

Knowledge to Policy

Contributing to the Measurement of Social, Health, and Environmental Benefits

Susan Cozzens, Georgia Institute of Technology,
and Michele Snoek, Universidad de la Republica, Uruguay

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The missions of many U.S. federal agencies include building the knowledge base for policy making. For example, the research programs of the Environmental Protection Agency inform its regulatory function; the National Institute of Occupational Safety and Health provides the evidence base for safety standards in the workplace; and educational research affects educational policy as well as educational practice. Policy impacts are also important, however, for agencies with broader research missions when they want to measure the uptake of their research results in the policy process, for example, the use of environmental knowledge in climate change policy or the influence of biomedical research findings on public health standards.

In general, measuring non-economic outcomes of research has been considered particularly difficult. Cozzens and her co-authors (Cozzens and Bortagaray 2002) have argued that the difficulty lies not in a lack of outcome measures – plenty of measures of human and environmental health exist, for example – but rather in under-development of models of the processes that lie between research and the measured outcomes. “Intermediate” outcomes have been adopted in several recent evaluations as short-term, relatively observable proxies for long-term changes to which the research program aims to contribute (Committee on Evaluating the Efficiency of Research and Development Programs at the U.S. Environmental Protection Agency 2008; Institute-of-Medicine 2009). Providing inputs to policy processes is one important example of such intermediate outcomes. So for example, occupational safety research must assure that its results are disseminated to the regulatory bodies that set occupational safety standards. One can “measure” whether this happened by asking the intended recipient or by checking for references in the relevant regulatory document. Intermediate outcomes like these are linked to but do not determine long-term outcomes, since research results are almost never the only influence on the ultimate policy decisions, and the policy decisions are in turn only one influence on actual health and safety in the workplace.

The current state of the art in evaluation practice for measuring policy impacts does not match the concepts that are most common in the research literature to describe the connections between knowledge and policy. The dominant concept in evaluation practice is linear, framed by logic models and the terminology of inputs, activities, outputs, and outcomes, sometimes with a loop back to planning. The policy process itself is a black box in this approach. In contrast, the dominant concept in the research literature is the network or system, which is made up of many small conversations, interactions, and adjustments among a diverse set of actors; and complex concepts of the ebbs and flows of the policy process itself are incorporated.

This review paper identifies the main concepts, models, and measures used to map the connections between research and government decision making in the current published literature on knowledge and policy. Its limitations should be acknowledged at the outset.

- The analysis represents a review of recent reviews, with an associated search for current projects and articles. It is thus indicative, but not exhaustive, with regard to current research on the knowledge-to-policy process.
- It is intended to inform measurement of the benefits of research for the environment, for health, and for such social outcome areas as housing, education, and criminal justice, although it does not go into detail on any of these areas.
- Research is treated as one form of knowledge, but whether it is privileged over other forms, such as practical experience or citizen reports, is taken as a matter to be determined empirically.
- The policy process is treated not only as authoritative government action, legislative or executive, but also as the broader set of deliberations that surrounds such action.

This paper first provides two examples of policy impact measures in use in U.S. federal agencies. It then turns to the research literature, first briefly reviewing the history of the development of research on knowledge utilization, then describing models of linkages between knowledge and policies; the underlying models of the policy process; and the current set of expectations for outcomes of policy-oriented research programs that follow from the models. It concludes with a discussion of the implications of current models for evaluation practice and a set of recommendations on a research agenda to move towards more realistic evaluation concepts and measures.

The general finding of the review is that models in the research literature support the current practice of seeking intermediate outcome measures for policy influence, but suggest different measures than those currently in use, focusing on building policy networks and affecting the frameworks for policy action over the long term. In terms of methods, the research literature is dominated by case studies, with a scattering of survey research; neither is particularly helpful for evaluation or performance monitoring purposes. We therefore recommend research to develop unobtrusive indicators of policy-related knowledge networks, using people- and concept-based indicators, with a smaller role for the direct impact indicators currently in use.

Current Examples

When the National Institute of Occupational Safety and Health decided to do an external review of its research programs, it took the bold step of asking the evaluators to focus on its impacts. NIOSH's mission calls for it to improve the health and safety of American workers, and it wanted to know whether the evidence indicated that it was doing that effectively. On the one hand, it asked the Institute of Medicine to develop an approach to an impact evaluation of its research programs. On the other, it worked internally with a consulting firm to prepare for the reviews. The firm recommended developing a "logic model" for NIOSH research – that is, a diagram that displayed the inputs, activities, outputs, and outcomes in a way that showed how its programs were supposed to work to produce the desired

impacts on health and safety. The generic logic model they developed together is shown in Appendix One. It was used in the eight program evaluations that were done, translated into the specific terms of each evaluated program.

Of particular interest here are the intermediate outcomes in the logic model. The model acknowledged that NIOSH could not by itself directly produce improvements in worker health. It was expected to have its effect through changing employer and employee practices, by developing safer workplace technologies, and through its research inputs to workplace safety standards. Those standards are set by another government body, the Occupational Safety and Health Administration, or for miners, the Mining Safety and Health Administration. The logic model took citation by either of these bodies as a sign of the policy effectiveness of NIOSH research.

A second example is quite similar. The Environmental Protection Agency is itself a regulatory agency, with the legislative mandate to set standards for air and water quality throughout the United States. EPA both supports extramural research that supports this mission and does such research in-house in its network of laboratories. One of the performance measures EPA has collected for its programs is the DDA – decision document analysis. “This type of analysis identifies each time selected ORD [EPA’s Office of Research and Development] publications are cited in EPA, other federal, State, or comparable international organization’s decision documents. Decision documents include regulations, records of decision, and policy guidelines.”¹ The search is limited to published results that are already highly cited in the research literature, using attention in the research community as a predictor of attention by regulators.

These approaches share several characteristics. First, they rely on documentary sources of information. This element produces an auditable, reproducible method – surely a plus under both government accountability standards and scientific canons. However, there has been no empirical research that demonstrates whether citations in regulatory documents correlate well or poorly with the sources of information regulators actually use when they come to decisions.² Second, the time frame for checking the citations is relatively short. Since reviews that are informed by the measures are happening on a 3-5 year time horizon, the technique is presumably useful on approximately that time scale as well.

Knowledge Utilization

Let us view these current practices in the light of the published literature on how research is used in the policy process. Since research is a specialized form of knowledge, and policy users are a specialized set of users of knowledge, the scope of this paper lies within the field of knowledge utilization. Estabrooks and her co-authors (Estabrooks, Derksen et al. 2008) have systematically traced the development of this field through citation analysis. They point out that research in the area may appear under a number of different labels: “... among them innovation diffusion, knowledge translation,

¹ <http://www.epa.gov/oigearth/reports/2010/20100804-10-P-0176.pdf>, retrieved October 25, 2010.

² There is a body of empirical research which demonstrates an equivalent point for citations from the research literature to the research literature.

research utilization, knowledge mobilization, and technology transfer.” They used a keyword strategy to search the Web of Science from 1945 to 2004 for articles in these areas, retaining 5278 for the analysis after screening for article type and relevance. They then analyzed the data by decade, using co-citation of highly cited authors to identify the key works defining the research agenda in each period. The number of publications in the field grew over the period, and was dominated by authors from the United States, the UK, Ireland, and Canada. It is quite small before 1964, which the authors therefore take as a true starting point for their analysis.

The author most cited in all decades after 1964 is Everett Rogers, and in particular his book Diffusion of Innovations. Rogers developed his theory of diffusion based on agriculture, and in particular the experience of the spread of new breeds developed in the Green Revolution. In the decade from 1965 to 1974, Rogers’ work is closely linked to the economists of innovation Zvi Griliches and Edwin Mansfield, both studying diffusion as well, Griliches in agriculture and Mansfield in manufacturing. In the next decade, the terms knowledge utilization and technology transfer enter the area, as the concepts become even more general. During this period, a set of policy scholars appear in the core group, including Carol Weiss and Robert Rich, who add a focus on the use of social science research in policymaking – the most direct predecessors of the topic of this paper. Between 1985 and 1994, a focus on evidence-based medicine emerges, and continues to grow in the last decade that Estabrook and her colleagues studied. Our own retrieval of literature for this paper suggests that the field has followed this last line, fragmenting along the lines of applications in specialized areas, such as education, public health, agriculture, forestry, criminology, road safety, psychotherapy, and nursing. The new movement for “evidence-based policy” (EVP) is one of these application areas. Just as the establishment of the knowledge utilization field was reflected in the journal Knowledge: Creation, Diffusion, and Utilization, the EVP movement is reflected in Evidence & Policy, now in its sixth volume.

The emergence of “evidence-based X” as a significant theme within knowledge utilization studies points to a prominent characteristic of the field: its normative orientation. The literature often starts from an assumption that there is a gap between knowledge and practice, and pursues the normative question “How can use of research results be improved?” rather than a more descriptive, “Under what circumstances are research results actually used?” In much of the literature, knowledge utilization is taken to be a good thing, and increasing the use of evidence by users, whether they are medical professionals, farmers, or policymakers, is the desired outcome. The basic conceptual framework identifies knowledge producers, knowledge users, and the processes that link the two. Weaknesses in any of the three elements could be “fixed” to solve the presumed problem.

In this normative orientation, the outcome of interest for evaluation of policy-oriented research programs is increased use of research results in the policy process. But are policymakers like doctors, police, foresters, or safety engineers in their use of research-based knowledge – and should they be? The various policy-specific models of the knowledge utilization process shed some light on this question. We turn next to them.

Policy-Specific Knowledge Utilization Models

Recent reviews have introduced typologies that describe the development of models of the interaction of knowledge and policy. In general, these begin with one-way, linear concepts and move to more interactive networked and systems views. For example, Jones identifies three “paradigms” for understanding the link between knowledge and policy (Jones 2009).

“1) *Rational*: In this view, often described as the ‘linear’ or ‘knowledge-driven’ model, knowledge inspires and guides policy. Knowledge is seen as providing instrumentally useful and apolitical inputs that improve policy, and policy-making works in a ‘problem-solving’ mode, according to reason and logic. A typical study might focus on how ‘high quality’ scientific inputs feed into different ‘stages’ of decision-making (setting the agenda, etc). This current ran through many of the early models of the link between knowledge and policy, but it does still influence fields such as work on evidence-based policy, older ‘generations’ of knowledge management, and the study of research communication For example, DEFRA’s (2006) model of the evidence-based policy process primarily proceeds from policy issues to policy options through the assembling and production of evidence, primarily conceived of as research.

“2) *Pluralism and opportunism*: The second paradigm challenges the ‘rationality’ of the policy process. Policy-making does not necessarily proceed as a linear problem-solving enterprise, but rather involves pragmatic decisions taken in uncertainty: the flow of knowledge into policy is not taken as a given, and is opportunistic, and dependent on explicit efforts of various actors. Although this entails a wider view of useful sorts of knowledge, including nonacademic producers of knowledge and local populations and civil society, there is still an underlying assumption that the incorporation of knowledge is generally ‘good’. For example, work on innovation systems argues for the importance of both supply and demand of knowledge, the need for intermediaries and regulatory framework conditions ..., but retains an assumption that innovation and the uptake of knowledge will generally be ‘good’, that promoting such innovation will lead to social and primarily economic benefits Other work which falls under this paradigm are the practice centred approaches to KM [knowledge management], and sustainability science.

