

Process Indicators to Measure Intermediate Progress of Social Impacts of an Individual Organization's Transition-Related Research

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1. Introduction

The question of how to assess the societal impact of transition research conducted by specific research organizations is a very important but difficult challenge, especially in short planning periods of 1 or even 2 to 5 years used by most organizations. This is because social systems are very complex, and changes in them are caused by many complex factors, while measuring social change itself is already a formidable task.

This paper addresses this challenge by developing an assessment framework which classifies the different stages or process of impact generation and proposes intermediate process-based indicators drawing on this framework. The framework and process indicators consider a variety of types of activities or action-based research which are commonly used by organizations involved in transition research. It is expected that process based indicators will be practically useful to help organizations to plan more effective strategies and demonstrate intermediate results well before final impacts are visible.

Existing literature on this issue tends to focus on final impacts and highlights the difficulties of conducting assessments, while it has not focused as much on the steps in the process of generating impacts or on indicators relating to them. A few recent studies have moved in this direction, but they are still in the early stages. Typical criteria for project evaluation such as the OECD/DAC framework emphasize points such as relevance, effectiveness, efficiency, impact, and sustainability (Development Assistance Committee 1991). These are certainly useful for assessing results at the end of the project, but they do not provide a clear guide for assessment of progress at intermediate stages. Relevance generally does not change over the course of the project, unless there is a major change in external conditions, which are not under the control of those implementing the project. Effectiveness may not be possible to assess until the end of the project, and sustainability may not be possible to assess until well after the end of the project.

Performance management and quality management are themes that have been thoroughly explored in relation to the business sector. During the 1990s, many businesses began to adopt performance management approaches, shifting away from a one-sided focus on financial management. For example, Kaplan and Norton (1992 and 1996) promoted the “Balanced Scorecard” approach considering intangible aspects such as internal business processes, learning and growth, and customer relationships (Kaplan, 2010). This change in management approach was based on the recognition that, “...financial measurements could not capture the value-creating activities from an organization’s intangible assets...” (Kaplan and Norton, 2001: preface). This approach initially was focused primarily on measurement, but later it became more concerned with developing and implementing strategy (Kaplan, 2010). The related management approach of strategic control is closely aligned with this later focus of the Balance Scorecard approach. Goold and Quinn (1990) argued that across a range of control mechanisms, strategic planning provided the greatest potential for maximising a business’s strategic advantage.

Many development agencies and international organisations embraced a Results Based Management (RBM) approach to performance management, motivated by their desires to measure performance and conduct strategic planning. It was hoped that this would help to strengthen projects’ performance. The United Nations started to use this approach in 2000 when RBM was selected as the new management approach to be adopted across of its entities around the same time as the adoption of the Millennium Development Goals.

RBM utilizes and expands on the Logical Framework Approach (i.e. LogFrame) which already had a thirty year history of practical application by a significant number of multilateral donor organizations

(Lawrie, Kalff and Andersen, 2005). “The basic purposes of results based management systems in the donor agencies are to generate and use performance information for accountability reporting to external stakeholder audiences and for internal management learning and decision-making” (Binnendijk, 2000: 10). The basic process of RBM approach is to: 1) assess the current situation; 2) think about the causes of this situation, scope out the stakeholders, and define objectives; 3) plan the actions to be taken, identify the required resources, and define a project timeline; 4) do the implementation, consider how things are going and if there is a need to adapt; and 5) review what went well and what did not, and identify lessons learned (ICRC, 2008). However, donor agencies typically also add to stage two the need to identify indicators and set targets as part of the accountability mechanism (Binnendijk, 2000). The RBM approach also follows the concept of the results chain as advocated in the LogFrame approach, i.e. resources/inputs → activities → outputs → outcomes → impacts (Lawrie, Kalff and Andersen, 2005 and ICRC, 2008).

While performance management and strategic management have been embraced by the business sector, international organizations, and development agencies, efforts to measure and manage the social impact created by research has not been well explored. Some clear efforts have been made in the fields of medical and health research to measure social impact (Smith, 2001; Lavis et al., 2003; and Frank and Nason, 2009). And while in general the natural sciences, technology, and engineering fields are often able to identify individual examples of research that have generated impact based on indicators like achieving a new patent or the value-added of an innovation, for the social and political sciences the ability to clearly identify and measure impact remains a persistent challenge (Bastow et al., 2014). Bornmann (2012) cites four problems originally presented by Martin (2007) for measuring social impact: 1) causality, 2) attribution, 3) the collective nature of research and development, and 4) the timescale and length it takes for an impact to be noticeable. An additional four challenges for developing measurements of social impact generated by research are also identified by Bornmann (2012) and include: a) it is difficult to establish a systematic peer review for assessing social impact generation, b) the modes of impact generation for different fields/disciplines cannot be assessed under the same framework, c) there is not just one model for a successful research institute, and d) achieved impacts from research are not always desirable or positive (Bornmann, 2012: 673-4).

