

**Linking Knowledge to Innovation in Government Services:
The Case of Solid Waste Services in Local Government in Sri Lanka
(K2I Project)**

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Final Technical Report

July 31, 2011

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Sri Lanka

1. BASIC PROJECT INFORMATION

Title: Linking Knowledge to Innovation in Government Services
Subtitle: The Case of Solid Waste Services in Local Government in Sri Lanka
Author: Sujata N Gamage
Report Type: Interim Technical report
Date: July 31, 2011
Published by: LIRNEasia
Location: 12, Balcombe Place
Series Name: Knowledge to Innovation
Series no.: One
Project Number: 104356-001, International Development Research Center of Canada
Project Title: Linking Knowledge to Innovation in Government Services: The Case of Solid Waste Services in Local Government in Sri Lanka (K2I Project)
Country/Region: Sri Lanka, Asia
Research Institution: LIRNEasia
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Abstract: The objective of the action research project was to identify cost-effective and sustainable means of developing a Web of knowledge-based interactions that link any given local authority to (a) peer community (b) a knowledge community, or (c) civil society, and explore if and how such connectedness may lead to improved performance in solid waste management. We also wished to apply the concept of an innovation system to the Web of interactions so formed in order to illuminate the concept further.

Using an action research methodology we have been able to elucidate that competency standards, and training and certification processes can sustain practitioner networks for cooperation in knowledge sharing in local government, and that, such practitioner networks need to be coupled with tools such as ranking surveys that create a competitive environment in the sector. Facilitating linkages between local authorities and universities or civil society groups proved to be difficult. Some possible reasons are explored. Full set of documents can be found at <http://lirneasia.net/projects/2008-2010/knowledge-to-innovation/>

Keywords: Innovations system, knowledge networks, local government, solid waste

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2. THE RESEARCH PROBLEM

Poor governance is perhaps the greatest obstacle to innovation in developing countries. Bad governments stifle innovation. Even good governments may be ineffective if run by a state-machinery made of uninformed or uncaring bureaucrats. The knowledge to innovation project at LIRNEasia is based on the belief that policy initiatives on innovations in the developing world, first and foremost, should be about making the government innovative in providing infrastructural services that are essential for innovators. If the government in question is a monolithic body such as a national government, it would foolhardy to think that one project can make a difference. However, many critical government services in Sri Lanka are in the domain of 330+ local government authorities (LGAs) which operate with significant autonomy from the central government. For our action research project we selected solid waste services by LGAs in Sri Lanka to address the following research question and research hypothesis, respectively.

Research question: How do you get local government in Sri Lanka to be innovative in providing solid waste services?

Research hypothesis: Linking of solid waste managers in local government in Sri Lanka to each other and to other stakeholders in a web of interactions through the co-creation, sharing and application of knowledge may lead to a sustainable culture of innovation in solid waste services in local government in Sri Lanka.

The basic rationale for the project remained essentially the same for the duration of the project.

2. OBJECTIVES

The overall objective of the project was to deepen the understanding of knowledge to innovation processes in service industry in a developing country.

The specific objectives of the project were as follows:

1. To initiate and evaluate/assess innovative practices in solid waste management services by local government I Sri Lanka by linking them to knowledge-intensive activities via
 - a. Relevant knowledge community
 - b. Competitive and cooperative peer community and
 - c. Knowledgeable and demanding user community

2. To evaluate waste management service delivery in Sri Lanka based on the conceptual framework and guiding principles from this project

	Objective	Modifications, if any	Comments
1	A relevant knowledge community	For internal project purposes we added a third objective as follows: "To identify linkages that will be driven by incentives intrinsic to one or more of the partners linked, so that the linkages continue beyond the project period" We replaced the term user community with civil society because the former is not an identifiable group. ¹	We believe this kind of qualification is necessary for any kind of action research project, because, with external funding it is always possible to bring about changes in individuals or organizations, but , without internal driving forces, the changes will not be sustainable.
2	A Competitive and cooperative peer community and		
3	A Knowledgeable and demanding civil society		
5	Deeper understanding of knowledge to innovation (K2I) processes in services in a developing country	-	-

¹ For civil society we used the definition by CIVICUS: "the arena, outside of the family, the state, and the market where people associate to advance common interests.
http://www.civicus.org/new/media/CSI_Methodology_and_conceptual_framework.pdf

3. METHODOLOGY

The overall method used was an action research method where we tested several tools/strategies to link local authorities. The tools/strategies are listed below by project objective.

