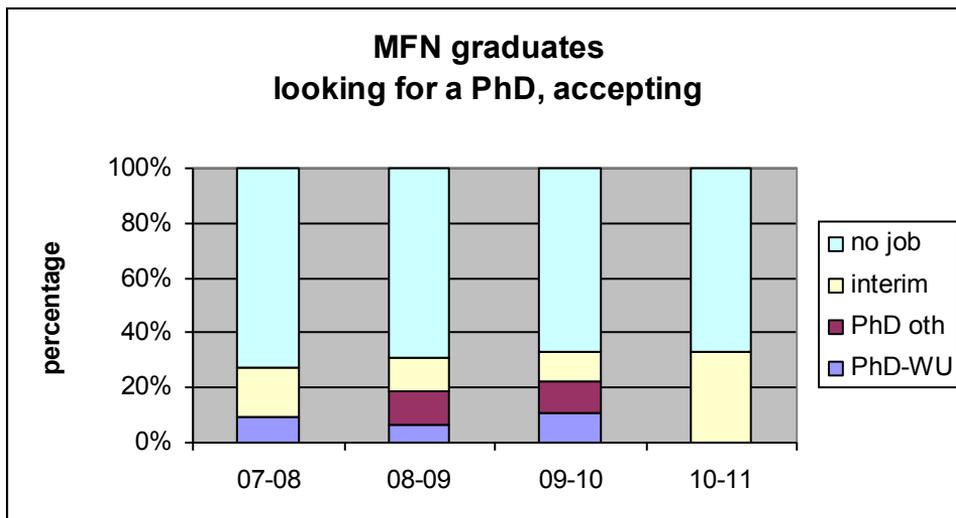


Figure 5: Percentage of MFN graduates who – after looking for a specific job (above PhD; below other) – were working at graduation. Legend: PhD: PhD at WU (Wageningen University, dark blue) or at another university (red); interim: temporary job; job: found a steady job; no job: did not found a job. Source: Unpublished data KLV/WU derived from MSc-programme evaluation, 2007-2011

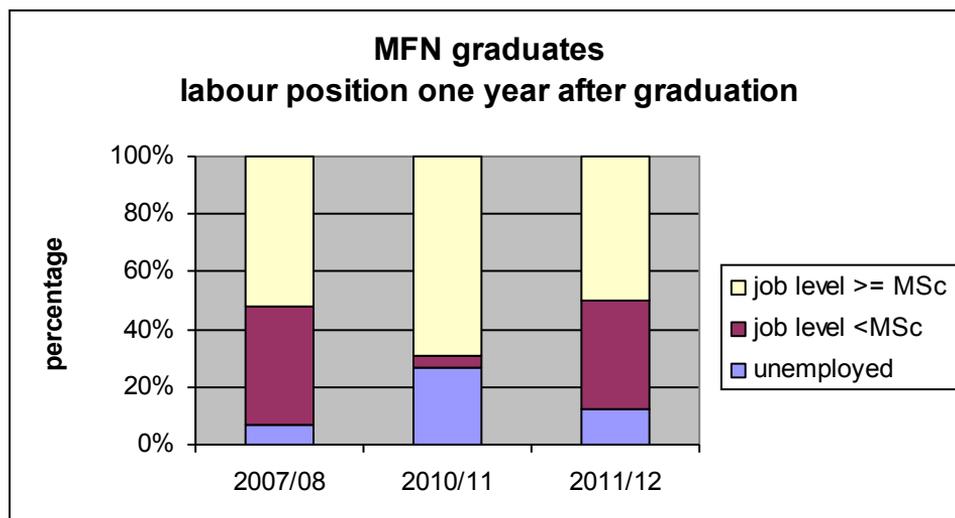


Figure 6: MFN graduates one year after graduation, who were unemployed and who were working in a position with a level lower or equal to and higher than MSc. Source: IVA, 2009; 2011; 2012; 2013.