Transitions studies is one perspective under which academics have been actively trying to understand how research can generate societal impact and how this impact generation can be better managed. Drawing on the study of technology innovation, some began to apply the concept of ‘transition’ to thinking about the way to achieve sustainability (Kemp and Soete 1992). One uniqueness of transition theory in comparison to other innovation approaches is its emphasis on long-term, multi-stage, and multi-level vision. As Geels (2002) argued, sustainability transitions imply the need for systems change and innovation rather than short-term achievement. It considers process-oriented propositions and requires bigger and more inclusive improvement as well as an appropriate governance mode.

The earlier approaches to transitions were based on ideas directly adopted from technology studies including the frameworks of technological innovation system and strategic niche management (Hoogma et al. 2002), but as transitions studies itself has developed, there has been a shift to the development of new frameworks about how societal transitions occur and can be managed, i.e. transitions management. A notable extension to this framework is the effort to broaden consideration of the influence of governance on the process of transition and driving long-term social change. In sustainability transitions, governance is important because it is believed that transitional social processes occur due to, at least in part, a well-managed process of deliberation and decision making with participation and interaction between a wide range of actors, stakeholders and technologies and which examines societal beliefs and choices towards sustainability to create a

basket of shared visions. Loorbach and Rotmans (2010) insisted that “transitions management has been made operational as a combination of problem structuring and envisioning in multi-stakeholder arenas, developing new coalitions, implementing agendas in experiments, and evaluating and monitoring the process” (Markard et al. 2012: 959).

The transitions management framework also expanded to accommodate a multi-level perspective based on the idea of working across three interdependent levels of interaction for the transition process: niche, regime and landscape (Geels, 2004). The multi-level perspective views micro-level niches where radical innovation originated by actors and networks as embedded within regimes. And, meso-level of regimes can be conceptualized such as the infrastructure and market factors which facilitate a certain paradigm; for example, much of the world is currently operating under a fossil fuel energy regime. Regimes also reflect softer features such as economic cycles and societal trends. The regime is an important level of analysis; however, it is again situated within landscape consisting of meta-factors such as cultural and value patterns and political developments (Geels and Schot 2007; Lachman 2013).

Transitions theory and transitions management have helped to understand how large-scale societal changes towards sustainability might occur and how they could be influenced/facilitated. The work in this field has also helped to clarify the roles that research institutes could play in influencing these transitions. Nonetheless, the persistent challenges and lack of methodology for measuring the social impact generated by research still remains. For research institutes working to create social impact and facilitate systemic change towards sustainability, the lack of such performance measurement is not just a concern for accountability, but it can also be a significant hindrance to effective management. Timely and appropriate indicators that could provide information about how well or how likely an on-going project is to generate impact can support better management and decision making.

Typical project planning is based on a logframe concept which shows the expected linkage between activities, outputs, outcomes, and impacts. Planning for impacts at IGES uses a modified version of this framework which elaborates on the stages of outcomes which are expected to enable the generation of impacts. However, this framework is not necessarily sufficient to clearly monitor intermediate progress. Therefore, this paper tries to develop more detailed and concrete process indicators through the analysis of five concrete project cases.

The framework and the indicators used in this paper were developed through an inductive process based on the experience of one policy research institute, the Institute for Global Environmental Strategies (IGES), which conducts a diverse range of activities and policy research related to the promotion of sustainability transitions. An internal appreciative inquiry process was conducted within IGES for 18 months to develop a general framework for outlining different stages in the process of impact generation.

This framework categorises its outputs, outreach, outputs and impacts into seven tiers as follows: 1) Outputs, 2) Outreach, 3) Outcome Level 1 – recognition of IGES expertise, 4) Outcome Level 2 – support for expanding IGES initiative and/or request for follow-up, 5) Outcome Level 3 – uptake of IGES proposal and/or acted upon by target stakeholders, 6) Impact Level 1 – changes in policy, planning or practice, 7) Impact Level 2 – changes in wider society. (See Figure 1 discussed below.)

This paper assessed the applicability and usefulness of this framework based on a comparative case study of five completed projects at IGES that have all resulted in a Level 1 Impact through the clear achievement of influencing wider changes among external stakeholders in policy, planning or practice. The selected projects were examined to identify the key features that supported impact

generation in each case, and the analysis will consider if there is any discernible pattern(s) to the procedural flow of impact generation among these projects. This case analysis also aims to develop possible process-level, outcome-level and impact-level indicators to support future tracking of impact generation of individual projects.

The findings of this paper are intended to help individual organizations to develop a deeper understanding of processes for impact generation and thereby enhance their effectiveness in facilitating sustainability transitions.

The rest of this paper is structured as follows. Section 2 describes the methods used by this paper, including the case study approach and the impact assessment generation framework. Section 3 describes the case studies. Section 4 reports the results, and Section 5 concludes.