“3) *Politics and legitimisation*: Under this conception, power is infused throughout the knowledge process, from generation to uptake. Rather than being universally instrumentally useful, knowledge will often reflect and sustain existing power structures and imbalances. The policy process is seen as the site of politics, processes of contest, negotiation, marginalisation, etc, with knowledge production and use entwined with these forces: knowledge can serve to add legitimacy to political action often after the decision, and what counts as ‘legitimate knowledge’ is itself politically determined Work in this area might focus on how ‘technical’ knowledge is used to gloss over contested and political aspects of situations, for example. Various schools in political science, and the study of policy as discourse contain elements of this understanding.” (Jones 2008, p. 11)

Best and Holmes (Best and Holmes 2010) describe a similar historical flow, as summarized in Nutley (Nutley, Morton et al. 2010).

- *“Linear models* (1960s to mid-1990s) - research is disseminated as results are handed over to others for use in various settings. Whether it gets used is a function of effective packaging. The predominant language of research use for these models is ‘knowledge transfer’ and ‘dissemination’.
- *“Relationship models* (mid-1990s to present) – the key processes for improving research use are the relationships that develop within networks of collaborating research producers and users. Knowledge products are defined and utilised in the context of these relationships and improving the interpersonal communication that occurs within these relationship is key. The language of research use for these models is ‘knowledge exchange’.
- *“Systems models* (more recently) – the way knowledge is embedded within organisations and systems is the most important factor in improving research use. For knowledge to be used it needs not only to be embedded in relationships but also interwoven with the priorities, cultures and contexts of organisations and systems. Research use is thus a dynamic process within complex adaptive systems. The language of research use for these models is ‘knowledge integration’, ‘translation’ and ‘mobilisation’.” (Best and Holmes 2010)

The two examples from current U.S. evaluation practice can be placed within these typologies. They are rational and linear, and represent instrumental uses of research results in a “knowledge transfer” process. As such, they are not wrong, but certainly incomplete, neglecting in particular the knowledge networks that inform policy decisions. The importance of these becomes even more important when one considers the receiving party – the “policymaker” – in light of current theories of the policy process.

Policy Process Models

The historical development of KTP models reflects an ever more sophisticated understanding of the policy process itself. Lindquist (Lindquist 2001) summarized this progression for a knowledge-to-policy project commissioned by the International Development Research Center (IDRC) in Canada. Research on knowledge utilization first emerged, he reports, when social scientists were disappointed that their policy-oriented research was not used as much as they hoped for policy. The first explanation was a two-community model, “depicting, exploring, and explaining the distance between two communities: one comprised of social scientists (the ‘knowledge producers’) and the other of policy-makers (the ‘knowledge-consumers’), each with different, though not necessarily unrelated, overarching values and cultures.” (p. 2) In these models, “the value of research was determined by its fit and timeliness for the decisions of policy-makers.”

According to Lindquist, this literature turned a first important corner with the work of Carol Weiss, who identified multiple routes for the influence of research on policymaking, including “enlightenment,” a function in which ideas percolated through policy discussions over time as ideas and concepts, rather than entering them directly as facts or theories. Weiss’s contributions blunted the simple linearity of the model by identifying several routes, but left the directionality intact.

A second major development for utilization studies, according to Lindquist (Lindquist 2001) was rising awareness of the many intermediary institutions between knowledge producers and consumers,

including specialists in policy areas who moved between organizations and “third communities” of policy organizations that contributed over the long run to policy discussions ((Hecló 1978; Lindquist 1990). These concepts ushered in an era of attention to networks as carriers of research knowledge. A particularly sophisticated version of this approach came from Paul Sabatier and Hank Jenkins-Smith (Sabatier and Jenkins-Smith 1993) in the concept of the “advocacy coalition framework for policy-oriented learning.” Policy domains are generally characterized, they argue, by one or more advocacy coalitions – collections of people and organizations arguing for similar policy outcomes. Each has its own beliefs and values, which likewise shape the knowledge it generates and brings to the policy process. Sabatier and Jenkins-Smith observe that while research and analysis have to contend with various beliefs and values in the policy arena, they also hold the potential for moderating values conflicts. Understanding the influence of research in such a complicated scenario, however, requires an inventory and awareness of the advocacy coalitions operating there, and can be done realistically only with observations over a decade or more.

This long time frame is particularly important in light of current models of the ebbs and flows of the policy agenda. Research knowledge cannot influence policy unless it is relevant to a problem that has become active on the decision making agenda; not all important problems get there, and none is there all the time. The most widely-used model of agenda-setting posits little relationship between the quantity or quality of research knowledge and whether an issue is receiving active policy attention. As Lindquist describes, Kingdon (Kingdon 1984) applied the “garbage can model” of decision making, “identifying three streams of activity that attempt to move alternatives higher on the agenda” (Lindquist 2001). They include:

- *the problem stream.* This stream of activity embraces the work of citizens, groups and journalists who seek to have issues recognized as genuine social problems of importance. Problems are ever-present, but some may already be monitored, so that significant changes in the number or rates associated with a given problem may be sufficient to spark concern in the media. Critical incidents – such as a death, scandal or a failure to secure a major opportunity – may trigger interest in the problem. Finally, other problems which garnered considerable attention may get resolved, or lose the interest of the public and the media. Energy may thus be directed to other problems which, though not having worsened, nevertheless move more easily up the agenda.
- *the policy stream.* Ideas about what constitutes a significant problem, and what might provide the best solution, are always in state of flux. Kingdon suggests that the leading experts on policy inside and outside government regularly debate and keep informed about the latest developments and possibilities on the national and international stage. There is a rolling – though always evolving – sense of what stands as the best advice at a given time. Thus, when governments take power, or external events demand new strategies, it is these general conclusions that will be offered and considered, even if there is not unanimity among experts.
- *“the political stream.* Elections are regular occurrences in federal states, and thus there is always a shifting balance in power. Moreover, the stock of governments and political leaders wax and wane, as does the public interest in certain issues. Political leaders are always seeking new issues and causes to champion, which may make better sense at different stages over the life of

a government. When a political leader puts their shoulder behind a problem and alternative, an issue can more quickly move up the policy agenda.” (Lindquist 2001)

The three streams do not produce steady attention to policy problems, but rather intermittent. “Kingdon argues that a single stream rarely single-handedly moves an issue to top of the policy agenda and results in a policy decision. Rather, he argues that there must be a *confluence* of at least two of the streams in order for a policy to obtain; there needs to be sufficient political interest and energy available to match a suitable alternative to a problem and to convert an alternative into a decision. Kingdon ascribes considerable importance to the opening, however briefly, of ‘policy windows’ – such as budgets, government crises, international agreements, or priority-setting exercises – can provide the occasions for a new alternative to get very seriously considered and for decisions to be taken quickly.” (Lindquist 2001)

Since policy-relevant research knowledge is more likely to be turned into action at the times when attention is high, the unpredictable and intermittent emergence of issues onto the policy agenda suggest that one cannot judge research on its policy impacts there on a regular evaluation schedule. Likewise, even after the issue emerges (e.g., hurricane research after Katrina), there are so many competing streams of issues and information flowing at that time that disproportionate impact of science is unlikely.

Expected Impacts and Influences

So far, the research literature suggests that we should not confine our evaluation attention to instrumental uses, nor to the short term, nor to policies nor even policymakers themselves. What does the literature suggest are more reasonable expectations? Snoeck and Sutz (Snoeck and Sutz 2010) summarize the three different kinds of use that are generally considered in the literature:

- *“Instrumental use:* research findings are directly applied to the solution of policy problems; they are a clear and identifiable input in the PMP [policy making process]. Though this is not considered in the literature to be the most common impact of research, the current evidence-based policy (EBP) trend tends to focus on the instrumental use of research
- *“Conceptual use or ‘enlightenment’ function:* concepts and theoretical perspectives engendered by SSH research permeate or ‘percolate’ the policy-making process, and contribute to modify ‘frameworks of thought’ or ‘the terms of the debate’ on specific issues. In other words, the accumulation of knowledge through research causes changes in the perceptions and understanding of PM, thereby modifying the parameters and paradigms within which policy solutions are sought. A recent MOST-UNESCO policy paper ... states: ‘It is useful to note that research for policy is not so much about providing answers as about changing the way questions are understood, so that people (researchers and policy makers, but other publics too) can begin to think differently, thus critically building the contours and contents of social problems’.
- *“Symbolic, strategic or legitimative use:* research is used to support a predetermined position of decision-makers, to legitimize existing views, or, more generally, as ‘ammunition’ for political

purposes. Also included in this category is a tactical use for purposes not related to the substance of the research but rather to the mere conducting of research (e.g., gaining prestige or allowing delays in decisions).” (Snoeck and Sutz 2010)

Lindquist provides his own list of reasonable impacts to expect from policy-oriented research (Lindquist 2001): **“Expanding Policy Capacities, by** . . . Improving the knowledge/data of certain actors, . . . Supporting recipients to develop innovative ideas, . . . Improving capabilities to communicate ideas, . . . Developing new talent for research and analysis; **Broadening Policy Horizons by** . . . Providing opportunities for networking/learning within the jurisdiction or with colleagues elsewhere, . . . Introducing new concepts to frame debates, putting ideas on the agenda, or stimulating public debate, . . . Educating researchers and others who take up new positions with broader understanding of issues, . . . Stimulating quiet dialogue among decision-makers; **Affecting Policy Regimes by** . . . Modification of existing programs or policies, Fundamental re-design of programs or policies”

In the context of the workshop for which this paper was prepared, we must note that none of these outcome concepts gets all the way to the achievement of the public goals that figure in the mission statements of the agencies involved, such as environmental protection for EPA or worker health for NIOSH.

Methods and Measures

As this review has illustrated, the literature on knowledge-to-policy is long on models and short on measurements. Case studies are by far the most commonly used method. For example, the Nutley summary quoted here introduced papers on six national case studies of the use of social science research in health and social policy. She admits that while comparative workshops were held, the reports there did not necessarily meet the strict standards of comparative case study analysis. The Lindquist background paper quoted here was prepared for a set of case studies of IDRC projects and their impacts on policymaking in developing countries. Likewise, Landry [Research Policy about 1998] notes the widespread use of case studies, although his own research was done with a survey. Performance reports from policy-oriented projects give a sample of how program managers themselves see their impacts. For example, Neilson relays examples given by Diane Stone:

“One example is provided by the Overseas Development Institute (ODI) in London which “assesses its effectiveness in its ability to place economists in the public sectors of developing countries. Since 1963, over 350 Fellows have been placed in 23 countries. Many former ODI Fellows ‘hold responsible positions in agencies and companies dealing with the Third World’” On the other hand, some individuals consider “having access to people in senior positions”, bringing new ideas or different perspectives into the public debate, or having the ability to attract senior officials to meetings as being indicators of influence IDRC has similar anecdotal evidence in terms of what staff perceive as “influence”. For example, members of IDRC staff have described situations in some countries where past grant recipients and/or project leaders are now in a

position to influence government policies either because they are senior advisors to certain ministers or because they are the minister.” (Nielson 2001)

In light of the previous presentation of models, the prominent role of people in these outcome descriptions is notable. People may learn research in a formal educational program, practice in a policy network, then have impacts when they reach positions with more direct policy influence. The research inputs to this career path would not be visible except in tracking where the person has been.

Discussion and Conclusions

This review of concepts and models allows us to put the current examples at the beginning of the paper into context. The examples identify instrumental uses of research information in a limited range of applications over a relatively short time period. The literature suggests that to measure the full impact of research, one must also look at the evolution of the relevant policy community over at least a ten year time period, examining both long-term change in ideas and the movement of people among the relevant organizations. One should expect an active research group to be engaged with the relevant community, contributing original ideas, and developing new generations of contributors. The key concepts from the literature are enlightenment, network participation, and human resources.

