Appendix

Innovation in Impact Assessment Theory and Practice: What does our bibliography tell us?
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Figure A1 – Public Participation, Social and Community Engagement Timeline [Cluster I: 17 papers]

- **Year 1995**
  - Education in EA process can improve public involvement. Public education influences almost exclusively on the project, ignoring EA process.
  - Collaborative discourse as a method to achieve consensus. The concept of social learning is described and an effort to show how communities of people with both division and common interests can reach agreement on collective action to solve a shared problem.

- **Year 1996**
  - Fundamental issues and problems in social impacts assessment which definitive answers can not be easily given. Who have legitimate interests in the community? How is the affected community to be defined and identified? What should be the role of community participation in the SUA? What impacts are to be considered? How should impacts be weighted?

- **Year 2000**
  - The emerging view of EIA holds that participation is not just a supplementary part of the assessment, rather EIA is a collective process where different actors—affected citizens, interest groups, authorities, and experts—can deliberate and exchange their views of the goals and their knowledge on the impacts of the proposed developments.

- **Year 2001**
  - The need to include local people and their experiential knowledge in the EIA process. Indigenous experiential knowledge has the potential to complement Western scientific knowledge; it could also encourage local participation and bottom-up approaches to environmental and planning decisions.

- **Year 2003**
  - The Interactive Community Forum (ICF) is a method of social impact assessment that seeks community members’ judgments of social impacts resulting from project alternatives in an environmental impact assessment. The method employs a participatory-driven description of the social system along with a set of community constructs to guide the identification of anticipated social impacts.

- **Year 2004**
  - Public participation must take place early in the decision-making process. Public participation must be inclusive, integrating a wide range of stakeholders and taking particular account of minorities. Public participation must be a two-way communication affair, where there is a dialogue between the developer and the public oriented to reach.

- **Year 2006**
  - Social assessment is changing to go beyond the prevention of negative impacts, to include issues of building social capital, capacity building, good governance, community engagement and social inclusion.

- **Year 2008**
  - It concludes that the poor prospects of SIA in China lie not only in the weak framework for environmental legislation, but also in all institutions concerning state-society relations, the socialist governing ideology and traditional Chinese culture.

- **Year 2010**
  - Public participation may be sought by decision makers not just as a way of obtaining information or testing its robustness, but also to assist with problem solving by suggesting ideas, concepts, solutions and resources that can be mobilized to address complex environmental and social issues.
Brazil - There are problematic links with planning procedures, a lack of secondary regulations, and very few trained and skilled personnel and material resources. There are weaknesses in the EIA process, and the EIS approval procedure is very bureaucratic and easily denatured by political and economic pressures.

Eastern Europe - EA systems have been reformed not only in order to enhance the effectiveness of environmental protection, but also to promote more transparent, participatory, and decentralized decision-making procedures and to comply with international norms, such as the EA Directives of the EU.

Bangladesh - The guidelines developed by the government and the donor agencies are stringent, however, there is less coordination among the various organizations involved in environmental decision making and of adequate infrastructure to ensure proper EIA.

Egypt, Turkey and Tunisia – Improve the implementation of mitigation measures and include a formal requirement to prepare an EMP as part of EIA. Approaches to ensure effective public participation in the EIA process need to be designed to suit the socio-political context. Strengthen interagency cooperation, especially between the environmental agency and the relevant sectoral authority.

Indonesia finally recognized the importance of emphasizing public involvement in the EIA guidelines of 2000. EIA in the previous Indonesian regulations, i.e., Regulation No. 29/1986 and No. 51/1993, did not have provisions for direct public involvement.

China - The main problems highlighted are as follows: the narrow historic focus on pollution of air, water and soil, at the expense of the consideration of wider environmental, social and health impacts; environmental protection agencies being funded by development-oriented local government administrations; the lack of consideration of alternatives in EIA processes; and the lack of effective public participation.

Canada - This study found that British Columbia's environmental assessment policy for First Nations' participation in mine development must evolve further to achieve overall effectiveness.

Mauritius - One of the main weaknesses, besides the lack of EIA audits, is the absence of EIA follow-up monitoring. There is poor public participation from project inception to implementation stages.

Bulgaria - The hearing happens at a later stage in the EIA process. The hearing also seemed to be a formality in that administrators did not go beyond the minimum requirements necessary.

Middle East and North Africa - Most deficiencies in EIA systems can be attributed to the poor performance of foundation measures (availability of guidelines, EIA system implementation monitoring, and a generally weak prevalence of local expertise, and training and capacity building initiatives).