	Objective	Tools/Strategies
1	A relevant knowledge community	<ol style="list-style-type: none"> 1. Course work/Internships for undergraduates at local government authorities (LGAs) 2. Post-graduate research comparing the performance of LGAs 3. Special reports on selected topics to be carried out by university researchers 4. Invitations to solid waste management (SWM) practitioners from LGAs to university research symposia (2008, 2009) 5. Certificate program for solid waste managers to be offered by universities 6. SW Research Forum
2	A Competitive and cooperative peer community	<ol style="list-style-type: none"> 7. Initiate good practices at several local authorities; Develop methods to share good practices; Good practices recognition survey and recognition event 8. Meetings to develop standards and curricula for training solid waste workers; Training of trainers and certification of assessors; Peer-to-Peer training programs 9. Clean city survey and recognition event
3	A Knowledgeable and demanding civil society	<ol style="list-style-type: none"> 10. Quarterly 3R Newsletter² 11. 3rasia.org Web site 12. 3R education for Sri Lanka Girl Guide Association's network of guiders and guides 13. Partnership with other local NGOs such as CHA (Consortium of Humanitarian Agencies); Arthacharya; and Sevanatha 14. 3R societies in schools 15. 3R committees in temples, Kovils/Churches 16. Joint 3R promotion with Community groups and individual activists
4	Deeper understanding of K2I processes	<ol style="list-style-type: none"> 17. Annual assessment of LGAs to assess (a) linkages between LGAs and their peers, govt authorities, industry, university and other and (b) performance of LGAs in effective SWM 18. Evaluate the actions 1-16 in light of the existing literature on mode-2 knowledge, communities of practice, knowledge management and innovation systems

² Under the theme Reduce-Reuse-Recycle or 3R

4. PROJECT ACTIVITIES

As per the action research methodology adopted, we systematically tested the 16 or so tools/strategies/activities we selected. Given that we had a project period of three years we were able to test the sustainability of these tools over time. During the process we were able to identify internal drivers that would make some strategies more sustainable than others and fine tune those drivers. As the project progressed we sought permission from the program officer to redistribute budget allocations so that strategies that did not work could be discontinued and those that had more promise to be pursued. . The results are first given as a summary table followed by more details.

Objectives	Tool/strategy/Activity	Result
1. Knowledge Community	Course work/Internships for undergraduates at LGAs	Facilitated 7 Internships (2 per year for 3 years plus one) at local authorities for university students;
	Post-graduate research comparing the performance of LGAs	Funded 1 MPhil student
	Special reports on selected topics to be carried out by university researchers	Sponsored the presentation of 3 papers on solid waste management at two international venues (one paper with university-Local authority co-authorship)
	Invitations to solid waste management (SWM) practitioners from LGAs to university research symposia (2008, 2009)	Funded 3 conference sessions in three consecutive years at the University of Sri Jayawardenapura (USJP) to bring academics and practitioners together
	Certificate program for solid waste managers to be offered by universities	Held discussions with the University of Sabaragmuwa, University of Sri Jayawardenapura (USJP) and University of Vocational Technology
	SW Research Forum	Initiated a successful SW Forum which is co-coordinated by the University of Sri Jayewardenapura, LIRNEasia and the Waste Management Authority of the Western Province. Five research meetings have been held to date since inception in September 2010.
2. Peer Community	Initiate good practices at several local authorities; Develop methods to share good practices; Good practices recognition survey and recognition event	Innovations were initiated at Gampaha, Kaduwela, Banadaragama, Colombo, Moratuwa and Balangoda. A Newsletter, Web site and good practices workshops were used for sharing. Also helped local authorities developed simple blog to post