Table 1: Minimum required level for the actual function/position/job for all and for MFN graduates from WU between 2000 and 2011. Source: Mariën *et al.*, 2012.

Required level	WU total		MFN	
	%	N	%	N
University plus PhD	12	123	9	6
University + postgraduate	4	41	3	2
University	55	558	57	40
Higher vocational	22	219	24	17
Vocational	2	21	0	0
High school	0	5	1	1
Unknown	4	37	6	4
Total	100	1,008	100	70

About 55% of MFN alumni, who graduated in 2011-2012, indicate that they are working in “their own field” (IVA, 2013). This may partly be caused by the interpretation, what “their own field” is: forest and nature or “green” in general. This is less than the average of 74% of all MSc graduates from WU and the average of all Dutch university graduates (72%), involved in the research (IVA, 2013). These data seem to differ from other surveys (Mariën *et al.*, 2012; see also Table 2), in which 87% of the MFN alumni and 80% of all graduates between 2000-2011 indicate, that they are working in their own field, while only 13% (MFN) or 20%

(WU) are working in another field. Differences in outcome between the different investigations have probably to do with the different methods (other groups, alumni of different years, other type of questions). The overall outcome seems to indicate, that present MFN graduates have more problems to find a job at their own level and in their own field than other WU graduates.

Table 2: Work field of WU graduates and MFN graduates. Source: Mariën *et al.*, 2012

Work field in relation to education	Total WU		MFN	
	%	N	%	N
Completely inside own education	12	123	13	9
Inside or related to own education	68	689	74	52
Completely different than education	6	59	0	0
No specific education required	14	137	13	9
Total	100	1,008	100	70

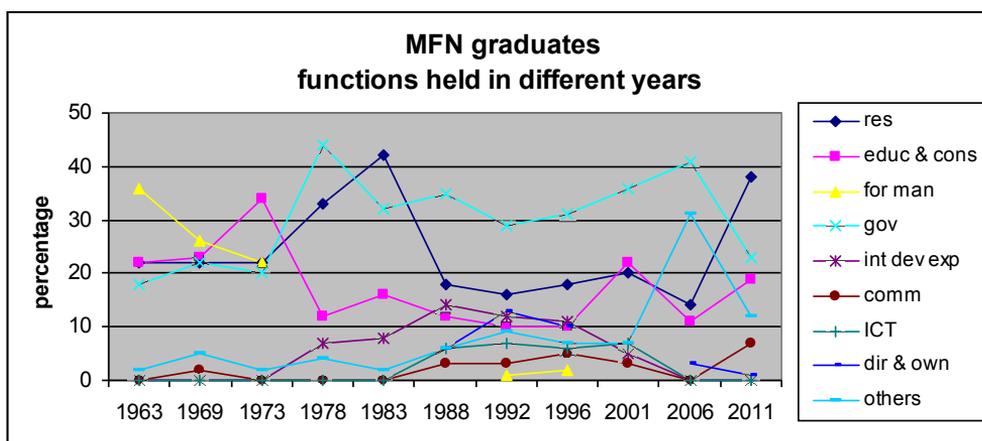


Figure 7: Functions/positions/jobs held by MFN graduates in the years between 1963 and 2011. Legend: res: research; educ & cons: education and consultancy; for man: forest management; gov: government, policy, management, director; int dev exp: international development expert; comm: commercial staff member; ICT: information and communication technologist; dir & own: executive and own company; others: others. Source: Unpublished data derived from KLV/WU career monitor 1973-2011.

