



Community forestry research in Canada: A bibliometric perspective



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ABSTRACT

A bibliometric analysis of community forestry research outputs in Canada was undertaken to 1) better understand the current status as well as spatial and temporal trends in research published in peer-reviewed journals, 2) identify gaps in the research literature, and 3) provide baseline data to inform future research. For each publication, information on several core metrics was gathered, for example: (i) year of publication, (ii) number of authors, (iii) author affiliation, (iv) gender and role, (v) journal title, (vi) citation count and (vii) keywords. Temporal and spatial trends were analysed to detect periods of heightened activity and geographical focus. Using a systematic and comprehensive approach we identified 85 papers published in peer-reviewed journals between 1935 and 2014. Research output during WWII and 1990 onwards corresponds with the implementation of provincial policy and programs initiated for conservation, economic development, and to resolve social unrest. Notably, most papers analysed originated from social science research, particularly geography, and not forestry or the biophysical sciences presenting a clear disciplinary gap. Findings portray the temporal, spatial, and thematic evolution of community forestry research and policy in Canada.

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1. Introduction: community forestry in Canada

Community forestry is a globally established approach to managing publically accessible forests in order to benefit local constituents (Charnley and Poe, 2007; Maryudi et al., 2012; Pagdee et al., 2006; Robson, 2014; Teitelbaum, 2014). In Canada, as in many countries throughout the world, this has entailed devolving government control of forest lands and resources to citizens and local groups, as well as establishing new government programs, policies, legislation, organizations, and information to guide and support implementation. While the concept and practice of community forestry is not new in Canada, since about the 1990s practice and enabling policy have steadily evolved (Bullock and Hanna, 2012). For example, provincial policy changes have been made in the provinces of British Columbia, Quebec, Ontario, and most recently, Nova Scotia, to increase local and Aboriginal involvement in the forest sector (Benner et al., 2014; MacLellan and Duinker, 2012; Teitelbaum and Bullock, 2012). Such reforms have unfolded alongside lively public debates as well as a growing body of academic research intended to probe, influence and inform community forestry policy and practice at different levels of scale.

Gaining access to required information—whether through dispersed sources or via specialized databases of complete and organized information—remains a key challenge for community forestry researchers, practitioners, and policy makers (Bullock and Hanna,

2012; Bullock et al., 2009; Thomson, 2005). As a starting point, no comprehensive and systematic inventory of published community forestry research has ever been published.¹ Existing literature reviews of Canadian research are also now outdated (e.g. Duinker et al., 1994). Teitelbaum et al. (2006) observed an overemphasis of a select few “recycled” cases that have been revisited by researchers and analysts, even though a broader literature and portfolio of expertise exists. There is no complete record of previous work that could be usefully accessed to inform research during what is a significant period of forest policy change and debate in Canada (Haley and Nelson, 2007; Kant, 2009). Just as failing to reach out beyond conventional interests can limit the knowledge that gets incorporated into community forestry decision making (Reed and McIlveen, 2006), lack of attention and access to the full range of research could be constraining professional and public perspectives on community forestry in Canada and similar regions.

There is a need to inventory and scrutinize community forestry research outputs to address a significant void in the forest policy research literature. There are benefits for researchers, policy makers and practitioners in both Canada and internationally from a review of Canada's community forestry literature. Bibliometrics offers an appropriate analytical method to gauge research outputs. The main objectives of this study are to

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¹ Some bibliographies have been compiled however they are not widely known or readily available (e.g., Sherry et al., 2003).

- better understand the status and trends of research and professional views published in journals;
- identify gaps in the community forestry literature, and;
- provide baseline data to inform future research.

The remaining sections of the paper are dedicated to 1) situating our study within the broader literature and outlining the methods we used for a bibliometric analysis of community forestry research, 2) presenting results from our analysis of a literature spanning 80 years, and 3) identifying research gaps and opportunities in the context of Canada's evolving forest politics.

2. Bibliometrics and community forestry research

The term 'bibliometrics' was first used in 1969 by Alan Pritchard to describe a method for analysing written information (Lawani, 1981). Bibliometric approaches to research evaluation have since become established and offer a useful tool to survey trends in entire disciplines as well as thematic areas of research. For example, bibliometric studies have been used to ambitiously investigate the thematic focus of entire fields, such as ecological economics (Castro e Silva and Teixeira, 2011), ecology (Neff and Corley, 2009) and, more specifically, forest ecology (Song and Zhao, 2013). Others have undertaken bibliometric analyses of thematic research areas such as green-roof development (Blank et al., 2013) and biodiversity (Liu et al., 2011). Leipold (2014) identified broad trends and gaps in international forest-related discourse research to note differences in methods and content.