Year 1999

Year 2000

Year 2001

Year 2002

Year 2003

Year 2004

Year 2005

Year 2006

Year 2007

Year 2008

Year 2009

Year 2010
Figure A3 – Effectiveness, Quality and Improvement Timeline

- **Employing input-output analysis enhances conventional EIA, as it allows effects to be taken into account in the decision-making process.**
- **Problems with public participation, issues of alternatives and uncertainty, the concern is to state clearly in the EIS that the proposed mitigation measure will not be effective.**
- **Practitioners should be encouraged to use the European Union “Guidance on EIA-EIS Review” before delivering their EIS. The development of a document with specific guidance for the preparation of the Non-Technical Summary should be supported, since high percentages of unsatisfactory grades were observed in this regard.**
- **Clear and consistent methods for articulating the significance of impacts in EIAs. The moral obligation on the proponent and the EIA consultant in such a case is to state clearly in the EIS that the project would cause significant adverse impacts without the mitigation measure but that the proposed mitigation measure would reduce the impact to an acceptable level.**
- **Details of methods used for prediction and evaluation of impact significance are often not provided, although the guidance clearly states the standard method of determining significance in terms of the nature, extent, duration, intensity and probability of the impact.**

**Year: 2002**
- Gibson

**Year: 2003**
- Berkson
  - Five ingredients, which tend to overlap, are essential to a successful community participatory approach: adequate funding; sufficient time; flexibility; a willingness to involve the community; and a skilled practitioner

**Year: 2004**
- Carter; Clark
  - Cumulative impacts are not assessed frequently. Public participation in EIA is often inadequate. Proposed mitigations may not be implemented. Post-project monitoring is rarely conducted. Assessments of risk and social impacts are often omitted from EIAs. Chalenges: problems concerning the global commons.

**Year: 2005**
- Candida; et al.
  - Poor communication of information, inadequate baseline data and indication of natural trends, superficial analysis of effects, lack of consideration of alternatives and adequate justification of rejected alternatives, no real communications planning, and lack of a mechanism to ensure that the commitments contained in the environmental statement were put into action on the ground

**Year: 2006**
- Ross et al.
  - Post-EIA follow-up in monitoring, implementation of mitigation measures, ecosystem management, and environmental auditing; Methodological approaches for addressing cumulative impacts and reductions in institutional barriers to analysis of cumulative impacts; Training of federal personnel implementing NEPA. Earlier considerations of NEPA in project planning and decision making. The integrated consideration of biophysical and socioeconomic sciences, along with risk assessment, in NEPA

**Year: 2008**
- Morgan
  - Employing input–output analysis enhances conventional EIA, as it allows effects to be taken into account in the decision-making process.

**Year: 2009**
- Elling
  - What is meant and understood by effectiveness is highly dependent on how the term rationality is perceived and the connotation attached to it.

**Year: 2010**
- Johann et al.
  - Impact Assessment should be a proactive agent in sustainable development and not just a regulatory hurdle. In impact assessment the emphasis tends to be on the avoidance of problems, but impact assessment can also help ensure that benefits are fully realized. While the mitigation of negative impacts is typically seen as a necessity, enhancement can be seen as an opportunity that can improve project design at all stages and the environment overall.

**Year: 2012**
- Portugal
  - Another clear issue which impact assessment practice needs to accommodate is climate change and, in many jurisdictions, the consideration of climate impacts is required within impact assessment legislation. EIA paper makes it clear that poor, or absent, public participation remains an issue. Cumulative effects are still poorly considered. There is a poor consideration of alternatives

**Year: 2014**
- Esteva et al.
  - Creating participatory processes and deliberative spaces to facilitate community discussions about desired futures, the acceptability of likely impacts and proposed benefits, and community input into the process, so that there can be a negotiated agreement with a developer based on free, prior and informed consent; identifying community needs and aspirations.

**Year: 2016**
- Sandham; Pretorius
  - Details of methods used for prediction and evaluation of impact significance are often not provided, although the guidance clearly states the standard method of determining significance in terms of the nature, extent, duration, intensity and probability of the impact. Fragility in the treatment of locational alternatives and mitigations plans.

**Year: 2017**
- Sandham; et al
  - What is meant and understood by effectiveness is highly dependent on how the term rationality is perceived and the connotation attached to it.

**Year: 2018**
- Sandham; Pretorius
  - What is meant and understood by effectiveness is highly dependent on how the term rationality is perceived and the connotation attached to it.
A new, comprehensive analysis approach is proposed. Critical elements of this approach include: an increased emphasis on improved monitoring of both environmental conditions and past development activities, and enhanced modeling of both development patterns and natural systems' responses. Finally, techniques to accomplish these tasks are discussed.

Geographic information systems, landscape analysis, and simulation modeling are shown to be useful methods of CEA. Loop analysis and cause-effect diagramming serve mainly as heuristic devices. A challenge for future methodological development is the design and testing of methods that incorporate processes of cumulative environmental change.

A structured questionnaire checklist is proposed for usage in scoping cumulative impacts. The items in the proposed checklist will not all be applicable to all projects and impact studies. However, usage of this approach would provide a consistent beginning for systematically addressing cumulative impacts.