The functions of MFN graduates show a great diversification, especially after 1983 (Figure 7). Again this raises the question: did the labour market change, did the graduates change or both? Government has been an important employer of MFN graduates, during the last 50 years (see Figure 8). Alumni work as policy maker, general manager or director. Forest management was an important employer in the

nineteen sixties and seventies, but was of no importance later, which for sure has been caused by a change in labour market. Research was an important employer of MFN graduated between 1975 and 1985 replacing forest management as most important employer, corresponding with the change of a management orientated curriculum to a research oriented one. After 2006, the number of alumni working in research functions rises again. Also here a more scientific oriented curriculum could be the cause for the change (WU, 2012). This corresponds with the trend of other WU MSc graduates. Mariën *et al.* (2012) stated: “43 percent of the Wageningen University alumni, who graduated less than five years ago, are employed in a research position at a university, research institution or industry. In the 2006 career survey this applied to just 29 percent of those, who had graduated less than five years before; a difference that can be attributed to the increasing number of alumni choosing to do a PhD.” Education and consultancy functions were important in the whole period, but probably with a shift from education to consultancy in the last ten years to alumni working in NGO’s and companies. In the last 30 years communication (no IT) functions made up 5-10% of the graduates’ jobs, but we expect, that communication aspects become more and more important in other functions like consultancy too.

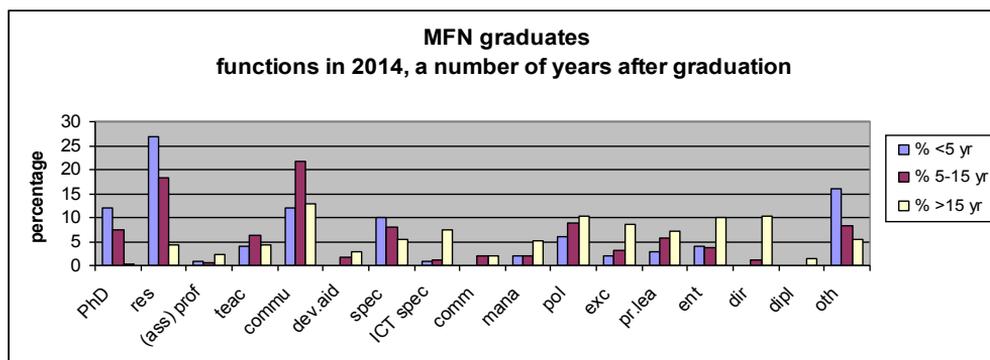


Figure 8: Functions held by MFN graduates in 2014, less than five, between five and fifteen and more than fifteen years after graduation. Legend: PhD: PhD researcher; res: researcher; (ass) prof: (associate) professor; teac: teacher; commu: information, reporter, advisor; dev.aid: development specialist; spec: professional specialist, designer; ICT spec: information, communication technology specialist; comm: commercial fellow; mana: manager, head; pol: policy fellow; exc: executive; pr.lea: project leader, head; ent: entrepreneur; dir: director; dipl: diplomat, chairman; oth: other functions. Source: Unpublished data KLV, derived from the KLV/WU database, 2014

The development of careers and functions of graduates is investigated by using the extensive KLV database (Figure 8 and 9). Recent graduates often obtain other functions than alumni, who graduated a longer time ago. The recent ones more often were PhD candidates or worked as researchers or technical specialists. Graduates further along in their careers often worked as consultants, directors,

policy officers or entrepreneurs. This is in line with the broad picture for WU graduates (KLV, 2012).