The general knowledge-to-policy literature, however, does not differentiate among policy users. We return to our earlier question about whether policy users are or should be like doctors and safety engineers in their professional responsibility to make decisions based on evidence. We propose that not all are, but that in the regulatory realm, they should be. The NIOSH and EPA examples are instances of this sort; evidence-based regulatory decisions should be the norm. Are researchers responsible, however, for making sure that their results are used? Other research on the use of science in policy warns us that in conflict-intense policy contexts, research results will be particularly hard to establish, as the opposing parties produce counter-findings and attack on methodological grounds (Collingridge and Reeve 1986; Jasanoff 1990). Researchers do not have control over the use or final disposition of their results under these circumstances. Even for such areas, then, where results are intended to feed directly into regulatory decisions, enlightenment and network contributions are important to consider alongside short term instrumental use.

Another paper in this session reports on a program of research that has focused on measuring policy networks for a variety of research areas (Bozeman and Rogers 2002). Like the wider literature on which it draws, the Research Value Mapping Program relies heavily on case studies. Research program evaluations can almost never afford the time or resources for such in-depth analyses, and they do not scale up well for monitoring or indicators purposes. The challenge for methods research on knowledge-to-policy is therefore to develop tools for detecting and monitoring the research inputs to policy networks on a larger scale at lower costs, addressing questions such as:

1. Starting from the map of science (or of federally-supported science), what are the markers of research areas that contribute to policy networks? Are certain journals more closely connected? Are contributions to certain conferences good indicators? Are there other indicators embedded in individual resumes?

2. Once these areas have been identified, are there scalable methods for identifying the non-research organizations and actors in the policy network? For example, could web site links, analyzed with network methods, give a good approximation?
3. Could these information sources be matched to personnel databases to track the career patterns of participants?
4. Could the outputs of the policy networks be analyzed for change over time in ideas and concepts? Could the introduction of new concepts be identified in timing and organizational source?

All of these tasks appear to be within a plausible range for current information processing tools.

In short, more systematic tools for tracking policy relevance and impacts could be developed. Would they be used? Many researchers claim that their results are policy relevant. A few claim that they have had policy impact. This review has shown that the latter event is likely to be rare, not driven by research quality, and out of the control of researchers. The former, however, should be demonstrable through the connection and contribution to policy networks. For evaluation, it is important to have appropriate criteria and indicators to identify credible claims of this kind.

Illustrative Research Projects on Knowledge to Policy

CanKnow: Canadian Network for Knowledge Utilization. http://doe.concordia.ca/cslp/RA-Themes_CanKnow.php.

EULAKS: The Knowledge Society in Europe and Latin America. Funded by the European Commission. <http://www.eulaks.eu/>

Knowledge and Policy in Education and Health Sectors. Funded by the European Commission. Twelve teams and 50 researchers, 2006 – 2011. <http://www.knowandpol.eu/>

Knowledge to Policy: Making the Most of Development Research. Evaluation studied funded by the Canadian International Development Research Center. PI: Fred Carden. Results published in http://www.idrc.ca/en/ev-135779-201-1-DO_TOPIC.html.

KUSP: Knowledge Utilization Studies Program. University of Alberta, Canada. <http://www.kusp.ualberta.ca/>.

NORFACE project. Six country comparison of utilization of research in policy in Iceland, Ireland, the Netherlands, Norway, Scotland, and Sweden. Reported in *Evidence & Policy*, June 2010.

RAPID: Research and Policy in Development. U.K. Overseas Development Institute. <http://www.odi.org.uk/work/programmes/rapid/default.asp>.

RURU: Research Unit for Research Utilization, Scotland. <http://www.ruru.ac.uk/>

RUSH: Research Utilization Support and Help. Funded by the U.S. National Institute of Disability and Rehabilitation Research, completed in 2009. <http://www.researchutilization.org/learnru/glossary.html>

References

Best, A. and B. Holmes (2010). "Systems thinking, knowledge and action: towards better models and methods." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 145-159.

Best, A. and B. Holmes (2010). "Systems thinking, knowledge and action: towards better models and methods." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 145-159.

Bozeman, B. and J. Rogers (2002). "A churn model of scientific knowledge value: Internet researchers as a knowledge value collective." Research Policy **31**: 769-794.

Collingridge, D. and C. Reeve (1986). Science Speaks to Power: The Role of Experts in Policy Making. New York, St. Martins Press.

Committee on Evaluating the Efficiency of Research and Development Programs at the U.S. Environmental Protection Agency, N. R. C. (2008). Evaluating Research Efficiency in the U.S. Environmental Protection Agency. Washington, DC.

Cozzens, S. E. and I. Bortagaray (2002). "S&T Policy for Human Development – the logic of outcomes indicators," co-authored with Isabel Bortagaray). Indicadores de Ciencia Y Tecnologia en Iberoamerica Agenda 2002, Proceedings of the Fifth International Iberoamerican and Interamerican Conference on Science and Technology Indicators. R. R. I. d. I. d. C. Y. Tecnologia). Quilmes, Argentina, RICYT (Red Iberoamericana de Indicadores de Ciencia Y Tecnologia).

Estabrooks, C. A., L. Derksen, et al. (2008). "The intellectual structure and substance of the knowledge utilization field: A longitudinal author co-citation analysis, 1945 to 2004." Implementation Science **3**.

Hecl, H. (1978). Issue Networks and the Executive Establishment. . The New American Political System. A. King. Washington, DC, American Enterprise Institute.

Institute-of-Medicine (2009). Evaluating Occupational Health and Safety Research Programs: Framework and Next Steps. Washington, DC.

Jasanoff, S. (1990). The fifth branch : science advisers as policymakers. Cambridge, Mass. :, Harvard University Press.

Jones, H. (2009). Policy-making as discourse: a review of recent knowledge-to-policy literature. ODI-IKM Working Papers. London, U.K., Overseas Development Institute. **5**.

Kingdon, J. W. (1984). Agendas, Alternatives, and Public Policies. New York, Harpers Collins.

Lindquist, E. A. (1990). The Third Community, Policy Inquiry, and Social Scientists. Social Scientists, Policy, and the State. S. Brooks and A.-G. Gagnon. New York, Praeger: 21-51.

Lindquist, E. A. (2001). Discerning Policy Influence: Framework for a Strategic Evaluation of IDRC-Supported Research. Ottawa, International Development Research Center.

Nielson, S. (2001). IDRC-Supported Research and Its Influence on Public Policy. Ottawa, International Development Research Center.

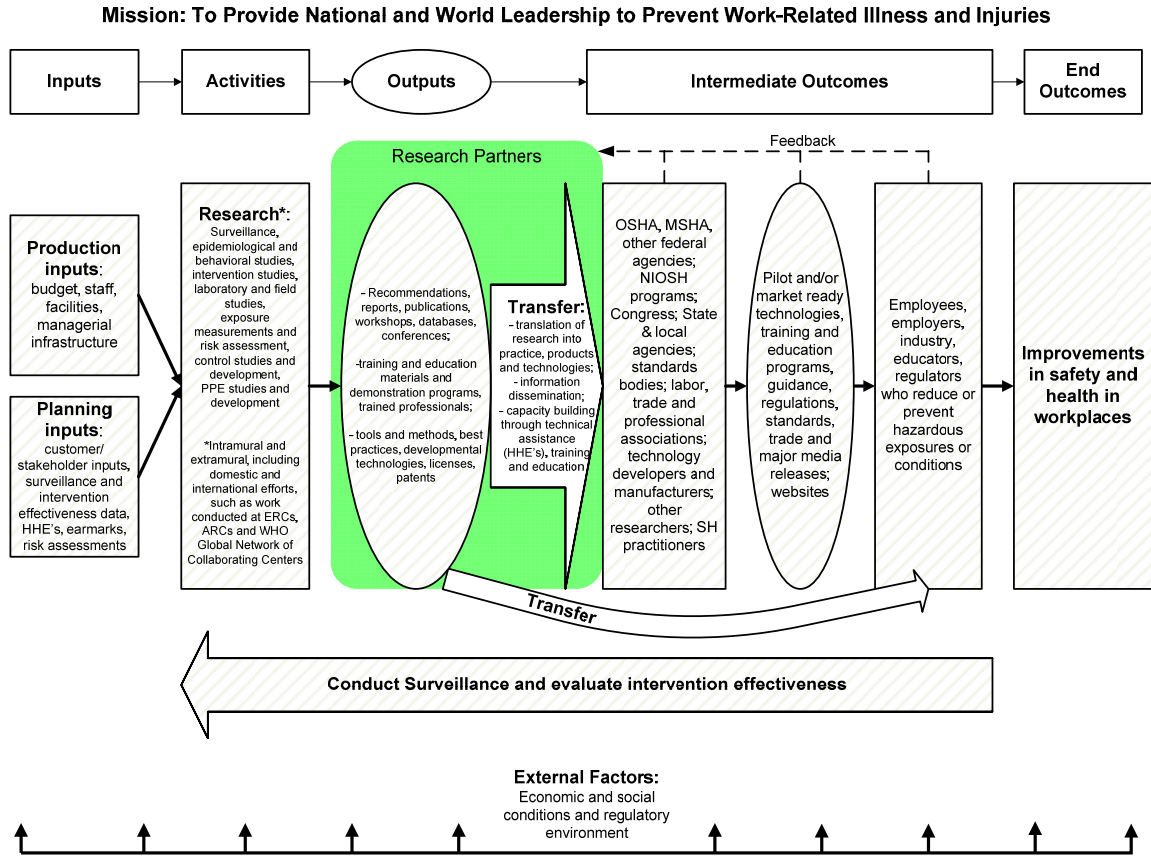
Nutley, S., S. Morton, et al. (2010). "Evidence and policy in six European countries: diverse approaches and common challenges." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 131-144.

Sabatier, P. and H. Jenkins-Smith, Eds. (1993). Policy Change and Learning: An Advocacy Coalition Approach. , Weastview Press.

Snoeck, M. and J. Sutz (2010). Social Science and Humanities Research and Science, Technology, and Innovation Policy-Making in Latin America: A Nexus Perception Study. Montevideo, Uruguay, CSIC - Universidad de la Republica.

Appendix

The NIOSH Logic Model



Source: Institute of Medicine 2009

Annotated Bibliography

Abraham, N., C. Byrne, et al. (2010). "Lessons from the literature." Evidence & Policy **6**(3): 411-425.

Ahmed, M. A. M., K. Shideed, et al. (2010). "Returns to Policy-Oriented Agricultural Research: The Case of Barley Fertilization in Syria." World Development **38**(10): 1462-1472.

Summary In 1984, ICARDA and its Syrian partners initiated farming systems research that led to a change in national fertilizer allocation policy. Evidence is assessed on the policy influence of the fertilizer-response research and on the impact of switching to a more inclusive policy that relaxed the government's probation of fertilizer allocation to barley. Interviews with key informants make a persuasive case for attribution; estimates from economic surplus models are consistent with a high rate of return on investment in the policy-oriented research. This case study provides a contribution to the limited empirical literature on returns to research under policy distortions.

Albæk, E. (1995). "Between Knowledge and Power: Utilization of Social Science in Public Policy Making." Policy Sciences **28**(1): 79-100.

