

# Collaborative research support in forestry

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## Abstract

The volume of published literature now available electronically, coupled with rapidly increasing raw data in multiple formats, potentially offers vastly increased resources to researchers worldwide. However, realization of this potential is hampered by funding shortages, inadequate metadata, incompatible carrier formats, lack of multilingual access, bandwidth problems and many others. Access to electronic services in many locations is intermittent or impossible, and the case for retaining 'traditional' print-based library services is increasingly recognised. Local collections are however often seriously inadequate and under-resourced. Two initiatives are aiming to improve matters in the forestry sector. The creation of a global network and forum for forestry librarians, for professional networking but also practical joint problem-solving, aims to link existing local and regional networks, sharing resources and expertise and developing wider awareness of existing sources. Following its success in the medical, social science and environmental fields, the introduction of evidence-based techniques in support of forestry research is now being pursued. This process, using systematic reviews to establish agreed, replicable distillations of the best global knowledge to provide reliable answers to specific questions, would be built upon international networks of subject specialists, supported by a central library making the reviews freely available to all. Libraries would underpin this structure, providing the literature base for reviewers and identifying specialists within their institutions. These initiatives will support each other, ensuring that existing print resources, including grey and unpublished reports and data collections, continue to be properly considered in research projects alongside those which only exist in electronic formats, and help identify those items in either format for which long-term access remains essential.

## Introduction

'It's all on the web!' Ah, if only it were. This too-commonly held belief amongst students, researchers and library funders is coming uncomfortably close to causing permanent damage to our long-term research record in many scientific disciplines, especially in the life sciences where literature often has a long half-life. Older material becomes increasingly difficult to access as specialist libraries close all round the world and redundant stock is stored or discarded. Subjects adopting an evidence-based approach to research management may find systematic reviewing of the research corpus is hindered by difficulty of access. At the same time, maintenance of traditional libraries where 'footfall' has reduced drastically as more and more current materials are available online cannot be economic. A new model is necessary.

## Access to forestry information

In forestry, a subject where 'information literacy' has always been relatively high amongst its researchers, largely due to the global scatter of its primary source material and the informality of its publication, awareness of the existence and importance of older literature and data is quite widespread. Bibliographic control, largely thanks to advocacy by IUFRO (International Union of Forest Research Organizations) since the late 19<sup>th</sup> century, is generally good; however, this had a negative effect in encouraging libraries to discard copies in the expectation that 'someone else will have it'. IUFRO was recommending as early as 1905 that a 'deposit library' for forestry should be set up; this was originally intended to be at Birmensdorf in Switzerland, but funding difficulties arising from the First World War prevented this. The role was taken up 'de facto' by the Imperial Forestry Institute (IFI) [now Oxford Forest Information Service] and Imperial Forestry Bureau (IFB) [now CABI] at Oxford, UK, immediately prior to the Second World War and to this day forestry literature received at Oxford and abstracted by CABI is permanently preserved. However, literature which never found its way to Oxford remains at risk, as does much original research data which was never published or catalogued in libraries at all.

The growing importance of climate change research has highlighted the significance of long time-series of statistical data on forest cover, for example. Vast amounts of satellite and GIS data are now available recording recent times, but earlier records are dispersed and extremely varied in source and publication status; computer-held data exists in a wide variety of formats, sometimes in secure locations, in other cases simply on disks in individual researchers' offices. Pre-computer, field data may have been collected and recorded by hand, with only summary data published, and that often in institutional publications or internal reports produced only in small quantities. Considerable international detective work is often needed to assemble a useful time series, and the detectives are often local librarians with knowledge of their institutions and likely sources. Frequently, useful 'old' data only comes to light after the retirement or death of a researcher, when desks are being cleared and material – sometimes - offered to the library. When the library closes too, this lifeline for institutional memory is usually gone for good. The role is theoretically handed in some cases to institutional depositories, but the complexities of metadata requirements and format conversion often deters entry.