This study included a systematic review of CI considerations in 30 EAs prepared on a variety of project types in the United States. In general, it was determined that CIs are neither normally mentioned nor thoroughly addressed; in fact, only 14 EAs even mentioned the term. When CIs were mentioned, they were typically addressed in a qualitative manner without clear delineations of spatial and temporal study boundaries and utilized guidelines or methodologies.

There is confusion concerning exactly what CEA involves. This clarifies the requirements of CEA and illustrates its use in a number of case studies. Practitioners must: identify valued ecosystem components (VECs) affected by the proposed project; determine what other past, present and future human activities have affected or will affect these VECs; predict the impacts on the VECs of the combined activities; and suggest how to manage these cumulative effects.
Figure A5 – Biodiversity, Ecology and Ecosystem Services Timeline

Year 2000
Atkinson
Biodiversity assessment is lacking in US environmental impact statements.

Year 2003
Stakeholders involvement for the purpose of conservation of biodiversity is extremely important because if one does not know the perception of biodiversity among a society, it will be very difficult to take into account and explain matters related to nature conservation in EIA studies and, even more difficult so, during project implementation.

Year 2005
Wegner et al.
The most sophisticated practitioners placed biodiversity in its spatial and temporal context as well as being cognizant of community aspirations and the principle of net conservation benefit. The ability to properly consider biodiversity in EIA is dependent on good information, not only on flora and fauna but also on the concepts and processes associated with biodiversity.

Year 2006
Geneletti
Habitat loss and fragmentation are major threats to biodiversity. Environmental impact assessment and strategic environmental assessment are essential instruments used in physical planning to address such problems. Yet there are no well-developed methods for quantifying and predicting impacts of fragmentation on biodiversity. In this study, a literature review was conducted on GIS-based ecological models that have potential as prediction tools for biodiversity assessment.

Year 2012
Scolozzi, Geneletti
Approach for assessing impacts on habitats on a local scale that integrates various approaches such as landscape graphs, object-oriented rule-based habitat assessment and expert knowledge. The results provide insights into future habitat loss and fragmentation caused by landuse changes, and aim at supporting decision-making in planning and suggesting possible ecological compensation.

Year 2013
Bragg, Hudson
The most notable recommendations for future practice are the implementation of monitoring and the publication of feedback, the creation of a central database for baseline survey data and the streamlining of guidance.

Baker et al.
Integrating ecosystem services within environmental assessment represents a relatively new and an innovative approach and there are currently limited examples of good practice to draw on. However, one of the constraints to incorporating ecosystem services into environmental assessment remains the reluctance of many practitioners to use it without official support.

Karjalainen et al.
Analytico-deliberative techniques have been suggested as a promising approach to ecosystem service (ES) valuation but are still at an experimental stage. This paper contributes to the development of ES valuation in the environmental impact assessment (EIA) procedure by introducing an analytico-deliberative approach to assessing restoration options for a regulated river in Finland.

Theme related to Biodiversity and Ecology assessment
Theme related to ecosystem service
First, there is the need for technical or disciplinary integration, that is, the bringing together of disparate ecologic, social and economic factors into a unified analytic framework that reflects a holistic perspective on the issues being addressed.

Procedural and organizational arrangements to enable environmental assessments and social and economic appraisals to be undertaken at similar points in time. Methodological guidelines that encourage different types of appraisal (environmental, social, and economic) to use consistent assumptions, methods, and data. Arrangements to ensure that frequently neglected impacts (e.g., health or gender impacts) are assessed and taken into account. Provisions to ensure that assessments (environmental, social, and economic, or combined) are taken into consideration at all key stages of decision-making. Measures to ensure that appraisals and decisions taken at one stage in the planning cycle are “tiered” into appraisals and decision-making at subsequent stages in the cycle.

The limited and sporadic interaction between EIA and planning theory has meant that EIA has largely failed to benefit from planning theory insights and lessons. Obstacles and dilemmas already encountered and addressed in planning theory are still hampering EIA theory building and practice.

Biophysical impacts also have social impacts, and social changes can cause changes in the biophysical environment, which create biophysical impacts. To date, there has not been an adequate framework for integrating biophysical and social impact assessment.

This paper proposes a method for achieving this result by coupling both content (physical and social environments) and professional demands (those of policy-level decision makers and IA professionals) to move toward effective decision making—a means for the IA professional to present needed impact.

Compared with biophysical components, social impact assessment (SIA) has not been as widely adopted in the assessment process for environmental and natural resource decision-making.

Integration of HIA, EIA and SIA added value and that there were additional opportunities for community involvement and integrated mitigation.

The paper proposes that integration and better focus are key to impact assessment vitality in the decades ahead, and that the impact assessment community needs to be proactive in streamlining impact assessment in an effective manner.
Figure A8 - Correlations between clusters
Appendix References