Most conceptualizations of the linkage between science and politics have traditionally been informed by rationalist concepts of science and decision-making. The result has been a false dichotomy between (legitimate) rational research utilization and (illegitimate) political research utilization. This dichotomy must be overcome, on normative as well as empirical grounds. Scientifically generated knowledge constitutes an important, but on the whole unquantifiable part of the enormous store of knowledge which participants in the politico-administrative decision-making process apply to their practical tasks. To understand the complex interfaces between social science research and the political-administrative decision-making process, it is necessary to be aware that research is transferred to, and becomes part of, a discourse of action, in the philosophical as well as the everyday practical sense - a discourse in which (self)reflecting participants deliberate on and debate norms and alternatives with a view to concrete action. This makes the contribution of science to policy making both less tangible and potentially more influential than is usually assumed.

Amara, N. (2004). "New evidence on instrumental, conceptual, and symbolic utilization of university research in government agencies." Science Communication **26**(1): 75.

Babor, T. F. (2002). "Linking science to policy." Alcohol Research & Health **26**(1): 66.

Barnett, W. S. and E. C. Frede (2001). "And so we plough along: the nature and nurture of partnerships for inquiry." Early Childhood Research Quarterly **16**(1): 3-17.

New approaches to inquiry that partner researchers with practitioners and policy makers have become more common in the early childhood field as it has

embraced a wider variety of research traditions. In this introductory article for the special issue on partnerships for inquiry, we explore the nature, origins, and purposes of collaborative research in early childhood. We also identify and discuss the challenges that arise in conducting collaborative research. The other articles in this special issue are discussed as they illustrate the diverse approaches to collaboration and provide examples of the challenges and how they are dealt with in practice. Equality between partners emerges as a major issue based on our explorations of the literature and the other articles in this special issue. (C) 2001 Elsevier Science inc. All rights reserved.

Bathurst, J. C. (2010). "Forests and floods in Latin America: science, management, policy and the EPIC FORCE project." Water International **35**(2): 114-131.

The EPIC FORCE project aimed to develop science-based policy recommendations for integrated forest and water resources management, relevant to extreme events for Costa Rica, Ecuador, Chile and Argentina. Data analysis and model application support the hypothesis that, as the size of the flood peak increases, the effect of forest cover becomes less important. Guidelines for integrated water and forest resources management are developed which recognize this effect but emphasize the role that forests play in reducing the flood levels of more moderate events. The research findings are transferred to policy-making for the four focus countries via a set of policy briefs, taking into account the institutional frameworks, achievable policy objectives and key stakeholders.

Bax, C., R. Elvik, et al. (2009). "Knowledge Utilisation in Road Safety Policy: Barriers to the Use of Knowledge from Economic Analysis." Knowledge, Technology & Policy **22**(4): 275-285.

Behrman, J. R. (2010). "The International Food Policy Research Institute (IFPRI) and the Mexican PROGRESA Anti-Poverty and Human Resource Investment Conditional Cash." World Development **38**(10): 1473-1485.

Summary The Mexican PROGRESA/Oportunidades anti-poverty and human resource conditional cash transfer (CCT) program has influenced considerably policies in many countries. The Mexican government engaged the International Food Policy Research Institute (IFPRI) to undertake the initial evaluation of PROGRESA/Oportunidades. This paper considers: (1) Was the PROGRESA program design influenced by prior IFPRI research? (2) Why was IFPRI chosen to undertake the initial impact evaluation of PROGRESA? (3) How did the IFPRI evaluation of PROGRESA contribute to the program? (4) Were there spillovers of the IFPRI evaluation of PROGRESA? It concludes that estimated benefit-cost ratios of IFPRI's evaluation of PROGRESA considerably exceed one.

Bekker, M., S. van Egmond, et al. (2010). "Linking research and policy in dutch healthcare: infrastructure, innovations and impacts." Evidence & Policy: A Journal of Research, Debate and Practice **6**(2): 237-253.

Belkhdja, O., N. Amara, et al. (2007). "The extent and organizational determinants of research utilization in Canadian health services organizations." Science Communication **28**(3): 377-417.

This article focuses on the use of research by managers and professionals in Canadian health service organizations (ministries, regional authorities, and hospitals). The results of the analysis of the 928 responses underlined the important role that the absorption, learning, culture, and linkage mechanism variables played in determining utilization. General linear regression and regression by organizational type confirmed the importance of the linkage mechanisms, research experience, unit size, and research relevance for the users. The emphasis could thus be put, according to the organization type, on research experience, linkage mechanisms, unit size, research culture, research relevance for the users, and research activities. The article also underscores the individual and organizational contextual factors' high degree of significance by expressing these contextual factors as organizational variables and by adopting a more organizational perspective of knowledge utilization analysis.

Benneworth, P. (2010). "Who matters to universities? A stakeholder perspective on humanities, arts and social sciences valorisation." Higher Education **59**(5): 567-588.

Valorisation is at the centre of many debates on the future of academic research. But valorisation has largely become narrowly understood in terms of universities' economic contributions through patenting, licensing, spin-off formation and technology transfer. This emergent restrictive definition of universities' societal impacts is a worrying development, overlooking the potential of universities' knowledge in the Humanities, Arts and Social Sciences (HASS). Our hypothesis is that HASS disciplines' disadvantage compared to the hard sciences (lesser policy attention and funding for commercialisation) arises because HASS stakeholders are not sufficiently salient as stakeholders to universities. Using case studies of three policy experiments, we argue that universities' responsiveness to stakeholders does not evolve simply and functionally but in response to the networks of relationships in which they are situated. This has important implications for how stakeholder research is used in higher education research, and for the design and implementation of policies to improve universities' societal contributions. [ABSTRACT FROM AUTHOR]

Best, A. and B. Holmes (2010). "Systems thinking, knowledge and action: towards better models and methods." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 145-159.

Bogason, P. and M. Brans (2008). "Making public administration teaching and theory relevant." European Political Science **7**(1): 84-97.

The academic field of Public Administration is quite diverse in Europe, ranging from applications of basic public law on the one hand to analyses of the 'hollow state' on the other (where it is difficult to find any clear-cut 'public' organisation). Nonetheless, in the light of societal changes towards late modernity, post-modern conditions and globalisation, there are some common challenges that

sooner or later may knock at the door of all universities teaching Public Administration: how might we best conceptualise Public Administration as a field?; what are the field's relations to practice?; how can we best teach our field in a globalising world?; how adequate are our theories?; and how can we reach out and meet the demands to come down from our ivory tower?

Braun, M. (2009). "The evolution of emissions trading in the European Union-The role of policy networks, knowledge and policy entrepreneurs." Accounting, Organizations and Society **34**(3-4): 469-487.

Brownson, R. C., C. Royer, et al. (2006). "Researchers and policymakers - Travelers in parallel universes." American Journal of Preventive Medicine **30**(2): 164-172.

Public policy, in the form of laws, guidelines, and regulations, has a profound effect on our daily lives and health status. Reasons for a lack of consistent and systematic translation of public health research into public policy is examined, including differences in decision-making processes, poor timing, ambiguous findings, the need to balance objectivity and advocacy, personal demands of the process, information overload, lack of relevant data, and the mismatch of randomized thinking with nonrandom problems. Next, several actions are suggested that should help bridge the chasm between science and policy, such as greater involvement in the process, better understanding of political decision making, building of effective teams, and development of political champions. Scientists are obligated not only to discover new knowledge but also to ensure that discoveries are applied to improve health.

Burnett, J. and S. Duncan (2008). "Reflections and observations: An interview with the UK's first Chief Government Social Researcher." Critical Social Policy **28**(3): 283.

Camou, A. (2009). "POLITICAL SCIENCE AND PUBLIC POLICIES WITHIN THE FRAMEWORK OF A CONTROVERSY." Andamios **6**(11): 11-+.

In October of 2004, Giovanni Sartori published a brief article, "Where is political science going?", that generated a long controversy in the notes that follow I am going to retake this dispute but moving the attention from the mainstream of political science to the studies of public policies. My purpose is to pay attention in one of the outstanding problems marked by Sartori: the weak connection between theory and practice. My main argument has two claims. On the one hand, I maintain that the critical analysis offered by professor Sartori is applied to some aspects of the studies of public policies, but not to others. On the other hand, I indicate that their critics and proposals are up to a certain point adapted, but also are little realistic, and to a certain extent they are insufficient, because he concentrates his reflection on the epistemological aspects of knowledge but he neglects the political-institutional aspects largely.

Caplan, N. (1976). "SOCIAL RESEARCH AND NATIONAL POLICY: What Gets Used, By Whom, For What Purpose, and With What Effects?" Policy Studies Review Annual **28**(1): 187-194.

The article presents information on social research and the national policy. The use of social science information in important matters of government has been the subject of increasing interest over the last several years. The term policy-maker is used here to refer to the upper-level decision-makers included in the study. It is not meant to imply that the respondents dictated policy, but rather to indicate that they were in policy-influencing positions. Social science knowledge or social science information refers primarily to information derived empirically from the following behavioral sciences: psychology, sociology, anthropology, political science and the multidisciplinary matings of fields. In policy-related situations even under the most ideal conditions, how knowledge is used, and what impact it may have are influenced by the content of the issues under consideration, the values and perspectives of the policymakers, and the relevant political and administrative hierarchical networks which they operate.

Caplan, N. and E. Barton (1978). "The potential of social indicators: Minimum conditions for impact at the national level as suggested by a study of the use of 'social indicators' 73." Social Indicators Research **5**(1): 427-456.

Centellas, K. M. (2010). "The Localism of Bolivian Science Tradition, Policy, and Projects." Latin American Perspectives **37**(3): 160-175.

State-sponsored science and technology projects are increasingly prominent in Bolivia. Evo Morales has implemented a series of new legal and infrastructure programs to foster the growth of these fields because of the promise they hold for fostering Bolivian development using local materials and methods. The content of and justification for these projects differ from those of earlier positivist or desarrollista models. Morales's emphasis on scientific research is congruent with the preexisting ideological and practical commitments of the Bolivian bioscientific and biomedical community. Because of the localism integral to scientific practice in Bolivia, these research projects are "Bolivian science," not "science in Bolivia." Bolivian science challenges common assumptions in the science-studies and philosophy-of-science literature regarding who does science, what the appropriate venues for it are, and how its practice is justified.

Collingridge, D. and C. Reeve (1986). Science Speaks to Power: The Role of Experts in Policy Making. New York, St. Martins Press.

Cooksy, L. J. and V. J. Caracelli (2005). "Quality, context, and use - Issues in achieving the goals of metaevaluation." American Journal of Evaluation **26**(1): 31-42.

Metaevaluations are systematic reviews of evaluations to determine the quality of their processes and findings. The knowledge about evaluation quality that results from metaevaluation of multiple evaluations can be used to inform researchers' decisions about which studies to include in evaluation syntheses.

Metaevaluations of multiple studies are also used to identify strengths and weaknesses in evaluation practice in order to develop evaluation capacity. This article discusses the multiple ways in which quality can be defined, the political and cultural contexts of metaevaluation, and issues surrounding use and misuse.

A metaevaluation of evaluations of international agricultural research centers illustrates these topics.

Corwin, R. G. (1982). "Organizational Barriers to the Utilization of Research." Administrative Science Quarterly **27**(4): 623-640.

Research findings frequently do not seem to have a discernible influence on administrative practice. We propose that a key reason is that research is often conducted in a policy vacuum. Policy vacuums occur in the absence of: an organized constituency of policy makers, identifiable policy issues and research questions, consistent policies and clear policy options, coordination among the independent agencies responsible for a policy area, and an ongoing, operational program that can make use of the findings. Examples of each feature are drawn from two demonstration programs operating in the National Institute of Education. Numerous organizational properties are identified that inhibited the utility of the research connected with the programs.