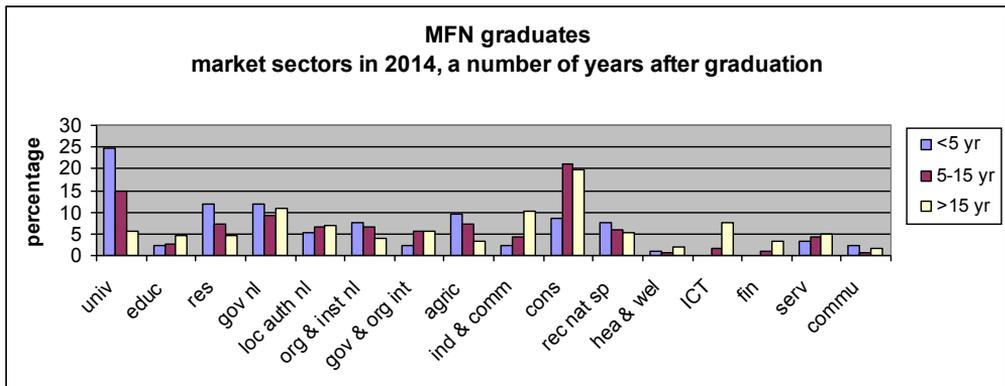


Figure 9: Organisations and market sectors in which MFN graduates are working in 2014, less than five, between five and fifteen and more than fifteen years after graduation. Legend: univ: universities; educ: education; res: research; gov nl: Dutch government; loc auth nl: Dutch local authorities; org & inst nl: Dutch organisations and institutions; gov & org int: non-Dutch governments and international organisations; agric: agricultural firms; ind & comm: industry and commerce; cons: consultancy firms; rec nat sp: recreation, nature conservation and sports; hea & wel: health and wellness; ICT: information and communication technology; fin: financial services; serv: other services; commu: public relations, communication, etc. Source: unpublished data KLV, derived from KLV/WU data base, 2014

Besides the individual development of 'growing' in a job, most alumni also continued to develop through their choice of employers. Recent graduates more often worked for a university, whereas less recent alumni are more often employed by engineering and consultancy agencies and also in information technology (IT). I. This last may be the result of a GIS specialization in the curriculum in the late 1990s. Of course, the demand from the market (many IT positions offered and only a few MFN positions) may play a role here, too. This is also shown in Figure 8.

Figure 10 indicates that both traditional and new means are used by the graduates to obtain a job. Networking (e.g. through internship, family, chair) is important, but even in 2011 reflecting on a job announcement is the most important means. Quite noteworthy is the fact, that there is no real trend: that a given mean is successful one year, is no guarantee for the next one.

According to the latest MSc programme evaluations conducted under the 2012-2013 alumni (KLV, 2013), the WU graduated found their jobs mostly through an internship (38% of the respondents with a job).

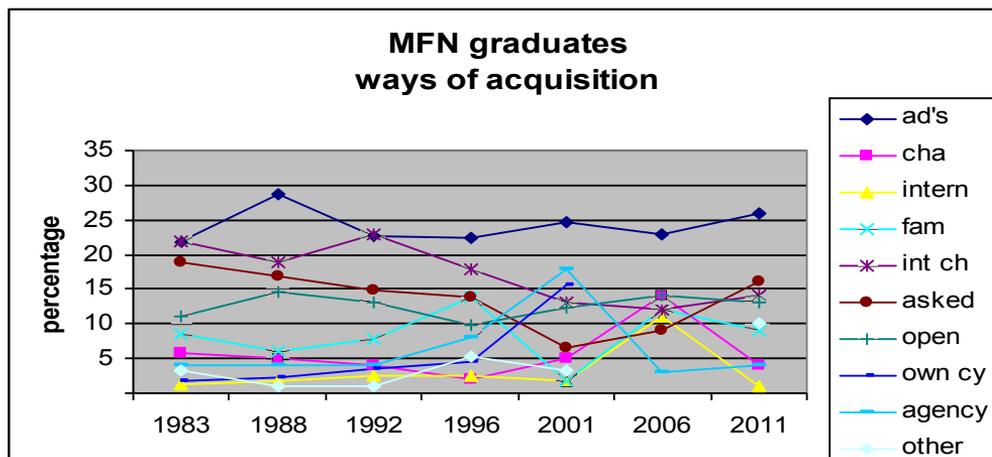


Figure 10: Acquisition means used by MFN graduates in different years. Legend: ad's: reflecting on an advertisement; cha: aided by the thesis'-chair; intern: internship; fam: aided by family or friends; int ch: internal promotion or change; asked: asked by employer; open: open application; own cy: own or parent's company; agency: employments office or firm, KLV, International Agricultural Centre or temping agency; other: other means. Source: Unpublished KLV data derived from KLV/WU career monitor 1983-2011.

