*Perspectives**

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Research and resource-dependent communities: A world of possibilities

Robert Kozak[1]

Abstract

The recent International Union of Forest Research Organizations (IUFRO) World Congress, held in Brisbane, Australia, showcased a wide variety of high-quality presentations related to forestry research from around the globe. Little of this research, however, can be extended to forest-dependent communities in British Columbia, despite the need to transform the province's forest economy from a commodity orientation to a more diversified approach. Possible exceptions include opportunities to promote the value-added wood products industry, develop a meaningful non-timber forest products and services sector, and incorporate innovative approaches into core business strategies and modes of operation. In this paper, I also argue that much of today's forestry research does not consider the "big picture," especially concerning sustainability issues and our current ecological footprint. We have come to a juncture in time wherein forestry researchers should take a leadership role with bold, innovative, and interdisciplinary work that serves to benefit the environment, the economy, and society as a whole.

KEYWORDS: *forest products, forestry research, globalization, resource-dependent communities, sustainability.*

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* Editor's Note

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Introduction

I was asked by the FORREX AGM conference organizers to predict what forests and forested ecosystems would look like in 2100, and summarize some of the crucial information from the 22nd International Union of Forest Research Organizations (IUFRO) World Congress in Brisbane, Australia. In short, the intent was to provide a picture of where we are now in forestry, where we are going, and how some of what was discussed at the IUFRO Congress could help to get us there. More specifically, what is happening out there in the world of forestry research and how can some of this research be applied to resource-dependent communities in British Columbia?

Although the recent Congress was truly an exceptional event, I did not, unfortunately, come back with a huge basket of ideas that the province could take to the bank (although there were some). In fact, I couldn't help but walk away from it worried about the general state of forestry research and a seemingly pervasive myopia throughout the research community. I did, however, gain a great deal of insight about the direction in which forest researchers are headed and that is the theme of this paper.

Robert Kozak, Associate Professor, Faculty of Forestry, University of British Columbia.

Predictions for 2100

Making predictions about what forested ecosystems will look like in 100 years is a dangerous proposition. Typically, predictions are fraught with error and predictions in forestry are certainly no exception. One need only turn back the clock 100 years to see Gifford Pinchot, the first Chief of the US Forest Service, making this famous and ill-fated prediction in 1907:

> *. . . result shows a probable duration of our supplies of lumber of not more than 33 years. [It] is certain that the United States has already crossed the verge of a timber famine.*

And just 25 years ago it would have been impossible to predict that the market share for structural plywood—one of British Columbia's bread and butter products—would be all but wiped out by something called OSB (oriented strand board), a product that uses flakes of aspen, which was once considered a weed species. This sort of product obsolescence should have us questioning whether or not a product like dimension lumber will even exist in 2100.

All that said, I am still willing to make one prediction, or at least provide a forewarning. This is based on the work of two noted economists, Roger Martin and Michael Porter, who, in their seminal analysis of Canadian competitiveness, stated the following:

> *[Canada is] standing at a crossroads, facing a choice of whether to tackle serious weaknesses in its microeconomic fundamentals of competitiveness or accepting a lower standard of living. The past nine years show that Canada pursued the latter road.* (Martin and Porter 2000:2)

Essentially what they mean by "microeconomic fundamentals" is that we in Canada have a choice: either we stop relying on commodity products, such as lumber and pulp and paper, and start to innovate, or we lower our standard of living. It is true that we have enjoyed

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tremendous wealth from producing these products, but now we find ourselves a bit out of step. Despite an abundance of high-quality fibre, we are simply no longer well positioned to compete. Competitiveness in the commodity game is fleeting and highly dependent on the ability to produce cheaply; however, in Canada and British Columbia we must contend with high resource and extraction costs, long rotation ages, high labour rates, generous worker benefits, and stringent environmental policies. Moreover, we are faced with the twin threats of globalization—lower-cost producers from around the world producing lower-cost goods (increasingly from tree plantations). A stud is a stud is a stud . . . it no longer matters that it comes from Russia, China, Chile, or the southern United States. The only way that mills can compete is by minimizing the costs of production through increased volumes and efficiencies.

