

DO WE REALLY NEED FOREST SCIENCES?

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We came together to celebrate the recovery of Forest Sciences in Sarajevo after a terrible war and I am very glad to be here and to see the success of this demanding process. However, independently from the situation here, forestry and forest sciences are increasingly challenged. Many forest enterprises - at least in central Europe - have lost their profitability. The demand for professionals on all levels is decreasing and the value system within the human society is changing quickly. We are talking much about sustainability, but we are behaving in a very unsustainable way.

The classical professional field of forest engineers has changed during the last decade. For example, in Switzerland we produce annually 30-40 forest engineers, but currently only about 20% of them get a job as a forest manager. The others go into a very wide range of fields, e.g. applied information science, teaching, research, nature conservation, timber trade, wood technology, forest certification and public relations. An increasing proportion is working in private engineering enterprises or goes to foreign countries.

Do we really need these forest engineers and do the forest managers really need forest sciences? There is a German saying 'Glücklich ist die Forstpartie, der Wald der wächst auch ohne sie'. Forests are growing also without foresters and without forest sciences. And many forests are disappearing despite of them. There are alarming data of the world bank, showing that despite the long tradition of forestry and forest sciences, on the global scale more than one third of the timber production is still coming from illegal cutting. Forest destruction is responsible for a significant proportion of biodiversity loss and for production of approximately 20% of greenhouse gases. Important topics like nature conservation, wood certification and forest carbon trade are discussed largely outside forestry (Blaser, 2000). We talk much about sustainability, but can we really prove the successful application of this principle?

Forest sciences are reflecting somewhat the crisis of forestry. I prefer the plural 'sciences' here because I feel that there is no great unifying forest science available any more. The very different components of forest science have evolved into separate disciplines working with specific methods (Schanz et al. 1999). The forest is no protected research area - forest related problems are increasingly attractive also for other disciplines (e.g. geography, ecology, economics). Also forestry itself is becoming more pluralistic. At university level, there is also some competition from technical colleges (Fachhochschulen), which tend to absorb the more applied contents. There-

fore, many discussions are running on the question how to develop forestry curricula in an optimal way to meet the demands of the future (Fachhochschulen). The forest departments at universities in many central European countries are suffering from their small size. A small size is frequently regarded as a subcritical mass for really competitive research. Separation of the more applied forest research from other, more basic disciplines inhibits the transfer of new methods and ideas into forest management. As a consequence, in many universities, the fusion of forest departments with others like agriculture, environmental sciences and earth sciences is a common current phenomenon. For all these reasons the question, whether we - or better, the society - really needs specific forest sciences, seems to be justified. Let me try to give a - rather personal - answer:

Forests are a major component of the environment and the people depend - directly or indirectly - on the multiple benefits from forests - not only from wood. Forests are very complex ecosystems containing tremendous genetic information. The populations of organisms in the forest are - as a rule - really wild. We have to manage these ecosystems, because the global human population is growing and there is not enough space left. Thereby also the problems will grow. We need biodiversity, wood, water, protection against natural risks and recreation. We need 'forest security' as much as 'food security' (Ullsten, 1998). Pure wilderness is not enough. However, problems provide also chances, especially for science.

We need professional people who are able to generate adequate management options for forests and landscapes and who are able to manage these ecosystems, which contain wild populations and delicate natural processes, in a sustainable way. Thereby, the production and processing of forest products is an essential component. Moreover, we need such professionals also as vectors for the idea of sustainable development outside the forestry sector. For all these activities, a real understanding of the biological, socioeconomical and technical system is necessary. This knowledge is continuously generated by science. It is very difficult to manage a landscape without real knowledge, which can be communicated in a convincing way. Natural resources belong to the public or they are at least perceived as being public goods. The 21st century is the century of information and - hopefully - also democracy. If we want to contribute successfully to a wise handling of our natural resources in such a setting, we have to inform and to involve the people. I think, the scientific approach, which is generating clear questions and tries to answer them using a clear methodology, is the only one that really can convince people. At university level, teaching and research are inseparable. We need forest sciences to educate high quality professionals.