		their good practices; recognition event not held.
	Meetings to develop standards and curricula for training solid waste workers; Training of trainers and certification of assessors; Peer-to-Peer training programs	National Standards for the Solid Waste Operations Assistant established in partnership with the Tertiary and Vocational Education Commission (TVEC). The preparation of the standard and associated curricula brought together solid waste managers from 45+ local authorities with 10 of those participating intensively; 17 solid waste managers were certified by TVEC as assessors of vocational trainees; 40+ municipal workers were certified as Solid Waste Operations assistant at National vocational qualification (NVQ) Level 2 through RPL (or Recognition of Prior Learning) method; The solid waste management training centre of the Balangoda Urban council was recognized by TVEC as national training center and 1 course to train and certify 15 workers through the institutional Method has started. The first batch of workers undergoing institutional training is scheduled to receive their certificates by the end of August 2011.
	Clean city survey and recognition event	First trial survey was conducted at the Negombo Municipal council (MC); Second trial at Moratuwa MC; Third and final successful trial was carried out partnership with the Waste Management Authority of the Western Province and Nielsen Company, where we compared the waste reduction and source separation activities of five local authorities.
3. Civil Society	Newsletter	3R newsletter
	Web site	3rasia.org
	3R education for Sri Lanka Girl Guide Association's network of guiders and guides	3R concept institutionalized at the Sri Lanka Girl Guides Association (SLGGA) through incorporation into the Girl Guide curriculum. 3R awareness for 1000+ girl guides across the country was carried out by SLGGA program officer. Competitions were conducted to encourage girl guides to practice 3R in their communities and spread the word

	Partnership with other local NGOs such as CHA (Consortium of Humanitarian Agencies); Arthacharya; and Sevanatha	Shared Newsletter and Web site with others. Kept them informed.
	3R societies in schools	Assisted Balangoda Urban Council with a highly successful 3R society program in schools
	3R committees in temples, Kovils/Churches	Facilitated a successful awareness program at a temple
	Joint 3R promotion with Community groups and individual activists	New waste management method successfully demonstrated at Vipassana Meditation Center, Colombo 00700
4. K2I Processes	Annual assessment of LGAS to assess (a) linkages between LGAs and their peers, govt authorities, industry, university and other and (b) performance of LGAs in effective SWM	Linkages between peers found to be important. Also find that linkages are necessary but not sufficient for performance

Details of Activities

4.1. A relevant knowledge community

The research objective of the action research here was to try out various methods of connecting the formal knowledge community represented by universities to local authorities and observe which approach works or does not work and why. Typically universities and research institutes are expected to be the knowledge producers who do research relevant to the economy and society. Universities are exhorted to become development universities etc. [Sutz, 2004] but a useful definition of a development university lacking.

It is difficult for universities anywhere, in developed or developing worlds, to respond rapidly to the needs of the economy and society. Industry needs solutions today either in the form of ready-made research outputs that are adaptable to their immediate needs or as rapid responses to immediate problems.

The intent of the project was to act as a rapid response intermediary who solves problems of immediate relevance to local government by connecting problems of the LGAs to the know-how needed. Initially we developed a compendium of available expertise SWTPM and tried out various ways of interacting with the individuals or departments so uncovered.

4.1.1. Field work opportunities /Internships at local authorities for university students

In 2009, we arranged with the Forestry and Environmental Science Program at the University of Sri Jayawardenepura to incorporate field work at local authorities into one of their courses. We also offered 2 Internships at local authorities for 2 university students per year for 3 years and funded 1 MPhil student.

The coursework was completely successfully in year one but the results were not encouraging. Student reports did not show any advantage in their interaction with the local authority. They were dull and theoretical and their presence was not particularly appreciated by the local authorities.

The internship program continued throughout the three years of the project involving 2-3 students per year as follows:

- 2008 Randika Jayasinghe
Himeshika Randeniya ((in LIRNEasia office assisting with 3R awareness work at the Gampaha MC)
- 2009 Sadeepa (Bandaragama PS)
Sameera (Colombo MC)
Deshika (Kaduwela Pradeshiya Sabha)
- 2010 Pavithra (Banadaragama Pradeshiya Sabha)
Hasini de Alwis (Kaduwela Pradeshiya Sabha)

Interestingly, the start of the first internship in 2008 was delayed due the fact that one of the interns was bed-ridden as a result of injury received while being a bystander at a clash between two rival student groups. Such occurrences and frequent unannounced closure of universities are common place in Sri Lanka. During 2009 and 2010 the situation was better than in 2008 but still we found that the time allotted by the University for Internships was intermittent and insufficient. By comparing the academic calendar of the University of Sri Jayawardenepura with the National University of Singapore and Universities in India we found that in Sri Lanka the academic year is broken up into small segments of classes, study leave, exams and vacations throughout the year, making it difficult for students or faculty to engage in interactions with the outside (See Section 5.1).