Unfortunately, this need to compete on costs and efficiencies alone has, in some ways, backfired. For instance, if we look at commodity prices over time, we see, not surprisingly, a long-term downward trend[1] as mills around the world try to produce more and more at lower and lower costs. Regrettably, these spiralling prices do not bode well for Canada, a nation that is highly dependent on its global commodity exports. Many IUFRO Congress presenters spoke to "poverty alleviation" within the context of forestry. In Canada, it is easy to dismiss this topic as a problem that occurs only in developing regions. If we continue our over-reliance on commodity production, however, poverty alleviation may become a very real issue—we already see this in many resource-dependent communities around British Columbia.

I am not suggesting that we should move away from producing commodity products; dimension lumber and pulp and paper have long been, and will continue to be, two of the province's important economic engines. However, I would suggest that we seek a more balanced approach by considering alternative means of deriving value from our forests. One could argue that if we continue to compete against global producers with clear cost advantages, not only is this economically imprudent, but it is almost certainly unsustainable as we will need to relegate environmental and social interests to the margins. In other words, continuing to vie for market share in an increasingly global, competitive, and cost-driven commodity game may mean that we compromise our environmental and social standards and, ultimately, our quality of life.

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At the moment, Canada should capitalize on its strengths—our abundance of high-quality wood, magnificent "natural" forested ecosystems, and good old-fashioned Canadian know-how—and envision a forest sector that encompasses a wide range of timber and non-timber values. At the very least, it is reasonable and rational to question a production strategy that is currently dominated by lower-value goods, such as dimension lumber and pulp and paper.

The 22nd IUFRO World Congress: The Big Picture

We forest scientists, trying to save the world one tree at a time, sometimes have difficulty adjusting the focal lengths on our individual research projects. Consequently, we lose sight of the bigger picture. For example, the 22nd IUFRO World Congress in Brisbane was a world-class event, but it meant travelling a great distance. We would need to plant approximately 40 000 trees[2] to offset the greenhouse gas emissions of all those conference delegates who flew to this conference.

In my view, the big picture assumes a relatively simple framework.[3] A finite amount of natural capital exists on this planet and, over time, we have drawn down that natural capital. We first began to perturb ecosystems as hunter-gatherers. Then, some 8000 years ago, we hit an inflection point where we began to draw from nature at higher and higher rates. This was the beginning of the agricultural and industrial revolutions and was characterized by the introduction of technology.

[1] See the Commodity Research Bureau (CRB) for further details (*www.crbtrader.com*).

[2] Obviously, this calculation depends on species, stocking density, site conditions, climate, etc. The interested reader is directed to carbon calculators available at *www.carbonneutral.com* **or** *www.climatecare.org*

[3] I credit Jon O'Riordan, formerly of the British Columbia Ministry of Environment, for introducing this "big picture" framework to me during a public lecture in 2004 at the University of British Columbia's Faculty of Forestry.

The advent of technology introduces an interesting paradox. The expansionist paradigm tells us that, as our global economy grows, humans should be able to tame nature with technological tools that liberate us from our dependence on natural resources. This explains the concept of the plantation, which is essentially an abstraction of a forest. At the same time, humans are a "patch disturbance" species and, for the most part, technology has served to escalate the scale and intensity of the patches we disturb (Rees 2002, 2003). Technology effectively allowed us to produce and consume at ever-increasing rates.

So where has that left us? What is our current ecological footprint? Well, no matter how you slice it up—forests, fisheries, climate, fossil fuels, fresh water—the picture is not rosy and the problem is truly global in scale.[4] For example, Bill Rees estimates that, "three additional Earth-like planets would be required to support just the *present* population sustainably if everyone enjoyed Canadian material standards" (Rees 2003).

And amidst this, we continue to consume at alarming rates, especially in North America. In the United States, for example, an average of 136 lbs (~62 kg) of resources are consumed per person each year, and this production generates about 2000 lbs (~907 kg) of waste through industrial processes, packaging, and so forth, the majority of which can never be assimilated back into nature (Hawken 1993). We can talk about "sustainable forest management" of individual stands and landscapes as much as we like, but let's remember that this notion may be nothing more than a house of cards when, collectively, we are not living within our means.

Although some sectors are clearly worse than others, the forest sector is by no means immune to this drawdown of natural capital, despite our best efforts to manage our forests sustainably. One need only compare global production of roundwood with consumption patterns to see that this is true (especially when we factor in our growing dependence on plantation forests and the need to feed an increasingly consumptive North American life style). *Research on sustainability in forestry must take consumption into account.* Huge volumes of timber feed the roughly 2 million housing starts in North America and this should raise many questions, such as:

- Do we really need to live in 5000-ft^2 houses?
- Why do we not design houses to last hundreds of years like we used to?
- Why are we not designing for disassembly, recycling, and re-use?
- What can we do about all of the junk mail and packaging that gets dumped on our laps?