## Challenges to be met

These issues have been increasingly recognized in recent years, revealing a need for regional and international 'support networks' for library and information staff to help raise awareness of the possible unintended consequences of library closures and develop alternative mechanisms for avoiding loss of key data. Co-operative cataloguing and inter-library loan schemes, in place for many decades, made it possible to identify holdings and sometimes borrow items internationally, though usually slowly. Co-operative acquisition programmes have however been much less widespread, due to the difficulties of agreeing and maintaining shared budgets between independent institutions in different sectors, countries, currencies and language groups. Systems to ensure that globally someone, somewhere, obtains and retains at least one copy of everything thus never got off the ground, though the goal of 'universal bibliographic control', to ensure that bibliographic records would be created for everything in a common format so that anyone could theoretically locate what does exist in libraries anywhere, achieved a high profile in the 1970's, and was still being endorsed by the International Conference on National Bibliographic Services in 1998 (<http://archive.ifla.org/VI/3/icnbs/fina.htm>).

The coming of the web allowed great speeding up of literature location but not of delivery. The advent of online journals with downloadable full text articles solved the delivery problem but cut out the library, in the eyes of most users, unaware of the library's role in managing the subscription. Open access removes the subscription barrier but brings the cost in the form of page charges direct to research departments – which often meet the challenge by diverting funds from library budgets. Extensive digitization of backfiles by publishers and libraries removes the need for local retention of space-consuming journal runs. Publication of books in electronic formats, supplemented by massive monograph digitization by Google and others, does the same for monographs. So it's all on the web? No, but one day, conceivably it could be.

There are many problems with this scenario. Access to any of the content requires access to high-level technology. Unlike paper, electronic formats require the use of an intermediary device; and not all devices can read all formats. There are, for example, about 26 different e-book formats currently in use. No e-reader on sale can read them all. Devices and formats become obsolete with dizzying rapidity. Content remains usable only so long as device and software manufacturers are prepared to shoulder the cost of maintaining backwards compatibility, or content owners are prepared to reformat it. Access to available content may require the payment of an ongoing subscription; unlike a paper copy, it can never be owned. Much information formerly communicated by written correspondence, some of which at least may have survived, is now shared electronically by e-mail or social networks with no long-term archiving, and can thus be considered lost. Useful data can sometimes be contained in personal web spaces inaccessible without the author's personal password, lost for good if that is not passed on or just forgotten. So how can we ensure that the long desired and seemingly now achievable goal of access to all information by all who need it does not in fact turn in to a new 'dark age' where key data is lost in a sea of trivia, or lost altogether because it is not readable with current technology or was simply not retained at all? Or is that librarians' nirvana now revealed as an impossible dream that should be quietly forgotten?

## A way forward

A group of forestry librarians think not, and at the World Forestry Congress (WFC) in Buenos Aires in Oct 2009, resolved to try to do something about it, initially by improving communication between existing networks of forestry and agricultural librarians, so that threats to collections and services can be more widely considered and alternative support strategies devised. There are many areas where better networking could help. For example, where institutions are well served by current electronic subscriptions, they may cancel print copies but be left with increasingly aged back runs, giving the library an out-of-date feel with fewer patrons and therefore increased vulnerability, and the danger of discarding what may be the only print copies remaining in the region. Union or shared catalogues are a great help in preventing this, and need to be maintained and publicized wherever they exist, and the possibility of creating them examined where they do not. Inter-lending systems, both electronic and postal, are also key to enabling world-wide access, and require investment. Reference enquiries and help services for on-line systems can be provided via chat services round the clock with global collaboration, and can to some extent compensate for the loss of local librarians, and provide some much-needed support for those who feel isolated. Directories of subject-based library staff, particularly those who have newly acquired responsibility for forestry collections but are unfamiliar with the subject, perhaps following mergers or retirements, are very useful in building support networks but hard to establish and keep up to date. Facebook groups and similar social networks can again be useful in building relationships and giving advance warning of problems to come, and raising awareness of those already here.

At the WFC four recommendations for the forest information community were passed as objectives for the coming five years (<http://www.fao.org/forestry/library/53818/en/>):

1. Create mechanisms to capture local and community knowledge as an information resource to enrich global forest knowledge and potentially improve decision making and science
2. Establish an informal forum for continuing discussion of improved global forest information networks and advocacy for the critical importance of forestry information and its adequate funding
3. Identify effective leaders to explore practical solutions to encourage the building of sustainable global and regional networks.
4. Generate proposals for formal discussion at regional and international levels.

The second recommendation is the first to be taken up and is being pursued under the umbrella of the Global Forest Information Service (GFIS 2009). Those interested are encouraged to join the GFIS Facebook group in the first instance and say hallo!