4.1.2.MPhil Program

Another linking activity was a series of research projects carried out as part of one or more Mphil programs concerning waste management at local authorities. Asanka Kumara, a research assistant who just completed an assignment at Burns (Pvt) Limited, a waste management company, was recruited as a possible candidate. He was accepted by the University of Sri Jayawardenepura as an MPhil candidate under the supervision of Prof. Nilanthi Bandara. His thesis is titled "Factors affecting the effectiveness of site composting programs conducted by local government authorities in Sri Lanka."

As part of his thesis, Asanka visited 42 solid waste processing sites in local authorities (LAs) in 7 out of the 9 provinces in Sri Lanka and conducted waste audits for each and analyzed

the compost produced by each for a set of selected attributes. Results for individual LAs were shared by each individual local authority but we were not able to compare and contrast the results and make public dissemination because plagiarism is a major issue in Sri Lankan universities and research data are kept from circulation until after the degree is awarded. Unfortunately, Asanka is yet to complete his thesis. This brings up the issue of thesis completion rates at universities. Thesis completion rate is an indicator of how well a university serves its research responsibilities. While students have a responsibility towards the completion of their thesis, university faculty workload in largely undergraduate institutions might be a cause for these delays.

During the process we also learned that, after completion, theses too are kept under lock and key in most of the libraries in universities, and, nobody is allowed to photocopy any part of the thesis for fear of plagiarism. As part of an effort to do a bibliography of theses on solid waste management, a research assistant visited several university libraries to find that she had to sit in the presence of a librarian and hand-copy the title, author and abstract details for each of the theses. These observations are summarized in a brief write up in APPENDIX 4.

4.1.3. Special reports on selected topics to be carried out by university researchers

Consultancies are a means through which university-industry or scholar-practitioner interactions occur. Some of the topics that required external expertise in our project were (a) assessing the e-waste situation in Sri Lanka (b) developing and implementing a clean city survey and a (c) conducting literature survey and summary on civil society participation in government. Our efforts to secure local expertise proved to be difficult. Either the required expertise was not there or the few who are available were overbooked. Since the project director had the necessary background to do the required research we were able to do most of the required research in-house. The clean city survey methodology was an exception in that it was developed in partnership with the Nielsen Company in Sri Lanka.

In any discussion about engaging universities in developing countries in development it is important to assess the capacity of these universities in terms of faculty qualifications and their continuing engagement with research as well as the time available to them for research.

4.1.4. Invitations to solid waste management (SWM) practitioners from LGAS to university research symposia (2008, 2009 and 2010)

The Faculty of forestry and Environmental Science at University of Sri Jayawardenepura (USJP) holds an annual conference on the theme and solid waste management is a recurrent sub theme at the conference. Since we observed that innovations in solid waste management are continually being tested and applied by local authorities, we negotiated with the University to devote a session to presentations by practitioners from innovative authorities.

In 2008, Mr. Nimal Premathilake, the public health inspector cum solid waste manager at the Balangoda Urban council, attended the conference and made a presentation. In 2009, the university made a special effort to help 6 selected practitioners to prepare their presentations but only three sent the finalized presentation and only two presented. Mr. Nimal Prematilake was one of the presenters. In 2010, none of the practitioners made presentations but Mr. Prematilake attended the conference and made significant contributions to the session. Overall, our efforts to bring together practitioners and scholars did not bear fruit. With the exception of Mr. Prematilake other managers did not seem to find the interactions useful and without a financial impetus from the project the university personnel did not seem too keen. Yet, the need for academics pursuing applied science subjects like solid waste management to be informed by practitioners became evident at these sessions. Many of the academic presentations concerned laboratory conditions. In one presentation a civil engineer presented plan for a toilet and sewerage system for a particular low income area in a suburb of Colombo without having consulted the public health inspector for the area.

4.1.5. SW research forum

In our final attempt to bring link universities to practitioners in solid waste management we initiated a monthly forum with a LIRNEasia researcher and a university student as co-conveners. The student/youth centered approach and informal atmosphere we created seemed to attract a good many senior officials from government and industry as well as senior academic from three universities -- University of Sri Jayewardenepura, University of Peradeniya and University of Moratuwa. Since inception in September 2010, the forum was able to hold five meetings. The attendance at these events averaged at 25 and the representation at the meetings was distributed as -- University, 28% Government 18%, Civil Society, 12%; Local Authorities, 8%; Industry, 8% and LIRNEasia and associate researchers, 22%. Towards the end of the project, the university students and their advisors were expected to take over the coordination of the forum, but, without the project's interventions the forum meetings have slowly come to end.