Research on sustainability in forestry must take consumption into account.

These are all tough questions with clear economic implications, but someone needs to pose them. Unfortunately, these questions were not being asked at the 22nd IUFRO World Congress.

So where can we go from here? What does (or can) the future hold for us? Three plausible futures or scenarios include maintaining the status quo, encouraging ecoefficiency, or promoting a restorative economy.

Status Quo

We can keep on the path that has taken us to our current global ecological footprint and continue to draw down our natural capital even further. Technology will possibly be the white knight in this scenario, although (as it stands) technology has been largely the domain of corporate interests with the objectives of profit, not the environment. Most of the IUFRO World Congress presentations I saw would fit into this "status quo" scenario—that is, industry-driven research on how we can make things faster and cheaper to feed our ever-increasing consumer appetites.

British Columbia already does an exceedingly good job of manufacturing commodity products, so it is unclear what lessons we could learn here. I was struck by how often I heard about "growing the demand pie." In another instance, a desperate plea was made for scientists to figure out how to grow trees with easily removable lignin, the basic building block of wood, in order to make the pulping process cheaper (apparently trees make for great pulp furnish, if only we can get rid of the pesky wood inside of them). Another leading researcher was beside himself with the promise of nanotechnology as a means of creating cellulose nanofibres from wood as a substitute for carbon fibres.

[4] For further details, the reader is directed to the Millennium Ecosystem Assessment (*www.millenniumassessment.org*).

To be honest, I do not know what these would be used for, but I cannot think of a better way to commodify our resource base than to deconstruct it to its bare essentials.

Ecoefficiency

We can still draw down natural capital, but do so in a more intelligent manner. For example, it is possible to increase wealth while reducing resource extraction. To that end, the ecoefficiency scenario recognizes the importance of responsible business practices, sustainable forest management, value-added wood products, and energy efficiency; however, we are still taking from nature faster than we are putting any of it back.

Some of the IUFRO World Congress research presentations addressed questions related to ecoefficiency, but much fewer than I anticipated. For example, value-added wood products are a generally agreed-upon means of generating wealth by using less resources, yet I could find only two presentations that explicitly discussed the need to catalyze the value-added sector.

Restorative Economy

We can reduce our ecological footprint by effectively going beyond sustainability and restoring degraded habitats back to their fullest biological potential. This requires a paradigm shift (i.e., another inflection point in our historical development), but economic development is still the driver here. In a restorative economy, we would attempt to integrate industrial processes with nature by emphasizing zero waste, custodial ownership of goods along the entire supply chain, environmental taxes as a means of promoting innovation, and the valuation of ecosystem services (see Hawken [1993] for more information on this concept). Although this may seem like a Utopian ideal, it is something to aim for. And who is better positioned to take the lead on this sort of paradigm shift than the forest sector? One need only examine the forest sector's discourse around the valuation of non-excludable public goods (e.g., carbon sequestration, water quality) to realize that we are ahead of the curve in thinking about these sorts of issues compared to many other sectors. Unfortunately, with the exception of a few presentations on the valuation of ecosystem services, very little research presented at the IUFRO World Congress addressed the notion of a restorative economy.

How can we move our forest research programs to embrace this notion of a restorative economy? I would argue that it depends on the types of research questions we ask. For example, while the relative merits of forest certification are still not fully understood, I heard (yet another) talk on consumer acceptance of certified wood products at the World Congress. Interestingly, 98% of the consumers surveyed had either never heard of forest certification or did not understand what it was. But then came the inevitable question about certification as a market-based incentive tool: *Are consumers willing to pay a premium for certified wood?* The answer was a resounding "No."

If we were working within a restorative economy framework, however, the question would be posed in a very different manner. In a restorative economy, we would conclude that non-sustainably harvested wood costs the environment and society more than wood that is sustainably harvested. Thus, if a premium is to be paid, it should be for wood that is not certified. The appropriate research questions would, therefore, examine the mechanisms we can use to charge a premium for wood that does *not* come from a sustainably managed forest. For instance, should we legislate an environmental tax for wood that is not certified?