Denburg, A. and D. Daneman (2010). "Pascal's Wager: From Science to Policy on Early Childhood Development." Canadian Journal of Public Health **101**(3): 235.

Dobbins, M., P. Rosenbaum, et al. (2007). "Information transfer: what do decision makers want and need from researchers?" Implementation Science **2**(1): 20.

PURPOSE:The purpose of this study was to undertake a systematic assessment of the need for research-based information by decision-makers working in community-based organizations. It is part of a more comprehensive knowledge transfer and exchange strategy that seeks to understand both the content required and the format/methods by which such information should be presented.**METHODS:**This was a cross-sectional telephone survey. Questions covered current practices, research use, and demographic information, as well as preferences for receiving research information. Three types of organizations participated: Children's Treatment Centres of Ontario (CTCs); Ontario Community Care Access Centres (CCACs); and District Health Councils (DHCs). The analysis used descriptive statistics and analyses of variance (ANOVA) to describe and explore variations across organizations.**RESULTS:**The participation rate was 70%. The highest perception of barriers to the use of research information was reported by the CCAC respondents, followed by CTCs and DHCs. The CTCs and DHCs reported greater use of research evidence in planning decisions as compared to the CCACs. Four sources of information transfer were consistently identified. **These were websites, health-related research journals, electronic mail, and conferences and workshops.** Preferred formats for receiving information were executive summaries, abstracts, and original articles.**CONCLUSION:**There were a number of similarities across organization type with respect to perceived barriers to research transfer, as well as the types of activities the organizations engaged in to promote research use in decision-making. These findings support the importance of developing interactive, collaborative knowledge transfer strategies, as well as the need to foster relationships with health care decision-makers, practitioners and

policymakers.

Driedger, S. M., A. Kothari, et al. (2010). "If you build it, they still may not come: outcomes and process of implementing a community-based integrated knowledge translation mapping innovation." Implementation Science 5(1): 47.

BACKGROUND: Maps and mapping tools through geographic information systems (GIS) are highly valuable for turning data into useful information that can help inform decision-making and knowledge translation (KT) activities. However, there are several challenges involved in incorporating GIS applications into the decision-making process. We highlight the challenges and opportunities encountered in implementing a mapping innovation as a KT strategy within the non-profit (public) health sector, reflecting on the processes and outcomes related to our KT innovations. **METHODS:** A case study design, whereby the case is defined as the data analyst and manager dyad (a two-person team) in selected Ontario Early Year Centres (OEYCs), was used. Working with these paired individuals, we provided a series of interventions followed by one-on-one visits to ensure that our interventions were individually tailored to personal and local decision-making needs. Data analysis was conducted through a variety of qualitative assessments, including field notes, interview data, and maps created by participants. Data collection and data analysis have been guided by the Ottawa Model of Research Use (OMRU) conceptual framework. **RESULTS:** Despite our efforts to remove all barriers associated with our KT innovation (maps), our results demonstrate that both individual level and systemic barriers pose significant challenges for participants. While we cannot claim a causal association between our project and increased mapping by participants, participants did report a moderate increase in the use of maps in their organization. Specifically, maps were being used in decision-making forums as a way to allocate resources, confirm tacit knowledge about community needs, make financially-sensitive decisions more transparent, evaluate programs, and work with community partners. **CONCLUSIONS:** This project highlights the role that maps can play and the importance of communicating the importance of maps as a decision support tool. Further, it represents an integrated knowledge project in the community setting, calling to question the applicability of traditional KT approaches when community values, minimal resources, and partners play a large role in decision making. The study also takes a unique perspective--where research producers and users work as dyad-pairs in the same organization--that has been under-explored to date in KT studies.

Elliott, H. (2000). "How Are Policy Makers Using Evidence? Models of Research Utilisation and Local NHS Policy Making." Journal of Epidemiology and Community Health (1979-) 54(6): 461-468.

Study objective- This paper is based on a qualitative study that aimed to identify factors that facilitate or impede evidence-based policy making at a local level in the UK National Health Service (NHS). It considers how models of research utilisation drawn from the social sciences map onto empirical evidence from this study. **Design-** A literature review and case studies of social research projects

that were initiated by NHS health authority managers or GP fundholders in one region of the NHS. In depth interviews and document analysis were used. Setting-One NHS region in England. Participants-Policy makers, GPs and researchers working on each of the social research projects selected as case studies. Main results-The direct influence of research evidence on decision making was tempered by factors such as financial constraints, shifting timescales and decision makers' own experiential knowledge. Research was more likely to impact on policy in indirect ways, including shaping policy debate and mediating dialogue between service providers and users. Conclusions-The study highlights the role of sustained dialogue between researchers and the users of research in improving the utilisation of research-based evidence in the policy process.

Estabrooks, C. A., L. Derksen, et al. (2008). "The intellectual structure and substance of the knowledge utilization field: A longitudinal author co-citation analysis, 1945 to 2004." Implementation Science 3.

Background: It has been argued that science and society are in the midst of a far-reaching renegotiation of the social contract between science and society, with society becoming a far more active partner in the creation of knowledge. On the one hand, new forms of knowledge production are emerging, and on the other, both science and society are experiencing a rapid acceleration in new forms of knowledge utilization. Concomitantly since the Second World War, the science underpinning the knowledge utilization field has had exponential growth. Few in-depth examinations of this field exist, and no comprehensive analyses have used bibliometric methods. Methods: Using bibliometric analysis, specifically first author co-citation analysis, our group undertook a domain analysis of the knowledge utilization field, tracing its historical development between 1945 and 2004. Our purposes were to map the historical development of knowledge utilization as a field, and to identify the changing intellectual structure of its scientific domains. We analyzed more than 5,000 articles using citation data drawn from the Web of Science (R). Search terms were combinations of knowledge, research, evidence, guidelines, ideas, science, innovation, technology, information theory and use, utilization, and uptake. Results: We provide an overview of the intellectual structure and how it changed over six decades. The field does not become large enough to represent with a co-citation map until the mid-1960s. Our findings demonstrate vigorous growth from the mid-1960s through 2004, as well as the emergence of specialized domains reflecting distinct collectives of intellectual activity and thought. Until the mid-1980s, the major domains were focused on innovation diffusion, technology transfer, and knowledge utilization. Beginning slowly in the mid-1980s and then growing rapidly, a fourth scientific domain, evidence-based medicine, emerged. The field is dominated in all decades by one individual, Everett Rogers, and by one paradigm, innovation diffusion. Conclusion: We conclude that the received view that social science disciplines are in a state where no accepted set of principles or theories guide research (i.e., that they are pre-paradigmatic) could not be supported for this field. Second, we document the emergence of a new domain within the knowledge utilization field, evidence-based medicine. Third, we

conclude that Everett Rogers was the dominant figure in the field and, until the emergence of evidence-based medicine, his representation of the general diffusion model was the dominant paradigm in the field.

Gagliardi, A., N. Fraser, et al. (2008). "Fostering knowledge exchange between researchers and decision-makers: Exploring the effectiveness of a mixed-methods approach." Health Policy **86**(1): 53-63.

Godfrey, L., N. Funke, et al. (2010). "Bridging the science-policy interface: a new era for South African research and the role of knowledge brokering." South African Journal of Science **106**(5/6): 8.

Goldson, B. (2010). "The sleep of (criminological) reason: Knowledge—policy rupture and New Labour's youth justice legacy." Criminology and Criminal Justice **10**(2): 155.

Gotor, E., F. Caracciolo, et al. (2010). "The Perceived Impact of the In-Trust Agreements on CGIAR Germplasm Availability: An Assessment of Bioversity International's Institutional Activities." World Development **38**(10): 1486-1493.

Summary This study assesses the generation and consequences of the In-Trust Agreements (ITAs) that established the legal status of the CGIAR germplasm as freely available for the benefit of humanity under the auspices of FAO. The analysis looks at the history of the ITAs and focuses on the role of Bioversity International in research and other activities in influencing, facilitating and enabling the ITA negotiations. Results confirm the central role of Bioversity and policy research in the negotiations process. Concepts developed during the ITA negotiations contributed toward subsequent multilateral negotiations that eventually culminated in the International Treaty on Plant Genetic Resources.

Grad, R. A., P. Pluye, et al. (2008). "Impact of research-based synopses delivered as daily e-mail: A prospective observational study." Journal of the American Medical Informatics Association **15**(2): 240-245.

We conducted a prospective observational study to (1) determine usage and construct validity of a method to gauge the cognitive impact of information derived from daily e-mail, and (2) describe self-reported impacts of research-based synopses (InfoPOEMs) delivered as e-mail. Ratings of InfoPOEMs using an Impact assessment scale provided (a) data on usage of the impact assessment method, (b) reports of impact by InfoPOEM and by doctor and (c) data for analysis of construct validity of the scale. Participants were family physicians or general practitioners who rated at least five InfoPOEMs delivered on e-mail. For each InfoPOEM rated, 0.1 continuing education credit was awarded by the College of Family Physicians of Canada. Use of the impact assessment scale linked to a daily InfoPOEM was sustained during the 150-day study period. 1,007 participants submitted 61,493 reports of 'cognitive impact' by rating on average 61 InfoPOEMs (range 5-111). 'I learned something new' was most frequently reported. 'I was frustrated as there was not enough information or nothing useful' was the most frequently reported negative type of impact. The

proportion of reports of 'No Impact' varied substantially across individual InfoPOEMs. Impact patterns suggested an 8 or 9-factor solution. Our Impact assessment method facilitates knowledge transfer by promoting two-way exchange between providers of health information and family doctors. Providers of health information can use this method to better understand the impact of research-based synopses. Sustaining current practice and increasing knowledge about new developments in medicine are important outcomes arising from research-based synopses delivered as e-mail, in addition to practice change.

Green, L. W., J. M. Ottoson, et al. (2009). "Diffusion Theory and Knowledge Dissemination, Utilization, and Integration in Public Health." Annual Review of Public Health **30**: 151-174.

Legislators and their scientific beneficiaries express growing concerns that the fruits of their investment in health research are not reaching the public, policy makers, and practitioners with evidence-based practices. Practitioners and the public lament the lack of relevance and fit of evidence that reaches them and barriers to their implementation of it. Much has been written about this gap in medicine, much less in public health. We review the concepts that have guided or misguided public health in their attempts to bridge science and practice through dissemination and implementation. Beginning with diffusion theory, which inspired much of public health's work on dissemination, we compare diffusion, dissemination, and implementation with related notions that have served other fields in bridging science and practice. Finally, we suggest ways to blend diffusion with other theory and evidence in guiding a more decentralized approach to dissemination and implementation in public health, including changes in the ways we produce the science itself.

Gregrich, R. (2003). "A note to researchers: Communicating science to policy makers and practitioners." Journal of substance abuse treatment **25**(3): 233-237.

Gunderson, M. (2007). "How academic research shapes labor and social policy." Journal of Labor Research **28**(4): 573-590.

How academic research affects labor and social policy is viewed through a program evaluation framework that highlights the difficulties of determining the causal impact of such research on public policy. The effect is illustrated by examples. **My conclusion is that academic research can have a modest to substantial impact on policy.** Its impact is enhanced if it has a number of key characteristics: high quality; reputable researchers involved; synthesized and translated into a language understood by policy makers, the general public, and the media; credible champions who will broker and defend it, in the political process or in the public realm; timeliness; and, political acceptability.

Gunning-Schepers, L. (1999). "Models: instruments for evidence based policy." British Medical Journal **53**(5): 263.

Hammersley, M. (2005). "Is the evidence-based practice movement doing more good

than harm? Reflections on Iain Chalmers' case for research-based policy making and practice." Evidence & Policy: A Journal of Research, Debate and Practice 1: 85-100.