2. Methods

Case Study Approach

This research conducted a comparative case study of five action research projects carried out by IGES and its partners in order to investigate process-level activities, features, and achievements that may demonstrate intermediate project results that were significant factors contributing to the projects' final impact generation. An assessment framework was developed based for this comparative case study that drew upon a recently developed strategy for impact generation at IGES (explained in the following sub-section). The cases were examined to identify the key features that have supported impact generation in each case, and the comparative analysis considered if there were any discernible pattern(s) to the procedural flow of impact generation among these projects.

In order to investigate the procedural steps involved in impact generation, case selection was necessarily biased, including only cases of projects that had already subjectively achieved a certain level of impact generation. While the key goal of impact generation in IGES's strategy (i.e. impact level 2) is to influence wider social transitions towards sustainability, it is extremely difficult to demonstrate any clear level of causation between specific IGES projects and such broader societal changes. However, it was possible to select cases that had resulted in more modest "level 1" impacts, which are defined as influencing actions of and changes made by external stakeholders in policy, planning or practice.

Five cases were selected for this study. This number seemed to strike an appropriate balance. On one hand, it was large enough to both allow for an in-depth qualitative investigation of each case as well as provide a robust enough selection for the comparative analysis. On the other hand, this number was small enough to feasibly analyse and present in a somewhat detailed discussion. In the case selection process, about a dozen cases were initially considered. After ruling out cases that had not subjectively achieved a clear impact and also cases that were too dated to recollect appropriate data from, the final selection was made to include consideration for a diversity of research/activity types, as well as modes of impact generation.

Impact Generation and Assessment Framework

IGES aims to act as an "agent of change" by conducting strategic research for promoting the global transition towards a sustainable and resilient society, especially in Asia and the Pacific. Throughout the current strategic research phase at IGES (fiscal years 2013-2016), internal efforts have been

made to better understand and clarify how the institute can best generate impacts contributing to this sustainability transformation. For example, an internal study group explored the topics of transition theory, research, and management to better consider their potential applications at IGES. Discussions among senior management and area leaders addressed how the institute could more strategically develop research roadmaps and impact generation plans to better position its activities in relation to identified stakeholder needs and system intervention points. While many of these discussions remained theoretical in nature, the overall inductive approach to this process meant that potential areas of application were related to cases of real world practice as the primary litmus test.

A main outcome of this internal appreciative inquiry process was a generalised impact generation framework (or strategy) that tries to elaborate how IGES's research, activities, outputs and research can reach the desired impact goal of societal change through a series of outcome and impact stages. While the framework is expressed in a linear form from outputs to outcomes to impacts, it is also recognised that the same exact stages will not apply in the same linear format for all cases of impact generation; this process of impact generation could be referred to as a "ripple effect." Some steps could occur in a different order or be skipped entirely. Outputs—tangible knowledge products such as reports, articles, policy briefs, etc. — are considered important to establish and develop the means for generating outcomes and impacts through conducting strategic research and creating value-added knowledge. Outreach is generally considered to make use of outputs, although this is not always the case. Outreach includes a variety of activities for wider advocacy, promotion, capacity building, etc. These activities aim to produce positive engagement, support and action by key actors in the short and medium-terms while also increasing their necessary capacities, competence and leadership for realising future impacts. Outcomes produced by the outputs and outreach are considered to be the engagement and actions taken by stakeholders. Impacts are then generated by stakeholders, not by IGES directly. In other words, strategic research aims to produce impacts leading towards sustainability transitions by encouraging and/or enabling stakeholders to take action through changes in policy and practice, as well as changes in wider socio-cultural values.

A review of how other organisations define their results chain was also conducted – especially for the OECD (Development Assistance Committee, 2002; OECD, 2013), UNDP (UNDP, 2002), and the World Bank (Binnendijk, 2000; Kusek and Rist, 2004; Independent Evaluation Group, 2012). This review found a large commonality between how these different development agencies and IGES define the general levels of outputs, outcomes and impacts, while there were some differences in the detailed interpretations at each level.

This framework, illustrated in Figure 1 below, is categorised into seven tiers as follows: 1) Outputs, 2) Outreach, 3) Outcome Level 1 – recognition of IGES expertise, 4) Outcome Level 2 – support for expanding IGES initiative and/or request for follow-up, 5) Outcome Level 3 – uptake of IGES proposal and/or acted upon by target stakeholders, 6) Impact Level 1 – changes in policy, planning or practice, 7) Impact Level 2 – changes in wider society. These tiers are explained in more detail, along with illustrative examples, in Table 1 below.