4.1.6. University certificate or diploma program for solid waste managers

Although we held discussions with the University of Sabaragamuwa, University of Sri Jayawardenapura (USJP) and University of Vocational Technology, during the project period we were not able to initiate an appropriate diploma for solid waste managers. However, this strategy might yet be the most effective in terms of bringing the scholars and practitioners together because there are incentives on both sides. The university teachers in Sri Lanka welcome teaching additional for-fee programs to top up their pay package and the solid waste managers welcome the opportunity to link up with universities and gain recognition.

These incentives for solid waste managers have to be understood in the context of the education system in Sri Lanka where many sit for public examinations in the hope of getting to universities and only those who do not succeed so go into technical and vocational tracks. There are very few opportunities to move from the technical and vocational back to the

academic track. From our survey of 160 managers carried out at the end of 2009 we learned that of the solid waste managers 63% hold academic qualification and other 37% percent hold technical or vocational qualifications. However, only 37% of those holding academic qualifications were innovative in solid waste management at their local authority³, while 67% of those holding technical and vocational qualification did.

With our success in bringing together the productive and/or enthusiastic managers as a peer network (See Section 5.3), we are confident that they will take the lead in working with the universities for a positive outcome.

4.2. A Cooperative yet Competitive Peer Community of Practitioners

In order to link up the solid waste managers at the 335 local authorities to each other we tried out three strategies: (1) Initiate and share good practices (2) develop a National Vocational Qualification framework for education, training and certification in the sector and (c) develop a ranking survey to assess the solid waste management performance of local authorities relatively to each other.

The first two methods are tools for instilling cooperation among the solid waste managers while the third method is for facilitating a competitive environment.

4.2.1. Initiate and share good practices

Gampaha Municipal Council

A chance invitation in mid 2007 by the mayor of the Gampaha Municipal Council (GMC) to the 3R initiative at LIRNEasia --a corporate social responsibility initiative then—to help distribute compost bins to homes in his locality took us on a fruitful journey that culminated in a successful proposal to IDRC.

After receiving the IDRC grant in January 2008 we continued to work with the GMC guiding them towards innovations in several key areas in solid waste management (SWM). For example, together with the solid waste management personnel at Gampaha we (1) developed awareness methods to encourage homeowners to compost bio-degradable waste at home (2) initiated a relatively efficient system for collecting, storing and selling of recyclables (3) set up a novel system to manage yard waste (4) established a monthly program to motivate workers and (5) started to bring the solid waste personnel together as a team to review their unit's progress in managing solid waste and (6) established a three-fold "Sabha Saviya" (or "strengthen the council").

Our efforts in innovation at Gampaha have served the valuable purpose of learning, making contacts and generally gaining credibility in the solid waste management personnel and the leaders in LGAS. Contrary to what we expected at the beginning, Gampaha has not been a

³ i.e. found ways of recycling at least 10% of the waste they collected

good case study to study innovation processes because we have been too involved with the innovation process.

Expanding the scope

With the insights gained from our interactions with GMC, we visited 20+ other local government bodies across the country with the objective of getting to know the LGA leaders and officials, comparing and contrasting the SWM practices in different localities and identifying intrinsic reasons, if any, for solid waste personnel in LGAs to deliver better services.

During these we visits we came in contact with the Federation of Sri Lankan Local Government Authorities, an association of local authorities modelled after and supported by the Federation of Canadian Municipalities. As a result of these visits and the link with the FSLGA we felt confident enough to include the full set of 275 local authorities in six provinces (excluding the northern and Eastern provinces that were directly affected by the war that lasted from 1983-2009 and the North Central Province which was excluded due various circumstantial reasons).

We continued to focus on a few with innovations as opportunities presented themselves to test new ideas. Some of the innovations we tried out are as follows.