Powerful voices are currently insisting that policy and practice must be based on research evidence, and that social science inquiry should be reformed in order to serve this need more effectively. An influential figure in the evidence-based practice movement is Sir Iain Chalmers, previously director of the UK Cochrane Centre. Taking evidence-based medicine as his model, he presents the task of research as to determine which policies and practices work. This is to be achieved through the use of randomised controlled trials and systematic reviews of their results. In this article, some of the central assumptions of his case are assessed.

Haug, C., T. Rayner, et al. (2010). "Navigating the dilemmas of climate policy in Europe: evidence from policy evaluation studies." Climatic Change: 1-19.

Hecllo, H. (1978). Issue Networks and the Executive Establishment. . The New American Political System. A. King. Washington, DC, American Enterprise Institute.

Hemsley-Brown, J. and C. Sharp (2003). "The use of research to improve professional practice: a systematic review of the literature." Oxford Review of Education 29(4): 449-470.

In a keynote address to the Teacher Training Agency Annual Conference, Professor David Hargreaves suggested that teaching could become an evidence-based profession if educational researchers were made more accountable to teachers. This systematic literature review set out to explore: how teachers use research; which features of research encourage teachers to use research findings in their own practice; whether medical practitioners make greater use of research findings than teachers; and approaches to dissemination. Two key ideas emerge from this review. First, there appear to be common barriers to research use in both medicine and in education. Findings suggest that there is a need to create a culture in the public sector which supports and values research. There are, however, a number of factors, which appear to be more specific to the education field. Key differences in the way that research knowledge is constructed in the social sciences has led to researchers being challenged about their findings, particularly in relation to the context, generalisability and validity of the research. For these reasons the development of communication networks, links between researchers and practitioners, and greater involvement of practitioners in the research process, have emerged as strategies for improving research impact.

Hertz-Picciotto, I. (1995). "Epidemiology and quantitative risk assessment: a bridge from science to policy." American Journal of Public Health 85(4): 484.

Hird, J. A. (2009). "Study and Use of Policy Research in State Legislatures." International Regional Science Review 32(4): 523-535.

The literature on knowledge utilization generally reveals limited use of social

science research in policymaking, and the proliferation of information sources and access suggests further erosion of traditional sources of expertise. However, many studies of knowledge utilization assess whether policymakers consider written research articles, books, reports - in reaching decisions. This emphasis on the written research product neglects an important vehicle for transmitting research to policymakers: the researchers themselves and their intermediaries. I argue that social science and policy research do influence public policymaking, yet the influence of research is mediated through think tanks and other boundary individuals and organizations that digest and transmit information to policymakers. Scholars studying research utilization should recognize the importance of people apart from written research, and scholars hoping to influence policymaking should recognize that publications alone are unlikely to sway policymakers. I offer some suggestions for how scholars and legislators can better connect knowledge and power.

Holmes, J. and B. Harris (2010). "Enhancing the contribution of research councils to the generation of evidence to inform policy making." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 391-409.

Humes, W. (2001). "Scholarship, Research and the Evidential Basis of Policy Development in Education." British Journal of Educational Studies **49**(3): 329-352.

The starting point for this paper is the ongoing debate about the relation between research and policy in education. Recent developments in England and Scotland are reviewed in the context of political and academic arguments about the nature and function of research activity. The defensiveness of the research community in the face of professional and political attacks is examined critically. A case study of the Higher Still programme is used to illustrate the complexity of the relationships between evidence, ideology, values and professional practice. It is argued that the research community needs to become more politically sophisticated and to advance a clearer vision of its social function in advanced democratic societies if its potential contribution to educational development is to be realised. The dangers of a retreat to a narrow empirical role are highlighted.

Huston, A. C. (2008). "From Research to Policy and Back." Child Development **79**(1): 1.

Huxley, P., T. Maegusuku-Hewett, et al. (2010). "Better evidence for better commissioning: a study of the evidence base of generic social care commissioning guides in the UK." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 291-307.

Ir, P., M. Bigdeli, et al. (2010). "Translating knowledge into policy and action to promote health equity: The Health Equity Fund policy process in Cambodia 2000-2008." Health Policy **96**(3): 200-209.

Jacobson, N. (2007). "Social Epistemology." Science Communication **29**(1): 116-127.
Knowledge transfer and exchange has become an increasingly important

practice in the arena of publicly funded health and social research. Throughout its history, investigators have used a variety of borrowed theories to explore and explain the determinants, processes, and results of knowledge transfer. As the context in which knowledge transfer takes place has changed, so too has the theory used to explore and explain the process. This article reviews the role of theory in knowledge transfer and exchange research and proposes a novel source for potentially useful new theory in the current context: social epistemology.

Jewell, C. and L. Bero (2008). "“Developing Good Taste in Evidence”: Facilitators of and Hindrances to Evidence Informed Health Policymaking in State Government." Milbank Quarterly **86**(2): 177-208.

Jones, H. (2009). Policy-making as discourse: a review of recent knowledge-to-policy literature. ODI-IKM Working Papers. London, U.K., Overseas Development Institute. **5**.

Jung, T., S. Nutley, et al. (2010). "Linking research and policy in Scotland." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 213-235.

Kaitibie, S., A. Omoro, et al. (2010). "Kenyan Dairy Policy Change: Influence Pathways and Economic Impacts." World Development **38**(10): 1494-1505.

Summary Marketing, transporting, processing, and consuming dairy products contribute significantly to the livelihoods of many poor Kenyan households. This study analyzes the impact of recent research supporting policy changes to liberalize informal milk markets. The study found that behavioral changes in dairy sector participants arising from the research evidence-supported policy and regulatory changes led to an average 9% reduction in milk-marketing margins, and a significant increase in the number of licensed small-scale milk vendors. High welfare benefits arising from the policy change, with a net present value of US\$230 million, are captured by consumers, producers, and milk vendors.

Kajermo, K., A.-M. Boström, et al. (2010). "The BARRIERS scale -- the barriers to research utilization scale: A systematic review." Implementation Science **5**(1): 32.

BACKGROUND:A commonly recommended strategy for increasing research use in clinical practice is to identify barriers to change and then tailor interventions to overcome the identified barriers. In nursing, the BARRIERS scale has been used extensively to identify barriers to research utilization.**AIM AND OBJECTIVES:**The aim of this systematic review was to examine the state of knowledge resulting from use of the BARRIERS scale and to make recommendations about future use of the scale. The following objectives were addressed: To examine how the scale has been modified, to examine its psychometric properties, to determine the main barriers (and whether they varied over time and geographic locations), and to identify associations between nurses' reported barriers and reported research use.**METHODS:**Medline (1991 to September 2009) and CINHALL (1991 to September 2009) were searched for published research, and ProQuest®

digital dissertations were searched for unpublished dissertations using the BARRIERS scale. Inclusion criteria were: studies using the BARRIERS scale in its entirety and where the sample was nurses. Two authors independently assessed the study quality and extracted the data. Descriptive and inferential statistics were used. RESULTS: Sixty-three studies were included, with most using a cross-sectional design. Not one study used the scale for tailoring interventions to overcome identified barriers. The main barriers reported were related to the setting, and the presentation of research findings. Overall, identified barriers were consistent over time and across geographic locations, despite varying sample size, response rate, study setting, and assessment of study quality. Few studies reported associations between reported research use and perceptions of barriers to research utilization. CONCLUSIONS: The BARRIERS scale is a nonspecific tool for identifying general barriers to research utilization. The scale is reliable as reflected in assessments of internal consistency. The validity of the scale, however, is doubtful. There is no evidence that it is a useful tool for planning implementation interventions. We recommend that no further descriptive studies using the BARRIERS scale be undertaken. Barriers need to be measured specific to the particular context of implementation and the intended evidence to be implemented.

Keller, A. C. (2010). "Credibility and Relevance in Environmental Policy." Measuring Strategies and Performance among Science Assessment Organizations **20**(2): 357-386.

Organizations that provide scientific information to policy makers face the difficult challenge of maintaining scientific credibility while establishing their political relevance. A growing body of research examines how assessment organizations meet the potentially competing expectations of science and policy communities. However, existing research has failed to produce generalizable findings. This study draws together theoretical approaches in science studies and organization theory to develop a framework that allows for a comparative analysis of multiple cases. The study compares the organizational strategies of the National Research Council, the National Acid Precitation Assessment Program, and the Intergovernmental Panel on Climate Change. Comparisons among the organizations are made using independent measures of credibility and political relevance. The evidence suggests that organizational strategies do impact assessment effectiveness and that it is possible for organizations to simultaneously achieve scientific credibility and political relevance.

Kennedy, P., B. de, et al. (2010). "An exploration of evidence-based policy in Ireland: health and social inclusion." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 255-268.

Kingdon, J. W. (1984). Agendas, Alternatives, and Public Policies. New York, Harpers Collins.

Kleine, M. (2009). "Capacity Building for Effective Work at the Interface of Forest Science and Forest Policy." Mountain Research and Development **29**(2): 114-120.

Linking scientific knowledge with political decision-making has never been an easy task. This is also the case in the forestry sector, especially with its wide array of stakeholders at local, national, and global levels. Considerable constraints appear to exist in translating innovative ideas generated through science into practical application for policy-making and on-the-ground forest management. Over the past few years, the International Union of Forest Research Organizations (IUFRO) therefore has addressed the issue of the science-policy interface through in-depth study by a special task force, and by providing training on the subject for the forest science community in developing countries. This paper reports on the results and ongoing activities of these IUFRO initiatives, including a best practices guide on how to work effectively at the interface of forest science and forest policy and a training program that has been implemented in Africa, Asia, and Latin America over the past few years. As an example of successful training in science-policy interfacing, we present results of a workshop focused on mountain forestry development. This workshop was organized for scientists from developing countries in Africa and Asia in conjunction with the International Conference on "Mountain Forests in a Changing World" held in Vienna, Austria, in April 2008. Experiences gained in implementing the training on science-policy interfacing for scientists from developing countries show that interaction between the science community and decision-makers is very limited. Although in some developing countries there are established formal processes for reporting research results to the government at higher levels, greater efforts in terms of resources and awareness creation are required for more effective integration of scientific knowledge into policy-making. The science-policy guidelines and training presented in this paper are an essential step toward this end.

Klobucky, R. and K. Strapcova (2004). "Knowledge utilisation in public policy: the case of Roma population research in Slovakia." International Social Science Journal **56**(1): 57-+.

This article surveys the use of research results in policies directed at the Roma minority in Slovakia and attempts to identify the factors that facilitate or hamper knowledge utilisation. Four case studies covering aspects of Roma issues are examined in detail from initiation to potential policy utilisation, using a uniform framework for analysis and methods including interviews and the document analysis. The main finding is that political context is the dominant factor negatively influencing the policy utilisation of scientific knowledge. In three of the cases studied, this factor was mainly responsible for poor utilisation. Another important negative factor is the character of the research findings themselves: the more general they are, the less likely they are to influence policy formulation. Conversely, utilisation is enhanced by good interconnection between researchers and funders and other stakeholders, including potential users. The most common positive factor was presentation and dissemination of results, especially in terms of popularisation, which depended on academic researchers as well as on stakeholders. In the cases studied, state entities appeared poorly equipped to undertake adequate dissemination, especially compared with non-governmental

organisations.

Kobus, K. and R. Mermelstein (2009). "Bridging basic and clinical science with policy studies: The Partners with Transdisciplinary Tobacco Use Research Centers experience." Nicotine & Tobacco Research **11**(5): 467-474.