Figure 1: Results Chain of IGES Impact Generation Strategy

Table 1: Working Definition of Results Chain (Outputs, Outcomes, and Impacts) for IGES Impact Generation

Types of Results	Working Definition	Breakdowns of Impacts/Outcomes with Examples
Impacts	<p><u>Positive changes in the external world</u>, (policies and/or practices)</p> <p>Impacts follow the outcomes created by IGES and other stakeholders, likely in medium- to long-term; therefore they are not solely due to IGES' efforts.</p>	<p>Impact 2 (Long-term): Changes in Wider Society Lifestyles of ordinal people became sustainable following changes in policy, business, beliefs, and practices.</p> <ul style="list-style-type: none"> ✓ Consumers choose more sustainable electricity companies, increase energy saving, due to economic incentives, policies and encouragement.
		<p>Impact 1 (Medium-term): Changes in Policy, Planning & Practice Stakeholders changed practices, policies, plans, guidelines.</p> <ul style="list-style-type: none"> ✓ New international agreements, rules, or targets. ✓ New government policies, plans, regulations, etc. ✓ Industry action plans, guidelines etc. ✓ Business practices significantly changed, e.g. green accounting, design for environment, green purchasing. ✓ Public vehicles converted to PHV, EV and FCV.
Outcomes	<p><u>Positive actions by key stakeholders</u> in response to IGES' outputs and activities. Outcomes can be both short-term and medium-term but also depend on external factors and relevant political circumstances.</p> <p>Engagement to target policy processes, together with appropriate networking and partnering, is necessary for achieving higher levels of outcomes.</p>	<p>Outcome 3: Target stakeholders act on IGES proposals Key stakeholders took <u>significant and direct actions in their own initiatives</u>, which may lead to medium- to long-term impacts, in response to IGES proposal.</p> <ul style="list-style-type: none"> ✓ IGES recommendations put into stakeholders' mandate. ✓ Government(s) established a working group for studying/drafting relevant policies. ✓ Government(s) and/or other stakeholders invited IGES to play key roles (e.g. committee member, facilitator, negotiator) in relevant policy processes.
		<p>Outcome 2: Support expanding IGES Initiative & Follow-up Key stakeholders took <u>actions to further explore IGES' proposals and/or initiatives</u>, mobilising their own resources. Government(s) and/or other key stakeholders:</p> <ul style="list-style-type: none"> ✓ provided funding to IGES to continue or expand work; ✓ offered to partner with IGES; ✓ cited IGES proposals and/or publications.
		<p>Outcome 1: Recognition of IGES Expertise Stakeholders <u>recognised IGES expertise</u> and requested IGES to promote, teach or share it with wider audiences. Government(s) and/or other key stakeholders:</p> <ul style="list-style-type: none"> ✓ invited IGES as an author in their publications. ✓ invited IGES as a guest speaker or resource person.
Outputs	<u>Tangible products</u> based on IGES' strategic research or activities.	<p>Policy Outputs: Policy Brief / Policy Paper, DB / Tool / Training Material</p> <p>Academic Outputs: Journal article, training, capacity building</p>

Although IGES's framework has aided in creating a common language and understanding in regards to the process of impact generation within IGES, its applicability and usefulness has not been clearly tested beyond the level of a conceptual construct. In this paper, the impact generation framework is employed as the primary assessment framework of the study. The individual cases were investigated to collect data in relation to activities, results and achievements at each of the seven stages of the impact generation framework.

3. Case Studies

This paper examines five project cases that each achieved at least a level 1 impact. The cases vary widely along a range of aspects, which are summarized in Table 2. Each case focused on different countries. Regarding contents, three cases were related to technology, though in very different ways, while the other two were related to governance and planning. Two cases focused on the national level, two on the city level, and one mainly on the private sector, although local and national government cooperation was also necessary. All cases had a mixed target audience, including policy makers as well as other stakeholders. Regarding impacts, two cases focused mainly on livelihoods, two were related to GHG emissions reduction, and one was related to climate change resilience. All of the cases involved cooperation with partners in order to generate impacts through the target audience. The main features of each case are summarized below.

Table 2: Summary of Basic Elements of Cases

Short title	Making Land-Use Climate Sensitive	Forest Governance Standard	Technology Transfer	Green Gift	Composting
Location	Philippines	Nepal	India	Japan	Asian cities
Contents	Integrating climate sensitive actions into watershed level land-use planning	Developing a forestry sector governance standard	Promoting low-carbon technology adoption	Promoting low-carbon technology investment through tax reform	Developing improved solid waste management with focus on composting
Target level/ stakeholder	City level	National level and Community Forest Groups	Small and medium enterprises	National level	City level
Target audience/ beneficiaries	Researchers and policy makers (city)/ local residents	Policy makers (national)/ primarily forestry sector stakeholders	Private sector/ private sector and general public	Policy makers on finance (national)/ general public	Policy makers (city)/ local residents
Expected/ actual impacts	Increased resilience to climate change	Improved forest sector livelihoods	Adoption of low-carbon technology and GHG emissions reduction	Increased investment in low-carbon technology and GHG emissions reduction	Improved livelihoods of residents
Partners	Univ. of the Philippines Los Banos; municipal governments	Griffith Univ., Univ. of Southern Queensland, Ministry of Forests & Soil Conservation (MoFSC) of Nepal	The Energy and Resources Institute (TERI)	Gained the support of Japan's parliament members	United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), municipal governments
Funding	Ministry of the Environment of Japan (MOEJ)	IGES internal fund	Japan Science & Tech. Agency (JST), JICA	IGES internal fund	Ministry of the Environment of Japan (MOEJ)
Timeline	2014-2015	2014-present	2009-2012	2013-2015	2000-present