The 22nd IUFRO World Congress: Cross-Cutting Themes

I noted some very interesting, timely, and recurring themes at the 22nd IUFRO World Congress. These themes, which are outlined below, revolved around sustainability, paradigm shifts, entrepreneurship, societal issues, globalization, policy implications, and research.

Sustainability

Everyone is talking about sustainability and this is, for the most part, a good thing—we are all talking a common language; however, not everyone has the same understanding of sustainability and connotations vary both across cultures and society at large. One researcher from the Center for International Forestry Research went so far as to suggest that the endless search for a globally accepted definition of sustainability is pointless and that we should concentrate our efforts on avoiding irreversibility and adaptively managing for resilience. I would go one step further and say that there is an inherent danger when everyone is talking about sustainability. Like the term "political correctness," "sustainability" could become nothing more than a thin veneer of truth—if we say it enough times, we begin to believe that it is true when maybe it is not.

Paradigm Shifts

This is an exciting time in forestry as we find ourselves sitting at the precipice of numerous paradigm shifts. For example, we have recently moved from sustained yield forestry to sustainable forest management to more ecosystem-based approaches. There also seems to be another movement afoot from neoclassical economics approaches, which tell us that the Exxon Valdez oil spill is a positive contribution to the GDP, to ecological economics, which views the economy as a subset of the environment. Our research programs should reflect these changes in a manner that moves this discourse forward.

Entrepreneurship

Although a more careful consideration of ecological issues is warranted, the market economy will not disappear. In fact, we need entrepreneurship more than ever, especially as companies are forced to innovate in ways that meet the triple bottom line of profits, the environment, and society.

Societal Issues

The research community increasingly recognizes the importance of societal issues in forest management and the complexity inherent in dealing with multiple stakeholders. Our research programs should focus on a better understanding of society's needs and on developing tools that encourage participatory decision making.

Globalization

This huge theme is on everyone's mind. Globalization is the proverbial double-edged sword—an opportunity for some, a threat to others. A researcher from the UN–FAO made this point: globalization is a man-made process and there is no reason to believe that it will necessarily exist in 50–100 years.

Policy Implications

Of course, policy implications underpin all of these themes and I would suggest that policy decisions should reflect the true costs of producing goods from nature. Although markets are a wonderful arena for setting prices, they are not very good at determining costs, especially where externalities are concerned. Policy can and should help to guide us away from Adam Smith's "invisible hand" by taking into account *all* of society's needs and informing the debate on *how* we should be valuing them.

Forestry deals with complex social, spatial, and temporal scales; we, therefore, need to work together in research teams and strive for interdisciplinary and trans-disciplinary solutions.

Research

One keynote speaker categorized the research community as "academically conservative." Some pressing issues need to be addressed concerning sustainability and a real opportunity exists for forest researchers to take bold steps and lead the way. That said, forestry deals with complex social, spatial, and temporal scales; we, therefore, need to work together in research teams and strive for interdisciplinary and trans-disciplinary solutions.

The 22nd IUFRO World Congress: Opportunities for British Columbia

From the presentations I was able to attend at the IUFRO World Congress, I gleaned three opportunities for the British Columbia forest sector that, I believe, hold the highest potential for success. These involve opportunities surrounding value-added wood products, non-timber goods and services, and new business approaches.

Value-Added Wood Products

The importance of value-added products in British Columbia is something that we all seem to agree on, and yet, it is difficult for this sector to gain traction. Given our abundance of high-quality wood resources, expanding the province's value-added sector beyond just rhetoric should be possible. One need only look at Denmark, a small country with arguably the most successful furniture-producing sector in the world. Denmark has succeeded in the face of insurmountable odds—very high labour rates and comparatively little in the way of a domestic resource base. The key to its success is simply a smart approach to business, and, specifically, an acknowledgement of the importance of design and technology. For example, the Jacobsen #3107 dining room chair, one of the most successful industrial designs ever, retails for about $600, but uses less than $20 of raw materials—this is "value-added."

Some might argue that British Columbia cannot compete against Asian manufacturers who produce commodified, value-added products cheaply. Research in the United States suggests that plenty of opportunities still exist for value-added producers and that we should take advantage of both our proximity to large consumer markets (most notably the United States) and our ability to provide customer service. In other words, we can provide unique systems- and solutions-based products, such as factory-built homes, cabinetry, and office furniture, that differentiate us from lower-end manufacturers. We have the ability to design, install, service, and provide mass customization, but, again, this requires business savvy. For example, instead of producing furniture, British Columbia producers could be looking at "furnishings" solutions for the entire house.