Lencucha, R., A. Kothari, et al. (2010). "Extending collaborations for knowledge translation: lessons from the community-based participatory research literature." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 61-75.

Lindquist, E. A. (1990). The Third Community, Policy Inquiry, and Social Scientists. Social Scientists, Policy, and the State. S. Brooks and A.-G. Gagnon. New York, Praeger: 21-51.

Lindquist, E. A. (2001). Discerning Policy Influence: Framework for a Strategic Evaluation of IDRC-Supported Research. Ottawa, International Development Research Center.

MacCoun, R. J. (2010). "IMPLICIT RULES OF EVIDENCE-BASED POLICY ANALYSIS, UPDATED." ADDICTION **105**(8): 1335-1336.

Maton, K. and S. Bishop-Josef (2006). "Psychological research, practice, and social policy: Potential pathways of influence." PROFESSIONAL PSYCHOLOGY RESEARCH AND PRACTICE **37**(2): 140.

McCaughey, D. and N. Bruning (2010). "Rationality versus reality: the challenges of evidence-based decision making for health policy makers." Implementation Science **5**(1): 39.

McGarity, T. O. (2001). "Politics by other means: Law, science, and policy in EPA's implementation of the Food Quality Protection Act." Administrative Law Review **53**(1): 103-222.

Morris, A. (2005). "Evidence initiatives: aspects of recent experience in England." Evidence & Policy: A Journal of Research, Debate and Practice **1**: 257-268.

This article examines aspects of the debate in British education about the role that research evidence can play in policy making and practice, stressing the wide spectrum of views held by different stakeholders including researchers, policy makers, institutional leaders and practitioners. Responses to the evidence agenda have come from central government, the research community and professional bodies, and include the establishment of the National Educational Research Forum (NERF) to oversee the development of a coherent strategy for educational research. NERF's activities since its establishment in 1999 are reviewed, and continuing barriers to strategic reform are discussed. The article concludes with some personal reflections on the way forward.

Mostert, E. (2008). "Seven rules for researchers to increase their impact on the policy process." Hydrology and Earth System Sciences **12**(4): 1087-1096.

This paper addresses the question of how hydrologists and other researchers can contribute most to water management practice. It reviews the literature in the field of science and technology studies and research utilization and presents the results in the form of seven "rules" for researchers. These are (1) Reflect on the nature and possible roles of science and expertise; (2) Analyze the stakeholders and issues at stake; (3) Choose whom and what to serve; (4) Decide on your strategy; (5) Design the process to implement your strategy; (6) Communicate!; and (7) Consider your possibilities and limitations. A key notion in this paper is that research always involves selection and interpretation and that the selection and interpretations made in a specific case always reflect the values and preferences of those involved. Collaboration between researchers and the other stakeholders can increase the legitimacy and utilization of the research and can prevent the researchers' specific expertise from being lost.

Nielson, S. (2001). IDRC-Supported Research and Its Influence on Public Policy. Ottawa, International Development Research Center.

Nutley, S., S. Morton, et al. (2010). "Evidence and policy in six European countries: diverse approaches and common challenges." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 131-144.

O'Dowd, A. (2010). "Science minister promises to promote evidence based policy making." British Medical Journal **340**(189449941).

Ogden, T., F. U. rki, et al. (2010). "Linking research, policy and practice in welfare services and education in norway." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 161-177.

Ottinger, G. (2010). "Buckets of Resistance." Standards and the Effectiveness of Citizen Science **35**(2): 244-270.

In light of arguments that citizen science has the potential to make environmental knowledge and policy more robust and democratic, this article inquires into the factors that shape the ability of citizen science to actually influence scientists and decision makers. Using the case of community-based air toxics monitoring with "buckets," it argues that citizen science's effectiveness is significantly influenced by standards and standardized practices. It demonstrates that, on one hand, standards serve a boundary-bridging function that affords bucket monitoring data a crucial measure of legitimacy among experts. On the other hand, standards simultaneously serve a boundary-policing function, allowing experts to dismiss bucket data as irrelevant to the central project of air quality assessment. The article thus calls attention to standard setting as an important site of intervention for citizen science-based efforts to democratize science and policy. [ABSTRACT FROM AUTHOR]

Parkhurst, J., A. Hyde, et al. (2010). "Improving communication of research findings: identifying the sources of information most important to national disease control officers in low and middle income countries." Tropical Medicine & International Health **15**(10): 1252-1255.

Pawson, R., L. Owen, et al. (2010). "Legislating for health: Locating the evidence." Journal of Public Health Policy **31**(2): 164-177.

Peterson, J. C. (2007). "Framework for research utilization applied to seven case studies." American Journal of Preventive Medicine **33**(1): S21-S34.

Background: It is widely acknowledged that prevention research often is not fully or adequately used in health practice and/or policies. This study sought to answer two main questions: (1) Are there characteristics of research utilization in communities that suggest stages in a process? (2) What factors, including barriers and facilitators, are associated with the use of prevention research in community-based programs, policies, and practices? Methods: Researchers used a multiple case study design to retrospectively describe the research-utilization process. A conceptual framework modified from Rogers's diffusion of innovations model and Green's theory of participation were used. Data were gathered from archival sources and interviews with key people related to any one of seven community-based practices, programs, or policies. Fifty-two semistructured interviews were conducted with program or project staff members, funding agency project managers, community administrators and leaders, community project liaisons, innovation champions, and other members of the research user system. Results: Participation in the process of research utilization was described by using characteristics of collaborative efforts among stakeholders. Program champions or agents linking research resources to the community moved the research-utilization process forward. Practices, programs, or policies characterized by greater community participation generally resulted in more advanced stages of research utilization. Conclusions: Investigating the interactions among and contributions of linking agents and resource and user systems can illuminate the potential paths of prevention research utilization in community settings. Because community participation is a critical factor in research utilization, prevention researchers must take into account the context and needs of communities throughout the research process.

Pielke, R. A. (2007). The honest broker : making sense of science in policy and politics. Cambridge, Cambridge University Press.

Porter, D. (1993). "Food labeling reform: the journey from science to policy." Nutrition Today **28**(5): 7.

Quintero, R. M. (2007). "Getting ideas into public-policy analysis in advocacy coalition framework." Gestion Y Politica Publica **16**(2): 281-318.

One most interesting feature in contemporary policy studies is considering ideas playing an independent role. Advocacy Coalition Framework is one of these

policy process new studies. It assumes some premises, and through a theoretical framework seeks to explain policy change keeping in mind several factors. Policy subsystem internal dynamics are emphasized: advocacy coalitions aggregate actors who try to translate their beliefs systems into public policy, and thus, participate in policy-learning processes. This article explains in detail this theoretical proposal, to conclude with a brief sample of this theory empirical application.

Raitzer, D. A. (2010). "Assessing the Impact of Policy-Oriented Research: The Case of CIFOR's Influence on the Indonesian Pulp and Paper Sector." World Development **38**(10): 1506-1518.

Summary Qualitative and quantitative methods are applied to assess the impact of CIFOR's political economy research on the Indonesian pulp and paper sector. Key-informant interviews triangulated by trend-series tests suggest important influence through advocacy intermediaries and counterfactuals of slower adoption of improvements. Effects on conservation set-asides, overcapacity, and plantation establishment are estimated to avert loss of 76,000-212,000 hectares of natural forest (135,000 under main assumptions). Application of an economic-surplus framework for environmental benefits of forest conservation and avoided implicit wood subsidies finds benefits of US\$19 to US\$583 million (US\$133 million main estimate), compared with US\$500,000 of direct research costs.

Raitzer, D. A. and T. G. Kelley (2008). "Benefit-cost meta-analysis of investment in the International Agricultural Research Centers of the CGIAR." Agricultural Systems **96**(1-3): 108-123.

While the Consultative Group on International Agricultural Research (CGIAR) has been long considered a driving force behind the successes of the "Green Revolution", no prior study has attempted to develop an aggregate estimate of the value of the CGIAR System's impacts. However, economic ex post impact assessments have been conducted for some of the most outstanding individual innovations of the System. This study aggregates benefit estimates from specific technologies, and sets such against total investments in the CGIAR centers, so as to derive estimates for five different aggregate benefit-cost scenarios. Impact assessment has been pursued in a largely decentralized manner by individual research centers, and, as a result, methods and approaches differ among studies. Consequently, a critical review process was necessary for determining the reliability of individual impact estimates. A framework including two overarching principles for evaluating study reliability - (1) transparency and (2) demonstration of causality, as well as accordant criteria and indicators, was developed to assess individual estimates of economic impact before inclusion in scenarios of aggregate benefits. Against an aggregate investment of 7120 million 1990 US dollars, resultant benefit-cost ratios for research to date range from 1.9 to 17.3, depending on scenario. However, the true value of benefits arising from the CGIAR is probably in excess of even the upper bounds of these results, as only a small subset of System impacts have been quantified.

Rhee, W. (2010). "Entitled To Be Heard: Improving Evidence-Based Policy Making Through Audience and Public Reason." Ind. LJ **85**: 1315-1659.

Ringquist, E. J. (1995). "Political Control and Policy Impact in EPA's Office of Water Quality." American Journal of Political Science **39**(2): 336-363.

The theory of overhead democracy is supplemented with theoretical insights from public administration to produce a more complete picture of bureaucratic decision making. Efforts at political control are less successful in altering agency goals, values, and the general direction of public policy than they are at altering bureaucratic outputs. Changes in bureaucratic activity over time depend upon external efforts at political control, agency resources, and the complexity and salience of the policy area. A series of multivariate transfer-function models is used to account for changes in EPA enforcement activity, total federal enforcement activity, and the expression of agency values in water-pollution control. Executive and legislative efforts at political control did reduce enforcement activity. However, these efforts were ineffective at altering agency values, less effective at EPA than in most other agencies, and less effective in water-pollution control than in other areas of EPA enforcement. They also mobilized EPA clientele to produce lower levels of political control in the long run.

Rosenberg, I. H. (2008). "Translating nutrition science into policy as witness and actor." Annual Review of Nutrition **28**: 1-12.

Ryder, D., M. Tomlinson, et al. (2010). "Defining and using 'best available science': a policy conundrum for the management of aquatic ecosystems." Marine and Freshwater Research **61**(7): 821-828.

Sabatier, P. and H. Jenkins-Smith, Eds. (1993). Policy Change and Learning: An Advocacy Coalition Approach., Westview Press.

Sarat, A. (1989). "Donald Black discovers legal realism: From pure science to policy science in the sociology of law." Law & Social Inquiry **14**(4): 765-785.

Shaxson, L. (2005). "Is your evidence robust enough? Questions for policy makers and practitioners." Evidence & Policy: A Journal of Research, Debate and Practice **1**: 101-112.

This article examines the reasons we need evidence for policy, discusses where evidence is needed in the policy-making process, and the nature of the evidence base for strategy and policy. Working relationships between policy makers and their advisers are key: as policy makers come from a variety of backgrounds, developing a common language helps set discussions about the robustness of the evidence base on a sound footing. The article identifies five components of robustness, proposes a series of questions that could be used to address them and discusses the implications for the processes of policy making.

Sheate, W. R. (2010). "Strategic approaches and assessment techniques-Potential for

knowledge brokerage towards sustainability." Environmental Impact Assessment Review **30**(4): 278-288.