Making Land-Use Climate Sensitive (Philippines)

The project aimed to develop climate-sensitive actions for local governments that integrate climate change adaptation and land-use planning using GIS information, while also coordinating and synergizing these practices at the watershed level among four local governments. The project was first launched to increase research capacity of the local partners in the area of climate change adaptation and evolved into a pilot project for a larger area, funded by the Ministry of the Environment of Japan. The four local governments of the Silang-Santa Rosa watershed agreed to form an Integrated Watershed Management Council to harmonise land-use plans, and they have used IGES technical support to incorporate flood-hazard maps and countermeasures into their comprehensive land-use plans. Data generated by the project was also incorporated in local climate change action plans of the municipal governments in the project site. At the request of the national development authority, the Participatory Watershed Land-use Management Approach is now being replicated in two other watersheds in the region.

Action Research Project to Develop a National Quality-of-governance Standard for REDD+ and the Forest Sector (Nepal)

IGES and its partners (Griffith University and University of Southern Queensland) have developed a quality-of-governance standard for the Ministry of Forests and Soil Conservation (MoFSC) of Nepal to guide the development of participatory, transparent and accountable governance arrangements in the forestry sector. The joint project was supported by IGES's internal research fund and contributions from partner institutes, and facilitated by a Memorandum of Understanding between the MoFSC and IGES. The guideline was developed through a participatory process with local communities, and the final guideline was officially adopted by the MoFSC in 2016. The project also produced a tutorial video for how to develop and use the guideline, supported by IGES knowledge management unit.

Technology Transfer (India)

This research project aimed at developing specific strategies to accelerate appropriate low-carbon technology transfer from Japan to India, and it was funded by the Japan Science and Technology Agency (JST) and the Japan International Cooperation Agency (JICA) for four years. The local implementing partner, The Energy and Resources Institute (TERI), is one of the leading organizations on the topic in India and has been collaborative partner with IGES for a long period of time. The project identified appropriate low-carbon technologies for GHG emissions reduction, provided capacity building opportunities to local engineers, and established a technology information sharing platform and a framework of cooperation among relevant businesses. Pilot projects were successfully conducted, and technologies were successfully transferred to a number of firms, which achieved a certain amount of savings of energy consumption, costs, and GHG emissions.

Green Gift (Japan)

The project proposed innovative tax incentives in Japan to mobilise personal assets to accelerate financing for low-carbon investment specifically focusing on inter-generation investment in low-carbon housing. The proposal attracted policy makers' attention as a practical policy recommendation, and it was discussed during the deliberation of tax reforms in fiscal year 2014. After a series of awareness raising activities including a public symposium, policy dialogues, media

coverage/articles, the policy proposal was officially adopted by the national government in the 2015 tax reform package.

Composting (Asia)

The project was launched to promote a practical action to address serious environmental problems from poor solid waste management in emerging urban areas with a special focus on reducing organic solid wastes from households using a composting approach. The project was conducted under the Kitakyushu Initiative for a Clean Environment (2000-2010), an initiative to improve the urban environment in the Asia and the Pacific region under the direction of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) to which IGES served as a secretariat as well as an implementing agency in collaboration with Kitakyushu City, Japan. This local community-led waste management method has been adopted widely in several cities in Asia, following the initial success in Surabaya City, Indonesia achieved by the project.

4. Results

Outcomes and impacts of the five cases are summarized below in Table 3. All five projects achieved outcome levels 1, 2, and 3. All received recognition of IGES expertise by stakeholders and relevant government officials as well as support and request for follow up. Different types of stakeholders and policymakers were involved in the different cases. Four cases clearly achieved impact level 1, in which the stakeholders and or policymakers took action and made changes in their policies, planning, or practice. While the fifth case is still continuing, it appears likely to achieve impact level 1 as its work is currently under review for formal adoption by the national government to be incorporated into existing policy/guidelines.