One year after graduation, graduates are requested to indicate, if the requested level on a number of competences corresponds with the offered level. This inventory is made every year; in Table 3 the results for two years are given. More MFN graduates indicate in both years, that they are – according to their opinion – better educated than required for their jobs, concerning six competences. On the other hand for three competences (use of ICT, functioning under pressure and take decisions) alumni indicate, that the level they offer is less than the level required in their jobs. For other competences, the difference between required and offered ones is less.

Table 3: Mean required level (Req.) and mean offered level (Off.) of a number of competences for MFN graduates in 2011 (N=30) and 2012 (N=25). Column required indicates the mean level required for the function, the column offered indicates the mean level offered by the graduates on a scale of 1.0 = very low, 5.0 = very high. Both required and offered was scored by the graduates.

\* indicates that the mean offered level is two points or more lower than the required level;

\*\* indicates that the mean offered level is two points or more higher than the required level.

Source: IVA, 2012; 2013.

Competences	2011		2012		Competences	2011		2012	
	Req.	Off.	Req.	Off.		Req.	Off.	Req.	Off.
<i>Knowledge of ...</i>					<i>The ability to...</i>				
own discipline	3.1	3.6**	3.3	3.7**	reason logically	3.8	4.0**	4.3	4.0*
other disciplines	3.2	3.1	3.6	3.3*	work according budget, planning or directives	3.3	3.7**	3.6	3.8**
The ability to ...					functioning well under pressure	3.7	3.5*	3.8	3.6*
implement professional knowledge	3.4	3.6**	3.3	3.8**	make decisions	3.6	3.4*	3.7	3.4*
use information and communication technology	4.0	3.8*	3.9	3.6*	develop new ideas and solutions	3.7	3.6	4.0	3.6*
communicate in foreign languages	3.3	3.9**	3.6	3.9**	learn new issues	3.7	3.9**	4.4	4.2*
collect information	3.8	4.0**	4.2	4.1	make oneself clear to others	4.0	4.0	4.4	3.8*
spot problems and chances	3.7	3.8	3.9	3.7*	cooperate productively with others	3.8	4.1**	3.6	3.9**
make connections between different issues	3.8	3.9	4.1	3.8*	address the capabilities of others	3.5	3.6	3.2	3.4**
distinguish between main and minor issues	3.6	3.6	4.1	3.8*	work independently	4.2	3.9**	4.1	4.3**

According to Table 3 the current disciplinary knowledge is fine, even higher than required for the jobs according to the graduates. The high scores are in line with the excellent student evaluations, the opinion of the external advisory board and the recent official visitation judgement (NVAO, 2014). The knowledge of other disciplines is not significantly scoring too low, but this is a point to keep an eye on the next few years. Students have already the opportunity to specialise in other fields near to forest and nature conservation, but it may be questioned, if they select presently with a view to the job market.

The question is, whether the curriculum needs to be adapted in the light of these results and if yes, how? Students have already the opportunity to select courses to improve their knowledge, skills and competences in the three fields mentioned. A decision making course is part of one of the specialisations, but is not selected by all students in the curriculum. Should we advise to follow specific courses or should we make specific courses compulsory?

### **Changes in the Forest and Nature Conservation curriculum in 2015**

As discussed above, major changes in the WU Forestry curricula were caused by major events outside the university, by changes in society and politics. Because of the focus of the MSc programme on Forest and Nature management since the mid-1990s, the graduates were successful in finding jobs. However around 2008, the situation changed: numbers of job opportunities in general decreased, while at the same time the numbers of MSc graduates increased. The government funding for forest and nature management decreased drastically. Nature became more and more a market product. Various reports and studies describe how the role of forest and nature in society is changing (HCA, 2013; PACT, 2104; Schmidt and Lewark, 2014).

Links of nature management with other sectors like recreation, communication and sustainable water management become more important. Entrepreneurship and situational awareness are becoming in the last years required skills and competences. The changing role of citizens from only being consumers into being also producers and active managers has relevant consequences. The reports show also an increase in the competitiveness of our graduates with neighbouring fields, like biology, landscape planning or human geography, but even with less closely neighbouring fields, like law or marketing.