Related to the current research, bibliometrics have been applied to forest research networks. Klenk et al. (2010) tracked the impact of the Sustainable Forest Management Network (SFMN) by assessing research outputs and citations. Their main findings demonstrated the areas of highest research output for the SFMN (i.e., economics, sociology, political science, and law), the significant influence of SFMN research in the development of the field of Aboriginal forestry, and that social science research funded by the SFMN achieved citation counts in keeping with international trends. Bonnell (2012) also used a bibliometrics approach to examine research trends within the Canadian Model Forest Network (CMFN). He found an increased thematic focus on the boreal, wildlife, and forest management within Model Forest research, as well as an overall focus on natural science research. Bonnell (2012) also noted a growing trend in national collaborative research by tracking relationships among researchers. As indicated by previous research, a main advantage of bibliometrics is the ability to select particular aspects of research outputs to assess and track over time, making it an ideal approach for analysing the status, gaps, and trends in a given area of research.

Bibliometrics research uses specific measures to focus on citation and impact factor evaluations, as well as to detect changes and trends in the conduct and content of research (Klenk et al., 2010; Liu et al., 2011). The most common metric is *year of publication*, which indicates changes in research activity, interest, and even funding availability as a field of research evolves (Blank et al., 2013; Hu et al., 2010; Klenk et al., 2010; Liu et al., 2011). The number of articles published, themes addressed, and questions explored through time may reflect developments in government policy, non-governmental initiatives, or other relevant areas. Observing trends in the *number of authors* on publications, whether papers are collaboratively (across geographical and organizational scales) or individually authored, points to the mode of research and level of collegial involvement (Nederhof, 2006). Collaborative research is frequently associated with the "team oriented" approach of the natural sciences, while an individual or "single scholar" approach to research is more characteristic of the social sciences (Klenk et al., 2010; Nederhof, 2006). When authorship is coupled with information about affiliations, this can also speak to the degree of interdisciplinarity on a research team and number of researchers dedicated to the research

area. The *affiliation* of authors is a metric frequently analysed at regional, national, and international scales (Zhang et al., 2010). Affiliation can indicate the number and types of institutions involved in research output, geographic regions of focus, and emerging authorship patterns. Affiliation also tells something about the researchers as author names and affiliation can, with verification, indicate professional *role* and *gender*. Diversity of *journal titles* can outline the breadth of prospective audiences and readership (Bonnell, 2012). Highly active journals also represent where the research is being directed as well as the leading publication sources or core journals for a field (Hu et al., 2010). *Citation counts* demonstrate the potential influence and impact of research articles (Klenk et al., 2010). *Keywords* provide insight into the evolution of a subject as an "overview of trends" is demonstrated through keyword selection and frequency of use (Leipold, 2014; Liu et al., 2011). Keywords may also be used to predict future research directions (Hu et al., 2010). Likewise, emergent themes can indicate where research is heading, the most prominent research topics, and the breadth of the existing body of research (Bonnell, 2012; Castro e Silva and Teixeira, 2011).

There are also confounding factors, most notably larger changes in societal and professional norms that have taken place over the almost eight decades this study covers. There have been changes in both the format and peer-review process of academic papers. The structure, length, and number of references in articles have grown and the peer-review process itself has slowed down and become more rigorous (Ellison, 2002, 2009). In addition, Persson et al. (2004) note that collaboration, co-authorship, the number of publications and citations have all increased. Of particular relevance to our research, the number of forestry journals has also increased (Malesios and Arabatzis, 2012). Widespread use of the internet now also provides alternative opportunities for knowledge dissemination (i.e., e-publication) (Ellison, 2009; van Raan, 2005). Our findings must be viewed with acknowledgement of the changing context for research. Below, we present how the above measures were applied to analyse community forestry research.

3. Methods

Community forestry articles were collected from ISI Web of Science, EBSCO Academic Premier, and Science Direct. ISI Web of Science is considered to be one of the most comprehensive and extensively used academic databases for literature reviews and research analysis (Cañas-Guerrero et al., 2013; Klenk et al., 2010; Liu et al., 2011; Nederhof, 2006). However, to maximize survey comprehensiveness, additional searches were conducted using EBSCO Academic Premier and Science Direct. Search terms were selected in accordance with previous bibliometric studies of a similar nature, accounting for plural and hyphenated phrases as well as use of acronyms. Search terms included: "community fores*", "county fores*", "town fores*", "ecofores*", "community-based resource-management", "community-based environmental-management", and "municipal fores*", used in combination with "Canada" and the names of Canadian provinces and territories to identify publications that contained these phrases in their titles, keywords, or abstracts. Search terms were selected to account for terminology changes surrounding the community forestry concept over time (Teitelbaum and Bullock, 2012).

A snowball approach was used to collect possible additional articles from the reference lists of searched articles that did not appear in the initial database searches (after Leipold, 2014). In total, 142 articles were found. Search results were sent to leading academic and government community forestry researchers to confirm the appropriateness of the articles found and to identify possible omissions. Each article had to satisfy one or more of the following criteria to be included: 1) contain direct references to community forestry in Canada in the title, keywords, or abstract; 2) the study had been undertaken in or was funded by a Canadian community forest, and/or; 3) article content had to explicitly focus on Canadian community forestry concepts and experience.

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