Table 3: Summary of Outcomes and Impacts

Outcome Level 1: Recognition of IGES Expertise	
Land use	Participatory approach enhanced understanding of local governments.
REDD governance	Local consultations and workshops fostered recognition of IGES.
Tech. transfer	Concrete indicators: <ul style="list-style-type: none"> • IGES was invited as a member of a platform for small & medium enterprises. • IGES was invited to several high level events • The pilot projects were recognized by the Indian and Japanese governments
Green gift	Some parliament members, officials from Finance and Environment Ministries
Composting	Local consultations and workshops fostered recognition of IGES.
Outcome Level 2: Support/ Request Follow-up	
Land use	Local governments requested IGES to identify countermeasures and replicate pilot projects. The National Climate Change Commission showed interest in the results.
REDD governance	<ul style="list-style-type: none"> • MOU between IGES and the Ministry of Forest and Soil Conservation to work towards national implementation of the standard. • National experts requested further work by IGES
Tech. transfer	Indian companies agreed to pilot projects at their sites, including monitoring tools.
Green gift	Some stakeholders and political decision makers came to support the initiative.
Composting	Some stakeholders and political decision makers invited IGES help to promote it.
Outcome Level 3: Action by Stakeholders	
Land use	Four local governments established an Integrated Watershed Management Council for harmonizing land use planning across the watershed.
REDD governance	The Quality-of-Governance standard has been piloted.
Tech. transfer	Pilot projects were implemented and some technology was transferred.
Green gift	Policymakers came to support the plan.
Composting	Pilot projects were implemented, and policymakers decided to adopt the system.
Impact Level 1: Changes in Policy, Planning & Practice	
Land use	Local governments are applying adaptation countermeasures in their land use plans and implementing them in practice.
REDD governance	Still in process. The Government of Nepal is considering adopting the new Governance standard and incorporating it into its Community Forestry Guideline.
Tech. transfer	Some Indian companies decided to use the piloted technology.
Green gift	The green gift tax plan was enacted into law in Japan.
Composting	The composting system was adopted by a few cities.

None of the cases have reached level 2 impact yet, and have not been scaled up. The technology transfer project is still working with individual companies, although it is attempting to expand the scope. Regarding the composting project, no effort has been made to assess the wider social impact in the cities where it has been implemented, but in any case, the initiative has not been expanded beyond a few cities, and no further efforts are being made. The green gift initiative has the potential for wider social impact, but it is still too early to assess its effectiveness.

Success factors for the different stages are summarized below in Table 4. Success factors cannot necessarily be translated directly into process indicators to measure the potential for social impacts, but it is a necessary first step. Also, these are not necessarily the only factors or the most important factors determining the success of the projects at the different stages, but rather those commonly found across the five reviewed cases. They are related to a kind of typical model for a policy research institute which involves using research in an effort to engage stakeholders and policymakers to change policies, planning, and practices. This also includes the idea that transition research should engage stakeholders and policymakers from the planning stage as much as possible. The five projects reviewed here generally, although not always fully, followed this prescribed approach. Following this approach was judged by the project managers as well as the authors of this study to have contributed to their success.

Table 4: Common success factors found at different stages of the Impact Generation Framework

Stage	Levels of Achievement and Success Factors
Preparation	<ul style="list-style-type: none"> • Research based on collaborative partnerships • Multi-dimensional and mixed methods research • Working with and building on existing good practices • Initial project plans were modified based on feedback from stakeholders.
Outputs	<ul style="list-style-type: none"> • Outputs took two forms: 1) to disseminate project information to stakeholders and raise awareness (presentations), and 2) to share experience and findings. with wider academic and policy audiences (briefs, journal articles, papers, etc) • Projects generated and disseminated knowledge specifically relevant to project stakeholders and partners, i.e. context specific knowledge.
Outreach	<ul style="list-style-type: none"> • Basis in real-world and context specific knowledge • Dialogue and deliberation with stakeholders (co-design and co-production) through workshops, focus groups, field research, onsite visits, and advocacy • Most outreach was specifically targeted at key stakeholder to be influenced.
Outcome Level 1	<ul style="list-style-type: none"> • Strong stakeholder engagement led to a process of co-design/co-production. • Engagement with individual stakeholder groups and/or communities evolved into multi-stakeholder collaboration. • Direct engagement of stakeholders in the research process supported strong buy-in of generated knowledge and findings.
Outcome Level 2	<ul style="list-style-type: none"> • Efforts were made to promote stakeholder ownership of project activities • Research process was adaptive, generally using a grounded theory approach, selectively coding in those items/activities that proved influential through the research process and from stakeholder dialogues. • Validity of generated knowledge was tested through engagement with stakeholders to form both <i>Pragmatic</i> and <i>Consensus Validation</i> • Directly relevant knowledge was piloted/applied in practice.
Outcome Level 3	<ul style="list-style-type: none"> • Actions were taken by stakeholders to formalize and legitimise the projects and/or institutionalise the continuity of the project and its replication/upscaling • Expansion of pilot projects and/or project activities to new sites and locations. • Information and outreach was successful in changing stakeholder perceptions. • Long term continuity of engagement was important. • Internal IGES funding helped maintain continuity of engagement.
Impact Level 1	<ul style="list-style-type: none"> • This generally resulted from stakeholder actions, not directly by IGES. • Stakeholder action was encouraged through changing perceptions.
Impact Level 2	<ul style="list-style-type: none"> • No clear achievement at this impact level yet. • Also, it is difficult to link this impact level in terms of wider societal changes back to the influence of single projects (i.e. difficult to determine causation).