The WO-monitor 2012 and 2013 (IVA, 2012; 2013) and the career monitor (Mariën *et al.*, 2012) indicate, that most competences relevant at the start of the career (see Table 3) are sufficiently present in the programme. However, it will be important to find a balance between the old and newly required competences.

The overall set-up with half a year of free choice courses in the BSc and also a lot of free choice between courses and within courses in the MSc gives a lot of flexibility. In order to adapt to the new situation, the existing flexibility of the programme can be used and no new major change is required. The advantage of this approach is that both a BSc and MSc programme – judged very positively by students, graduates, external visitation and the external advisory board<sup>8</sup> – can be used as the basis. By keeping the balance between domain knowledge and

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<sup>8</sup> According to the QS World University Rankings by Subjects WU is the best European university for agriculture and forestry and the second one in the world (Anonymous, 2014). According to the prestigious “keuzegids”, a student based advisory book on study programmes in the Netherlands, the WU Forestry and Nature Managements are top-programmes.

competencies the same, students are both well prepared for the more traditional jobs and have a good base to operate successfully in new jobs. Three lines are presently being developed to prepare students to be more successful in these new jobs.

*Making students more aware of their own competences*

The first line is to make students more aware of their own competences and the choices they can make within the programme. For this line the study advice is adapted, special events are organised and some new elements are introduced. For the BSc a personal assessment module was developed to make students aware of their own qualities and to relate these to the choices within the BSc and MSc programmes. In the BSc programme these choices are located in the free choice courses and in the minor thesis; in the MSc programme these choices are located first of all in the choice of specialisation and the free choice courses. In addition career evenings are organised, where alumni, staff and KLV illustrate, how useful it is to develop your own network (see also Ziesak and Müller-Starck, 2010). Alumni reflect critically on their own choices during these evenings.

In the students advice it is stressed, that a good choice of an internship is vital for acquiring the right competences for a job. Hence, students with strong international ambitions are advised to look for international internships. Students with an ambition in Dutch jobs are advised to do their internship in the Netherlands. Nowadays about 30% of the all Wageningen alumni find a job directly related to their internship. In the MFN programme the present percentage is lower, partly due to a preference for interesting internships in developing countries, without good job opportunities. About 60% of the 2011-2012 graduates indicated, that they did an internship outside the Netherlands (IVA, 2013). Dutch students are still stimulated to gain international experience, even if they want a job in the Netherlands. They are advised to do this during their BSc study or for instance in the MSc thesis work.

The content of the BSc and MSc programmes and the many international students in the classes assure that students have enough experience with international aspects, a very important aspect too. Wageningen is aiming for an international classroom and international classes. In the study advice students are made aware of the possibilities to choose appropriate skills' training. The knowledge on forest and nature management is more and more combined with knowledge in other fields like recreation, communication, health (see PACT, 2014). In study advice and general meetings, the fields which can be combined with the domain of forest and nature, are indicated to give students inspiration for the selection of free choice courses in their BSc and MSc programmes. Besides, students are made aware of jobs outside the traditional fields of forest and nature. For example without the career evenings relatively few students turned out to be aware of the possibility to get a job in a company or to become an entrepreneur. It is stressed that they can follow their ambition to work in the "green" field, also by combining nature with other fields.

### *Minor changes in domain content*

The second line is to change the domain content of the BSc and MSc programmes a little. The general approach, that ecological, economic and social sciences are equally important for optimal conservation, protection and management of natural resources, is kept. Graduates have to be aware of all these aspects (also indicated by PACT, 2014 and HCA, 2013) and in addition to specialise in the field of policy and society, ecology or management. Through their academic training they know about theories of the ecology and biology of natural and semi-natural ecosystem and populations, and the social, economic and political forces, which ultimately lead to decisions in their use and management.