The role of science in policy and decision-making has been an issue of intensive debate over the past decade. The concept of knowledge brokerage has been developing in this context contemplating issues of communication, interaction, sharing of knowledge, contribution to common understandings, as well as to effective and efficient action. For environmental and sustainability policy and decision-making the discussion has addressed more the essence of the issue rather than the techniques that can be used to enable knowledge brokerage. This paper aims to contribute to covering this apparent gap in current discussion by selecting and examining empirical cases from Portugal and the United Kingdom that can help to explore how certain environmental and sustainability assessment approaches can contribute, if well applied, to strengthen the science-policy link. The cases show that strategic assessment approaches and techniques have the potential to promote knowledge brokerage, but a conscious effort will be required to design in genuine opportunities to facilitate knowledge exchange and transfer as part of assessment processes. (C) 2009 Elsevier Inc. All rights reserved.

Smith, K. (2010). "Research, policy and funding - academic treadmills and the squeeze on intellectual spaces." British Journal of Sociology **61**(1): 176-195.

In recent years, there has been a great deal of collective rumination about social scientists' role in society. In the post-1997 UK context, public policy commitments to 'evidence-based policy' and 'knowledge transfer' have further stimulated such reflections. More recently, Michael Burawoy's 2004 address to the American Sociological Association, which called for greater engagement with 'public sociology' has reverberated throughout the discipline, motivating a series of debates about the purpose of sociological research. To date, most such contributions have been based on personal experience and anecdotal evidence. In contrast, this paper responds directly to Burawoy's suggestion that we should 'apply sociology to ourselves,' in order that we 'become more conscious of the global forces' driving our research (Burawoy 2005: 285). Drawing on an empirical research project designed to explore of the relationship between health inequalities research and policy in Scotland and England, in the period from 1997 until 2007, this paper discusses data from interviews with academic researchers. The findings suggest that the growing pressure to produce 'policy relevant' research is diminishing the capacity of academia to provide a space in which innovative and transformative ideas can be developed, and is instead promoting the construction of institutionalized and vehicular (chameleon-like) ideas. Such a claim supports Edward Said's (1994) insistence that creative, intellectual spaces within the social sciences are increasingly being squeezed. More specifically, the paper argues we ought to pay far greater attention to how the process of seeking research funding shapes academic research and mediates the interplay between research and policy.

Snoeck, M. and J. Sutz (2010). *Social Science and Humanities Research and Science, Technology, and Innovation Policy-Making in Latin America: A Nexus Perception Study*.

Montevideo, Uruguay, CSIC - Universidad de la Republica.

Sörlin, S. (2009). "Narratives and counter-narratives of climate change: North Atlantic glaciology and meteorology, c. 1930-1955." Journal of Historical Geography **35**(2): 237-255.

Soydan, H. (2010). "Evidence and policy: the case of social care services in Sweden." Evidence & Policy: A Journal of Research, Debate and Practice **6**: 179-193.

Stoker, G. (2010). "Translating Experiments into Policy." Annals of the American Academy of Political and Social Science **628**(186954065): 47-58.

It is in their potential policy relevance that experiments may make their strongest contribution to innovation and progress in political science. Yet there are good grounds for thinking that the policy world has in place a number of barriers that can limit the impact of experimental evidence. Moreover, some experimenters seem to approach the business of influencing policy with spectacular naivety. In modern democratic societies, engaging with the policy process is a complex and demanding activity. In order to make advances in this quarter, experimenters will need to develop their methods and practices in field experiments and extend their strategies to deal with the demands of a complex policy world.

Strydom, W., N. Funke, et al. (2010). "EVIDENCE-BASED POLICYMAKING: A review." S Afr J Sci **106**(5/6).

Thompson, G. N., C. A. Estabrooks, et al. (2006). "Clarifying the concepts in knowledge transfer: a literature review." Journal of Advanced Nursing **53**(6): 691-701.

Aim. The aim of this paper is to examine the concepts of opinion leaders, facilitators, champions, linking agents and change agents as described in health, education and management literature in order to determine the conceptual underpinnings of each. **Background.** The knowledge utilization and diffusion of innovation literature encompasses many different disciplines, from management to education to nursing. Due to the involvement of multiple specialties, concepts are often borrowed or used interchangeably and may lack standard definition. This contributes to confusion and ambiguity in the exactness of concepts. **Methods.** A critical analysis of the literature was undertaken of the concepts opinion leaders, facilitators, champions, linking agents and change agents. A literature search using the concepts as keywords was conducted using Medline, CINAHL, Proquest and ERIC from 1990 to March 2003. All papers that gave sufficient detail describing the various concepts were included in the review. Several 'older' papers were included as they were identified as seminal work or were frequently cited by other authors. In addition, reference lists were reviewed to identify books seen by authors as essential to the field. **Findings.** Two similarities cut across each of the five roles: the underlying assumption that increasing the availability of knowledge will lead to behaviour change, and that in essence each role is a form of change agent. There are, however, many differences that suggest that these concepts are conceptually unique.

Conclusions. There is inconsistency in the use of the various terms, and this has implications for comparisons of intervention studies within the knowledge diffusion literature. From these comparisons, we concluded that considerable confusion and overlap continues to exist and these concepts may indeed be similar phenomena with different labels. All concepts appear to be based on the premise that interpersonal contact improves the likelihood of behavioural change when introducing new innovations into the health sector.

Walker, T., J. Ryan, et al. (2010). "Impact Assessment of Policy-Oriented International Agricultural Research: Evidence and Insights from Case Studies." World Development.

Webber, D. (1985). "State Legislators' Use of Policy Information: The Importance of Legislative Goals." State & Local Government Review 17(2): 213-218.

Weber, E. P. (2010). "Civic Science and Salmon Recovery Planning in Puget Sound." Policy Studies Journal 38(2): 235-256.

Today, science and scientists as experts no longer hold sway as unquestioned authoritative sources of objective information in many policy debates. This has led to growing frustration on the part of government officials and scientists over their inability to have science exert as meaningful a role as they think appropriate in the consideration and selection of policy alternatives. Given this development, what can be done to restore or otherwise ensure that the appropriate science and scientists are integrated into the policy process so that they matter to policy outcomes? There is general agreement that traditional top-down, one-way (from scientists to others), linear models for conceptualizing the role of science and scientists in the policy process are not capable of capturing the changed political, social, and "scientific" realities of the contemporary policymaking context. Many have gravitated to the concept of civic science/scientists as a new and improved model. Yet, despite clear progress in reconceptualizing the role of science in the policy process, there are gaps in the literature when it comes to actual applications of civic science. As McNie correctly notes: "it is essential that we develop a more robust understanding of experience and practical experiments regarding how relationships [and institutions] are constructed and managed across the science-society boundary" (p. 29). This research develops lessons for civic science in the policy process by exploring an innovative collaborative governance effort by the National Oceanic and Atmospheric Administration Fisheries and the Shared Strategy for Salmon Recovery in Puget Sound (Washington). The integration of science into the salmon recovery process in this case relied on a series of actions that the Technical Recovery Team (TRT) took to bridge the traditionally separate science and policy spheres in order to increase the certainty of science impact, specific steps taken to establish and maintain the TRTs role as an authoritative, credible source of science, and the embrace of a results-oriented, adaptive learning approach.

Weber, K., K. Kubeczko, et al. (2009). "Trade-offs between policy impacts of future-oriented analysis: experiences from the innovation policy foresight and strategy process

of the City of Vienna." Technology Analysis & Strategic Management **21**(8): 953-969.

Weible, C. M. (2010). "Harnessing expert-based information for learning and the sustainable management of complex socio-ecological systems." Environmental Science & Policy **13**(6): 522-534.

Human-used and managed natural resources, such as watersheds, represent complex socio-ecological systems where learning from different knowledge sources is essential for sustainable management. Guided by the advocacy coalition framework, the paper presents a set of propositions that help explain the different functional uses of expert-based information, the network position of scientific experts, and learning within and between coalitions. Most importantly, the paper investigates common assumptions about the superiority of consensus-based institutions for integrating science into policy-making by examining two collaborative and two adversarial policy subsystems. The findings show that the scientists' centrality as coalition allies and opponents is lower in collaborative policy subsystems than in adversarial policy subsystems. The findings suggest a more hospitable setting for learning and sustainability in the management of natural resources in collaborative compared to adversarial subsystems. The paper concludes with suggestions for future research in sustainability and learning. (C) 2010 Elsevier Ltd. All rights reserved.

Weiss, C. and M. Bucuvalas (1980). "Truth tests and utility tests: Decision-makers' frames of reference for social science research." American Sociological Review **45**(2): 302-313.

Weiss, C. H. (1979). "Many Meanings of Research Utilization." Public Administration Review **39**(5): 426.

Weiss, C. H. (2008). "Fairy Godmother and her warts - Making the dream of evidence-based policy come true." American Journal of Evaluation **29**(1): 29-47.

Evaluators sometimes wish for a Fairy Godmother who would make decision makers pay attention to evaluation findings when choosing programs to implement. The U.S. Department of Education came close to creating such a Fairy Godmother when it required school districts to choose drug abuse prevention programs only if their effectiveness was supported by "scientific" evidence. The experience showed advantages of such a procedure (e.g., reduction in support for D.A.R.E., which evaluation had found wanting) but also shortcomings (limited and in some cases questionable evaluation evidence in support of other programs). Federal procedures for identifying successful programs appeared biased. In addition, the Fairy Godmother discounted the professional judgment of local educators and did little to improve the fit of programs to local conditions. Nevertheless, giving evaluation more clout is a worthwhile way to increase the rationality of decision making. The authors recommend research on procedures used by other agencies to achieve similar aims.

Whiteman, D. (1985). "The fate of policy analysis in congressional decision making: Three types of use in committees." Political Research Quarterly **38**(2): 294.

Wilder, M., C. Scott, et al. (2010). "Adapting Across Boundaries: Climate Change, Social Learning, and Resilience in the US–Mexico Border Region." Annals of the Association of American Geographers **100**(4): 917-928.

Wilensky, H. (1997). "Social science and the public agenda: Reflections on the relation of knowledge to policy in the United States and abroad." Journal of health Politics, Policy and Law **22**(5): 1241.

Wynne, B. (2010). "Strange Weather, Again Climate Science as Political Art." Theory Culture & Society **27**(2-3): 289-305.

For a long time before the 'climategate' emails scandal of late 2009 which cast doubt on the propriety of science underpinning the Intergovernmental Panel on Climate Change (IPCC), attention to climate change science and policy has focused solely upon the truth or falsity of the proposition that human behaviour is responsible for serious global risks from anthropogenic climate change. This article places such propositional concerns in the perspective of a different understanding of the relationships between scientific knowledge and public policy issues from the conventional 'translation' model, in which prior scientific research and understanding is communicated and translated into corresponding policies - or not, if it remains disputed and overly uncertain. Explaining some of the key contingencies and bases for uncertainty in IPCC climate projections and human influences, I show how social and technical analysis of climate science is not about denial of the scientific propositional claims at issue, but about understanding the conditional and essentially ambiguous epistemic character of any such knowledge, however technically sophisticated and robust it may be. Contrary to conventional wisdom, it is entirely plausible that existing scientific representations of climate change and its human causes may understate the risks induced by prevailing social-economic processes rather than exaggerate them. As the article shows, the public meanings given to climate science, and to 'the climate problem', and thus also the public culture which that knowledge is supposed to inform, are themselves already in key respects presumed and (attemptedly) imposed by the science and its framing. This gives rise to perverse effects on public readiness to take informed democratic responsibility for 'the global climate problem', and associated cross-cutting issues which existing scientific framings of public policy erase from view.

Zigler, E. and M. Finn Stevenson (2007). "From research to policy and practice: The school of the 21st century." American Journal of Orthopsychiatry **77**(2): 175-181.