In the preparation stage, four dimensions were reviewed: a) the nature of the research, b) use of pilot projects, c) funding, and d) planning. All five projects used some kind of research, but its nature was very different in each case. Four of the cases (except for the green gift project) used pilot projects or trials. Generally, mixed methods were used, and efforts were made to build on existing research and good practices. The technology transfer project focused on the transfer of existing technology, but research was conducted on demand and supply for technology, local conditions, and detailed assessment of the results of pilot projects. The composting project used existing research and did not develop a new method, but rather used an existing method and adapted it to local conditions and conducted pilot projects. The land use project used GIS research but also included a trial of integrated watershed management. The forest governance project had a research component but also included a pilot/trial of the governance standard. The green gift project used a modelling study to estimate its effects. In four cases, stakeholders were involved from the beginning, but in the case of the green gift project, which was a more traditional effort to influence national policy, stakeholders were involved at a later stage. All cases relied to some extent on IGES internal funding, especially in the beginning stages, and most cases had at least a small amount of external funding. All projects started with a reasonably clear plan, but these were modified during the course of implementation based on preliminary results and feedback from stakeholders.

All five projects produced outputs. Projects generated and disseminated knowledge specifically relevant to project stakeholders and partners, i.e. context specific knowledge. A variety of outputs was produced, although many were not traditional reports or peer reviewed journal articles. Outputs had two main purposes: 1) to disseminate project information to stakeholders and raise awareness (presentations), and 2) to share project experience and findings with wider audience – both academic and policy (briefs, journal articles, papers, etc). The project on technology transfer produced many presentation slides for local stakeholders, which project participants felt were most important in persuading stakeholders, but it also produced several reports for funders, two chapters in more traditional IGES White Papers (Rabhi 2015; Rabhi and Shiga 2012) a policy brief (Shiga and Rabhi 2012) and a working paper (Rabhi 2016). The composting project produced a policy brief (Maeda 2009), and the project was also highlighted in the final report of the Kitakyushu Initiative (Secretariat of the Kitakyushu Initiative Network 2010). The forest governance project produced a discussion paper (Lopez-Casero, Cadman, and Maraseni 2016). Outputs from the green gift project were mainly in the form of short articles in newspapers, media, and non-peer reviewed journals, but an analytical discussion paper was also produced (Kabaya, et. al. 2014). In addition to a short description of the pilot project, (MOEJ, IGES, and LCS-RNet 2015) outputs from the land use project so far included two videos (Endo and Didham 2016; Endo et. al. 2016) and two peer reviewed journal articles (Johnson and Iizuka 2016; Johnson, et. al. 2015) and others are under review. The journal articles might contribute to future diffusion of the methodology, but did not directly contribute to persuading the local stakeholders.

Stakeholders were involved in the production of the research in all of the cases except for the green gift. This was especially critical for data collection. Co-design and co-production of knowledge were implemented through active dialogue and deliberation with stakeholders through workshops, focus groups, field research, onsite visits, and advocacy. The validity of the generated knowledge was tested through engagement with stakeholders to form both pragmatic and consensus validation. Efforts were made – basically successfully – to identify key stakeholders to be influenced. The technology transfer and composting projects required data on the performance of pilot projects and cost effectiveness. The land use project required data on land use in order for the GIS analysis to be effective. The forest governance project needed data not only on the forests themselves, but also on the socioeconomic conditions of related stakeholders.

Outreach to related stakeholders and policymakers was a key element in achieving the outcomes (levels 1, 2, and 3) of all five projects. Outreach provided context-specific knowledge relevant to the situation and concerns of the stakeholders. This knowledge, in turn, served to change stakeholder perceptions, and changing perceptions motivated stakeholders to take actions leading to impacts. Basically, impacts are generated by stakeholders, not directly by IGES. Thus, a few cities adopted the composting system and a number of enterprises adopted the low carbon technologies promoted by the IGES projects, and a certain level of impacts were achieved by these projects in terms of GHG reduction, cost savings, reduction of municipal solid waste generation, etc. However, at this time, they have not led to wider changes in society.

One common finding is that generally, changing stakeholder perceptions sufficiently to motivate stakeholders to take concrete actions to generate impacts took more time than expected. Project leaders emphasized that continuous long term engagement was critical to the achievement of successful outcomes. Also in this respect, internal IGES funding to maintain continuity, even when external funds were not continuous, was very important for maintaining the continuity of stakeholder engagement. Outcomes at both levels 1 and 2 could be achieved in a relatively straightforward way through outputs and outreach within a reasonably short time period of 1 or 2 years. However, outcome level 3 generally required a longer time period and a longer term continuity of engagement. Funding, at least at minimal levels, was also important for maintaining long term continuity, and IGES internal funding was necessary in order to overcome some instability in external funding, which was also generally short term. Even in cases where external funding continued for a longer term, it often experienced short term interruptions due to complex administrative procedures, and renewal processes were often delayed, so IGES internal funding was necessary to provide continuity during these gaps. This is especially important for the transition between outcome levels 2 and 3. Even though stakeholders support follow-up, they may not have sufficient funding.