It remains to be seen how far this initiative will go,

GFIS. 2009. Strategic Plan - Sharing Forest Information around the World. November 19, 2009. Vienna : IUFRO GFIS Working Paper; 16.

[http://www.gfis.net/gfis/pdf/GFIS\\_WP16.pdf](http://www.gfis.net/gfis/pdf/GFIS_WP16.pdf)

## **A European Collaboration (The COST Collaboration in Forest Science) in Evidence-Based Policy and Practice in Forestry**

### **Abstract**

European Governments increasingly emphasise evidence-based policy. They aim to make existing research a key policy resource available to those responsible for policy formulation and delivery. They advocate 'evidence' as a central link in different phases of the policy cycle. This proposal will establish a European collaboration to develop a common approach to the use of existing forestry research in policy and practice. It draws on techniques of systematic review and international communication developed by the Cochrane Collaboration in the medical sector, the Campbell Collaboration in social welfare, and the Collaboration for Environmental Evidence in environmental management. The outcomes will be (1) a European network of review groups covering all areas of forest science which will each develop systematic reviews; (2) a European network for libraries working with the review groups to facilitate information sharing; and (3) an openly accessible library of review outputs.

### **Background, Problems**

Decision-making by policy-makers and practitioners in contemporary forestry is undertaken in increasingly complex circumstances. The regulatory, scientific and socio-economic requirements needed to deliver sustainable forest management together with the wider legal and technical requirements faced by land managers means that forestry professionals need to be able to draw on an extremely wide range of information, data and analysis.

At the same time forest science is expanding rapidly, driven in particular by new environmental and regulatory priorities, so that the amount of information available to decision-makers is growing exponentially. The volume of research in almost all fields is becoming so great that it is beyond the scope of individuals to encompass and to take account of it all in their decision making.

The problem is compounded by the fact that forest research is undertaken in many different languages, so that high quality research that is reported in languages other than English very often goes unnoticed.

A further dimension of complexity is added by rapid changes in information technology so that changes in digital standards, and differences between institutions, can make data inaccessible. Highly important historical data can be overlooked because it is not in digital format. Similarly, differences in metadata management are a recurring problem across Europe, making much data inaccessible.

The problems arise, therefore:

1. that decision making and policy formulation is undertaken without access to the best relevant information, leading to sub-optimal outcomes,
2. resources are wasted duplicating research,
3. gaps in research knowledge can go unnoticed and,
4. the setting of research priorities is haphazard and based on subjective
5. assessments.

European Governments are aware of these issues and increasingly are promoting concepts of 'evidence-based' policy and practice. At the heart of this approach is a methodology for synthesising new analyses from large volumes of existing research information.

The development of these evidence-based approaches was pioneered in medical science. The Cochrane Collaboration, founded in Oxford, UK in 1993, but now a global organisation, accesses existing medical research through 65 review groups located across the world. Participants are all volunteers. Within the space of a few years the library of systematic reviews has become one of the most cited sources of evidence world-wide in the medical research literature, with an impact factor of 5.182 1.

The Campbell Collaboration started in the USA in 2000 and covers the fields of crime and justice, education and social welfare. The Collaboration for Environmental Evidence started in 2007 to address environmental policy and practice. The 3 collaborations use review methodologies tailored to the nature of the science they deal with.

All three embrace 9 key principles:

- Collaboration

- Quality control
- Relevance
- Minimising bias
- Avoiding duplication
- Keeping up to date
- Building on the enthusiasm of individuals
- Promoting access
- Continuity

At the heart of the collaborations is systematic review. There are a number of common principles associated with systematic review. The UK Government's Social Research Service sets them out as follows:

- Defining an answerable question
- Systematic searching for studies
- Obtaining and reading studies
- Organising studies by methodology
- Critical appraisal and sifting of studies
- Data extraction
- Analysis of data
- Summary answers to questions asked
- Implications for policy, practice and further research

In Campbell, Cochrane and CEE each of these stages is governed by protocols developed by authors working within specialised review groups. The review should be replicable and transparent, so that any reviewer should be able to answer the same question to produce the same findings. A particular concern is to design bias out of the process. The protocols specify how research evidence is selected and weighted. The outcomes from a review are published in the collaboration libraries and become freely available. Authors retain the right to publish their reviews in peer-reviewed journals and to disseminate to a wide audience.