The idea of ecosystem management is evolving rapidly and there is a real need for a sound scientific basis for this approach (Kaufmann et al. 1994, Christensen et al. 1996, Kohm & Franklin 1997, Perry 1998). In the forest, we have some experience, but not for a much longer time than one generation of trees and our data are based on very few real experiments. We are acting within a very complex system, and our action is based on very incomplete information. In forest management, there is a gradual transition from the generation of knowledge to the application of knowledge. Therefore, I cannot see much differentiation between science and engineering or between pure and

applied science. Real progress will come from a transdisciplinary approach. We need a mutual understanding between researchers from different disciplines. This means that already the research questions have to be defined together (Schmid, 1990). Forest sciences clearly have such an integrative potential and forest scientists will play an increasingly important role at the interface between biology, technology and policy. Therefore, for all the reasons listed above, my answer to the question, whether we really need forest sciences, is clearly : Yes!

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DA LI ZAISTA TREBAMO ŠUMARSKE NAUKE?

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Došli smo da proslavimo obnovu Šumarskog fakulteta u Sarajevu, nakon strašnog rata i vrlo sam radostan da sam ovdje i da mogu vidjeti uspjeh ovog zahtjevnog procesa. Međutim, neovisno od ovdašnje situacije šumarstvo i šumarske nauke su sve izazovnije. Mnoga preduzeća šumarstva - bar u centralnoj Evropi - su izgubila svoju profitabilnost. Opada potreba za stručnjacima svih nivoa, a sistemske vrijednosti humanog društva se brzo mijenjaju. Mnogo razgovaramo o održivom razvoju, ali se ponašamo suprotno.

Klasično područje rada šumarskog inženjera se u posljednjoj dekadi promijenilo. Na primjer, u Švicarskoj godišnje proizvodimo 30-40 šumarskih inženjera, ali danas samo njih oko 20% dobije zaposlenje u preduzećima šumarstva. Ostali odlaze u druge djelatnosti vrlo različitih područja, kao što su: primjenjene informacione nauke, školstvo, nauka, zaštita prirode, trgovina drvetom, tehnologija prerade drveta, certificiranje šuma i javne službe. Sve veći broj se zapošljava u privatnim građevinskim preduzećima ili idu u strane zemlje.

Da li mi zaista trebamo ove šumarske inženjere i da li šumarstvo zaista treba šumarsku nauku? Postoji njemačka izreka 'Glücklich ist die Forstpartie, der Wald der wächst auch ohne sie'. Šume također rastu bez šumara i bez šumarske nauke. Mnoge šume nestaju usprkos njima. Postoje zabrinjavajući podaci Svjetske banke koji pokazuju da je, i pored duge tradicije šumarstva i šumarskih nauka, na globalnom planu više od jedne trećine proizvodnje drveta još uvijek iz nezakonitih sječa. Destrukcija šuma je u značajnoj mjeri kriva za gubitak biodiverziteta i za proizvodnju oko 20% stakleničkih gasova. Važne teme kao što su zaštita prirode, certifikacija šuma i trgovina šumskim ugljikom su široko razmatrane izvan šumarstva (Blaser, 2000). Mnogo razgovaramo o održivom razvoju, ali da li uistinu možemo potvrditi uspješnu primjenu ovog principa?

Šumarske nauke odražavaju neku vrstu krize šumarstva. Ovdje preferiram pluralne 'nauke' jer mislim da danas više ne postoji jedinstvena šumarska nauka. Vrlo različiti dijelovi šumarske nauke su se razvili u posebne discipline koristeći specifične metode (Schanz et al. 1999). Šuma nije zaštićeno područje istraživanja - problemi vezani za šumu su sve više privlačni i za druge discipline (na primjer, geografiju, ekologiju, ekonomiju). Samo šumarstvo, također, postaje više pluralno. Na univerzitetskom nivou postoji kompeticija tehničkih kolega (Fachhochschulen), koji teže da prisvoje sadržaje veće primjenjivosti. Zbog toga se vode mnoge diskusije o pitanju kako sačiniti optimalan nastavni program šumarstva koji bi odgovarao zahtjevima budućnosti (Fachhochschulen). Šumarski fakulteti na univerzitetima mnogih zemalja centralne Evrope trpe zbog malog prostora. Mali prostor je često u vezi sa subkritičnom masom istinski kompetitivnih istraživanja. Izdvajanje primjenjivijih

šumarskih istraživanja od drugih fundamentalnijih disciplina, inhibira transfer novih metoda i ideja u preduzeća šumarstva. Kao posljedica, spajanje šumarskih fakulteta sa drugim, kao što je poljoprivreda, nauka o zaštiti životne sredine, nauka o zemljištu, danas je česta pojava na mnogim univerzitetima. Zbog svih ovih razloga pitanje da li mi - ili bolje, društvo - zaista treba specifične šumarske nauke, izleda opravdanim.