Finally, Danish and British research suggests that health problems related to our modern lifestyles cannot be addressed by medicine alone and that natural spaces and materials can improve physical and mental health. This may be a bit "out there," but perhaps we can use this sort of information to differentiate value-added wood products used in appearance applications as a healthy alternative for use in houses, hospitals, schools, and offices.

Non-Timber Goods and Services

Opportunities also exist for non-timber goods and services in British Columbia. A simple, but telling, case study out of South Africa compared traditional timber harvesting with sustainable bark harvesting for medicinal purposes. Over a 1100 ha area, the potential income from bark harvesting was $30 million compared to $15 million for traditional timber harvesting (and this does not include the potential for other non-timber forest products such as fruits, fibre crafts, and other medicines). This case is now a reality—a small community-based enterprise, which began in early 2005, has already generated about $8 million in sales, and has had a major effect on the livelihoods of one local community. In British Columbia, I would argue that similar opportunities exist for salal, syrups, berries, medicines, and mushrooms.

Similarly, opportunities for and examples of environmental services abound around the world. For instance, I think a close look at the development of Costa Rican ecotourism is warranted. In the last 5 years, $100 million has been spent to improve the infrastructure over 400 000 ha in this country. This represents a relatively small investment, considering that Costa Rica now has one of the most successful ecotourism sectors in the world.

Lastly, opportunities exist in British Columbia for valuing more esoteric ecosystem services such as carbon sequestration, air quality, water quality, biodiversity, and so forth. One World Congress presentation, by a researcher from the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia, personally resonated with me. Researchers here have developed some fairly sophisticated on-the-ground methods (beyond just market-based incentives) for valuing ecosystem services. More importantly, they have deployed some of these valuation methods in real-world applications. For instance, road erosion caused by increasing water levels is a huge problem in Australia. The solution was simply to pay landowners to plant trees commensurate to the deferred cost of road repairs. Again, many such examples and lessons exist, but the key to successful valuation of ecosystem services seems to involve maintaining a manageable scale and the ability to convey tangible benefits easily.

New Business Approaches

As a result of shifting paradigms in forestry, many new business approaches are on the horizon. For example, community approaches such as community-managed forests are becoming increasingly commonplace around the world, and I saw two excellent presentations on such approaches in Mexico and Guatemala. In Massachusetts, woodlot owners are banding together to manufacture value-added products co-operatively.[5] This is a business model that is worth exploring further, especially as a means to take advantage of the economies of scale that are created by working together.

Some innovative supply chain approaches were also showcased at the IUFRO World Congress. One with relevance for British Columbia involves a portable technology, created by Forest Research in New Zealand, that measures the quality of wood contained within stems of logs and standing trees. While not strictly a business approach, this innovation does have very real business implications, most notably the segregation of logs according to their optimal end-use. Clearly, this can be beneficial in determining which trees are best suited to commodity products and which ones are best suited to higher-value applications.

[5] This approach was attempted at the Shared Use Facility in Quesnel, B.C., with some degree of success (see Kozak and Hartridge [2000]).

Lastly, other recent business innovations include the advent of practices that deal with environmental and sustainable marketing and corporate social responsibility. In many ways, forest companies have already incorporated many of these ideals into their strategies, but a great deal of research outside the domain of forestry is still applicable. For example, how can companies seek to implement approaches that are not only good for profitability, but also serve to benefit the environment and society as a whole?

Concluding Thoughts

These are exciting and dynamic times in forestry. Forest researchers sit in the privileged position of changing the world for the better, if they wish. Let's take on this leadership role with bold, interdisciplinary research programs that truly capture the complexity of forest ecosystems and the needs of communities that depend upon them. And let us heed the words of another great leader . . .

> *Earth provides enough to satisfy every man's need . . . but not every man's greed.* — *Mahatma Gandhi*

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Test Your Knowledge . . .

Research and resource-dependent communities: A world of possibilities

How well can you recall some of the main messages in the preceding perspectives paper? Test your knowledge by answering the following questions.

1. How will globalization affect resource-dependent communities in British Columbia?
2. Why is it important that British Columbia's forest sector move from a commodity focus to a more balanced approach?
3. What are some possible ways to create a more diversified forest products sector in British Columbia?
4. What can society do to be more sustainable?