5. Process Indicators

Process indicators can follow directly from this framework, starting with preparation, outputs, and outreach, and continuing to the outcomes as indicated below. Table 5 focuses on indicators relating to project activities before any outcomes are achieved. First, of course, appropriate plans for research and impact generation should be developed, but these should be based on collaborative partnerships with stakeholders, and appropriate target stakeholders and policymakers should be identified. The initial project plans should be modified based on feedback from stakeholders. Second, outputs should be generated, but these should be relevant to the stakeholders. Third, outreach should be conducted with stakeholders, and the validity of knowledge should be tested through stakeholder engagement.

Table 5: Process Indicators Relating to Preparation, Outputs, and Outreach

	Process Indicators
Preparation	<ul style="list-style-type: none"> • The research plan was based on collaborative partnerships. • Appropriate target stakeholders and policymakers were identified and relevant impact generation plan was developed. • Initial project plans were modified based on feedback from stakeholders.
Outputs	<ul style="list-style-type: none"> • Outputs relevant to stakeholders were generated.
Outreach	<ul style="list-style-type: none"> • Outreach was conducted with stakeholders (co-design and co-production) through workshops, focus groups, field research, onsite visits, and advocacy. • Validity of generated knowledge was tested through stakeholder engagement.

It is necessary to note that the outcomes themselves in this framework are important steps with the potential to lead to impacts. Therefore, achievement of the outcomes are themselves important process indicators. These could be divided into two main categories as outlined below in Table 6. First, concrete evidence of achievement of the outcomes could be one type of indicator. Evidence could be collected of stakeholder recognition of IGES expertise, support for further expansion of activities, and actions taken by stakeholders in response to IGES initiatives. This could take a wide variety of forms, and project participants could propose specific indicators related to the project's particular conditions and objectives. Second, there could be activity based indicators relating to a project's efforts to achieve the outcomes. For Level 1, this could be the extent to which the project team uses stakeholder co-design and co-production in the research. This could be very important in persuading stakeholders to recognize the expertise of IGES. For Level 2, this could include activities to promote stakeholder ownership, for example, the use of pragmatic and consensus validation to test the validity of generated knowledge. This could be helpful for encouraging stakeholders to go further with the project. For Level 3, the indicators could include the continuity of the project team's activities – continuity of activities is more likely to lead to actions by stakeholders. It could also include steps taken to formalize and institutionalize stakeholder actions such as forming a committee.

Table 6: Process Indicators Related to Outcomes

	Outcome-based	Activity-based
Outcome Level 1	<ul style="list-style-type: none"> • Concrete indications of stakeholder recognition of IGES expertise. • Evidence of changed stakeholder perceptions resulting from IGES initiatives 	<ul style="list-style-type: none"> • Use of stakeholder co-design and co-production of research
Outcome Level 2	<ul style="list-style-type: none"> • Concrete indications of stakeholder support for further expanding activities. • Stakeholders engage in cooperative action or partnership with IGES. 	<ul style="list-style-type: none"> • Ownership by stakeholders was promoted through the use of pragmatic and consensus validation to test the validity of generated knowledge.
Outcome Level 3	<ul style="list-style-type: none"> • Evidence of actions taken by stakeholders • Expansion/replication of activities/pilot projects to new sites and locations. 	<ul style="list-style-type: none"> • Continuity of project team's activities • Steps taken to formalize and institutionalize stakeholder actions such as forming a committee

This list of indicators is intended to be suggestive, not comprehensive. Potentially, there could be many possible specific indicators, and these could be proposed by the project team depending on the specific circumstances of the project.

6. Conclusions

As a scoping study, the comparative case study and process analysis carried out presented in this paper has identified a number of key features that appear to have common relevance in IGES's efforts to generate impact towards sustainability transitions through its applied research activities. With further systematic review and testing, these features could be validated as important process-level or intermediary indicators for both monitoring and evaluating a projects likelihood of generating impact as well as supporting more effective decision making for timely results-based management of such projects.

Overall, the IGES framework seems useful to track the progress of generating outcomes and impacts. Moreover, it was broadly applicable to a variety of types of projects, including not only those

focused on a local level or specific companies but also projects aimed at changing national level policies.

However, it may not be easy to use this framework directly to make decisions about whether or to what extent to continue implementing the project. At the time projects were in their intermediate stages, achievement of level 1 impact seemed possible, but was not certain. Even when stakeholders and policymakers recognize the expertise of IGES and support further efforts, they are not always able to contribute their own funding, and IGES is not always in a position to support projects with its own funding.

This paper has a few other limitations, including the small number of cases. Moreover cases where support was withdrawn for projects which still achieved some level of outcomes or impacts were not considered. Cases with limited or no outcomes or impacts were also not considered for this paper.

Finally, this paper points to the importance of further study of longer term outcomes and impacts. This is very important for improving management decisions to allocate scarce financial and human resources. Project funds often do not provide sufficient resources to monitor the outcome/impacts during the project period, let alone beyond project period when outcome/impacts may be realized, and it is also difficult for most organizations to allocate internal funds for this. Funding agencies would be advised to devote more resources to this; sometimes they seem more focused on short term results rather than long term effectiveness.

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