## Benefits

At the highest level the benefit of an evidence-based collaboration in European forestry would be to make European forest research more accessible to scientists, practitioners and policymakers. As the process develops it will become a resource for forest science, not only indicating research gaps but also making the outcomes of expensive reviews available to all.

The formation of review groups across Europe is likely to lead to greater scientific collaboration.

Decision-makers will have access to rigorous and objective analysis of research evidence. Forestry is well placed to develop a strong voice within an evidence-based collaboration because of its established international infrastructure.

## Objectives, Deliverables and Expected Scientific Impact

The long-term aim is to develop a network of review groups that reflect the key areas of forest science, building on the Campbell, Cochrane and CEE model. A strong aspect of the proposal is that participants include founding members of Cochrane and the CEE. The nodes within the network will develop linkages with research and policy communities in their sphere and will work with the 3 existing Collaborations to contribute to methodological development in systematic reviewing. They will also develop training appropriate for the forestry community.

Deliverables will be in three groups:

- 1) Design: It will set out a structure for a forestry collaboration in Europe. This will cover the governance of the collaboration and institutional arrangements for supporting the collaboration.

- 2) Scope: It will develop methods to identify key fields and establish review groups to cover them. It is expected that review groups will arise in areas of current importance to forestry e.g. climate change, biodiversity, ecology, socio-economics, silviculture.
- 3) Practice: It will scope a series of key systematic review questions and prepare draft protocols for these review topics. It will provide training in systematic reviews with a short 1-day introduction to evidence-based methodology at the start of the Action followed by a 3-day training school in the second year.

## Scientific Programme and Innovation

In addition to scientists and policymakers, participants in the Action will include experts in data management working in Government and research institutions and professional forestry librarians.

### Year One:

- Introductory briefing by personnel from Cochrane , Campbell and CEE.
- Assessment of current expertise in forest science in Europe and current levels of national activity.
- Production of country-level reports. Identification of centres of expertise and recruitment to the Action of additional experts.
- Work on the design of collaboration in Europe covering structure, governance and resource needs. This will engage experts from the US and elsewhere. It will also engage experts from international organisations with a strong interest in forestry and forestry information - FAO, UNEP and CIFOR are interested parties.
- Mapping of potential fields to be covered by review groups.
- Short-term scientific missions to centres experienced in systematic reviews with the three principal collaborations.

### Year two:

- Establishment of preliminary review groups.
- Work starts on the development of review protocols in different fields.
- Work on structure and governance continues
- Work starts on the development of a system (the Library) for storing and making accessible the outputs from systematic reviews.
- Work starts on systematic review methodologies in collaboration with existing methodology groups in Campbell, Cochrane and CEE.
- 3-day training course.

### Year three:

- Work on systematic review protocols continues.
- Methodology groups continue to develop and improve methodologies for a variety of applications and review question types.
- Inaugural conference to consider the recommendations of the governance group. In particular deciding whether to establish a wholly new collaboration for forestry, or position forestry within an existing collaboration.
- Work starts on drafting the Action report setting out the pros and cons of a European collaboration.
- Formal consultation by the Action giving a wider range of institutions from participating countries an opportunity to express views and respond to the opportunity to host review groups.
- Work starts on agreeing processes that will maintain the collaboration once the Action completes.
- Work starts on production of a publication aimed at non-expert professionals explaining the proposed collaboration.

**Year four:**

- Draft constitution, review groups and protocols to be published for debate within the action.
- Agreement of Action recommendations.
- Publication of final reports and the professional publication.
- If appropriate, a competition to identify institutions to lead future collaboration.

**Organisation**

We expect this will be a small to medium-sized action. In addition to the COST MC structure for simplicity we propose 3 working groups:

- 1) Structures and Governance.
- 2) Data access & management and librarianship.
- 3) Review Groups and Protocols.

An executive group of chair, vice chair, communications lead & WG leaders.

We strongly support COST's interest in encouraging young researchers. This is a new area very suitable for new talent. We will make every effort to give prominent roles to young women, young men and early-stage researchers.

The proposal is supported by the networks IUFRO, CIFOR, CIAGAR, SFI-Campbell and by information management centres in non-COST countries USA, Canada and Australia.