The programme committee decided to introduce a new course in the management specialisation dealing with resource dynamics and utilization. Ecosystem services and economics are also part of this course. After consultation of the external advisory board probably new adaptations will be discussed. This may lead to changes in the programmes, but also to a further change in study advice. In a constantly changing world the programme committee is constantly evaluating the curriculum of the BSc and MSc programmes to meet the state of the art academic standards and at the same time the needs of students and the labour market.

### *Develop learning lines*

The third line is to prepare graduates better for jobs by presenting ‘learning lines’, which are a specific combination of courses or choices within courses preparing for specific job types. The present general set-up will be kept. Students have to select a number of courses, depending on their specialisation and choice of thesis subject. Additionally all students have to do an internship of four months (24 credits), and a thesis of six months (36 credits). Furthermore they have to participate in so-called academic consultancy training, where they learn in an interdisciplinary group, to tackle a real world problem of a company or institution.

But the flexibility in the major parts of the programmes will be increased and specific free choice courses will be advised. By introducing learning lines the possibility for students to profile themselves more specifically is enhanced:

- Theoretical interested, excellent students, who intend to do a PhD after their MSc are allowed – after selection – to exchange the academic internship with a second thesis. They are also stimulated to follow a specific academic research training with, among others, an exercise in proposal writing for research grants.
- Students, who want to become entrepreneur or work as “entrepreneur” in a company may select a specific task during their academic consultancy training and follow a course on pursuing and realising entrepreneurial projects. The MSc study will become also a part of a European Education Programme on climate innovation (<http://www.climate-kic.org/>), in which entrepreneurship and climate are combined.
- The currently existing special track in diplomacy called sustainable development diplomacy will be promoted.

- A track focussing on information and communication technology will also be defined, because of the better job opportunities (IVA, 2013). In the free choice part of study students have the opportunity to choose GIS and remote sensing courses. If students are more than average interested in this field, they are advised to follow the WU MSc Geo-information Science, which can be combined with forest and nature elements.
- Moreover, students are advised to engage in specific courses in their free choice part of study. There are many high quality courses due to the presence of other MSc programmes (MSc communication science and MSc geo-information science) at WU and students are stimulated to select from these courses in their free choice part of study or to do two MSc's.

In the WO-monitor 2012 and 2013 (KLV, 2012, 2013 and IVA, 2012, 2013) and the career monitor (Mariën *et al.*, 2012) competences are indicated, which are relevant at the start of the career (see Table 3). Most are sufficiently present in the actual programmes. Three competency/skill-like topics seem to score lower than required. The “use of information and communication technology” can be tackled easily by the students by selecting the geo-information courses or communication courses. The competence “functioning well under pressure” and “making decisions” could be introduced as part of present course.

Concluding it can be said, that with the three lines of change mentioned above, it is expected, that the requirements of the traditional and new job market of forest and nature alumni can be met much better. Further discussions in the programme committee based on continuing graduate surveys and with the external advisory board will help to continue fine-tuning these and eventual other adaptations. However, the future is uncertain. On the one hand, job availability will increase due to the demographic situation on the labour market, many people retire, but on the other hand retirement age will rise. At the same time the general economic prospects are positive, but the financial attention for forest and nature management will not easily grow. In any case, the modifications presented above will improve the labour market position for students graduating from the WU MSc programme Forest and Nature Conservation.

## **Conclusions**

The study above shows, how changes in the forestry and nature labour market influenced the curriculum of the forest and nature programme. However, not all major changes are caused by the job market. One of the main questions, that the programme is facing, is whether the curriculum has to be changed in content or flexibility. Surveys on the job market turned out to be useful for the development of the programmes at the time of the major changes and especially for smaller adaptations in between the large changes. The start of the WU alumni survey was a result of a major change in job perspectives. The major role is that it gives specific information of the effect and requirements of programmes at the university level.

Presently the MSc programme Forest and Nature Conservation makes use of the results by improving the study advice, introduction of a new course and developing learning lines. Due to the flexibility of the programme students will be prepared better for the changing job market, while the high academic standards are kept.

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