Dozvolite mi da dam - svoj lični - odgovor.

Šume su glavna komponenta životne sredine i ljudi ovise - direktno ili indirektno - o višestrukim koristima šuma, a ne samo od drveta. Šume su vrlo kompleksni ekosistemi koji sadrže ogromne genetičke informacije. Populacije organizama u šumama su - kao pravilo - istinski divlje. Trebamo upravljati ovim sistemima, jer globalno populacija ljudi raste i nema dovoljno slobodnog mjesta. Usljed toga će i problemi rasti. Mi trebamo biodiverzitet, drvo, vodu, zaštitu od prirodnih nepogoda i rekreaciju. Trebamo 'bezbjednost šuma' jednako kao 'bezbjednost hrane' (Ullsten, 1998). Čiste divljine je nedovoljno. Ali, ovi problemi stvaraju i šansu, naročito nauci. Trebamo profesionalne ljude sposobne da generiraju odgovarajući način gospodarenja šumama i okolišom, ljude sposobne da upravljaju ovim sistemima, koji sadrže divlje populacije i složene prirodne procese, na način održivosti (potrajnosti). Zbog toga je proizvodnja i prerada proizvoda šuma bitna komponenta. Dalje, takve stručnjake trebamo i kao prenosiocje ideja održivog razvoja izvan sektora šumarstva. Za sve ove aktivnosti potrebno je istinsko razumjevanje bioloških, socioekonomskih i tehničkih sistema. Ovo znanje kontinuirano generira nauka. Teško je upravljati okolišom bez pravog znanja koje može saopćavati na uvjerljiv način. Prirodni resursi su javni ili se bar prihvaćaju kao da su javno dobro. Stoljeće 21. je stoljeće informacija i također - nadamo se - demokracije. Ako želimo da uspješno doprinesemo razboritom rukovanju prirodnim resursima u ovakvim okolnostima, trebamo da informiramo i uključimo sve ljude. Lično mislim da naučni pristup, koji generira jasna pitanja i pokušava na njih da odgovori korištenjem jasne metodologije, je jedini put koji istinski može ubijediti ljude. Na univerzitetskom nivou, obrazovanje i istraživanje su nerazdvojni. Mi trebamo šumarske nauke radi edukacije visoko kvalitetnih stručnjaka.

Ideja upravljanja ekosistemom se razvija brzo i zaista postoji potreba za zdravu naučnu osnovu za ovakav pristup (Kaufmann et al. 1994, Christensen et al. 1996, Kohm & Franklin 1997, Perry 1998). O šumi imamo neka iskustva ali ne za mnogo duže vrijeme nego što je jedna generacija stabala, i naši podaci baziraju na vrlo malo pravih eksperimenata. Bavimo se vrlo kompleksnim sistemom a naša aktivnost se bazira na vrlo nepotpunim informacijama. U preduzećima šumarstva postoji postepen prelaz od stvaranja znanja ka primjeni znanja. Zbog toga, ne mogu da vidim veliku razliku između nauke i inžinjerina ili između čiste i primjene nauke. Pravi napredak će nastati interdisciplinarnim pristupom. Trebamo međusobno razumjevanje između istraživača različitih disciplina. Ovo znači da se već istraživačka pitanja trebaju definisati zajedno (Schmid, 1990). Šumarske nauke jasno imaju takav integrativni potencijal i šumarski naučnici će sve više igrati važnu ulogu povezivanja biologije, tehnologije i politike.

Zato, zbog svih gore navedenih razloga, moj odgovor na pitanje, da li zaista trebamo šumarske nauke, je jasan: DA!

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