Gampaha MC:	Recycling center management; Motivational program for solid waste operations assistant (or labourers); Professional Development day, appreciation of citizens and workers, Family Day
Kaduwela Pradeshiya Sabha	Green bucket concept for collecting biodegradables separately from other waste
Bandaragama Pradeshiya Sabha	Green bucket concept
Moratuwa MC (Soysapura Ward)	Public-private partnership for buying non-biodegradable waste from residents
Colombo CMC:	Training modules for solid waste operations assistants; Develop a model depot at Kirulapone division

Sharing of good Practices

Sharing mode-2 knowledge is a challenge because that knowledge is not always documented. So far the project has been acting as the mediator in facilitating innovations and disseminating those among the LGAs. We used a bimonthly newsletter, the 3rasia.org web site and mail-outs for that purpose. In addition we conducted several workshops to IT personnel from Central and Southern Provinces to help them set up their own blogs. The workshops included also a session on what constitute a good practice and writing up good practices. While there was much enthusiasm and several web sites were set up by the participants, with time these Web sites were abandoned.

Overall it became clear that while good practices are initiated in various at local authorities, the managers who do not have the time, the culture or the inclination to share those.

4.2.2. Develop standards and curricula for training solid waste workers; Training of trainers and certification of assessors; Peer-to-Peer training programs

Standards and Certification

Working together with the Tertiary and Vocational Education Commission of Sri Lanka we were able to draft the competency standards for labourers in solid waste. This standard is perhaps the first of its kind in south Asia, if anywhere.

Our efforts brought together a panel of solid waste managers for five consecutive Saturdays for developing the competency standards and another larger group comprising of 38 senior managers from 24 LGAs from across the island and officials from key central government agencies at a one day meeting to review the draft prepared by the panel. The response of the participants was overwhelming. They were happy that they were in the driving seat and it was clear that they would work together as a community to take ownership of the standards and the training based on those standards.

Education and Training

While the competency standards were being developed, we challenged an existing solid waste management center at the Balangoda Urban Council to offer training to their colleagues in other LGAs. They rose to the occasion and sent us a curriculum for training solid waste personnel to work as teams. That was in October 2008. By January 31, 2009, or within four months, over 90 solid waste professionals from 22 localities have received training at the Balangoda. A unique feature of the Balangoda training center is that the training is done by practising managers in the location where they practice.

More important than the training achievements is the fact that about 90 solid waste managers across the country were now connected to each other as friends and colleagues.

Other LGAs have expressed interest in developing their own training centers seeing that such centers will bring additional income to the LGAs as well as improve their standing among peers. We expect to facilitate the establishment of at least two more training centers that give opportunities for quality interactions among peers in solid waste management. Over time these training centers are expected to become self supporting.

By the end of the project we were able to facilitate:

2010 June	Launch Competency standards within a National Vocational Qualifications for Solid Waste Operation Assistant vocation
2011 Jan	Receive national recognition of a training center at the Balangoda Urban Council
2011 Jun	18 solid waste managers qualified assessors for testing and certifying solid waste operations assistant
2011 Jun	Begin the first institutional training for 15 solid waste workers at the Balangoda Urban Council; they will be receiving their certificates
2011 Jul	Have TVEC test and award NVQ certificates for solid waste operations assistant at NVQ level 2 to 50+ worker from four local authorities. They were

tested by teams of assessors selected from the solid waste managers from across the country who were certified as assessors.

More importantly the 18 solid waste managers who were registered by the TVEC decided to organize themselves as a **“Solid Waste Management Professionals’ Association”**

Connectedness v. Performance

While knowledge sharing and education and training activities among local authorities brought about much connectedness and cooperation among solid waste managers, their performance did not have much to do with connectedness.

There are 331 LGAs spread across 9 provinces in Sri Lanka. During the period October 2009 to January 2010 we surveyed the solid waste (SW) managers in 109 LGAs in 3 out of nine provinces in Sri Lanka, asking them whether they sought knowledge inputs from outside of their LGAs using a positive answer as a measure of their CONNECTEDNESS.

We also asked the SW managers we surveyed about their ‘success’ in recycling at least 10% of their biodegradable waste and we used their answer as an indication of their SUCCESS. Source separation of waste where household or businesses sort their waste prior to collection is theoretically the most effective method of managing waste but site separation methods (or the separation of recyclable components from the waste after the collection) is the only method that is proven in practice in Sri Lanka (Pilapitiya, 2009 and references therein). In Sri Lanka, municipal waste consists of 50-60% biodegradable waste. Currently only one local authority in Sri Lanka has a landfill that is designed for the purpose of disposing solid waste. All other LGAs dump their waste in the open with a few covering the waste with soil. In site separation the waste collected is allowed to compost in a systematic way so that the biodegradable components are composted. Treating municipal waste to make compost is not a new invention but introducing the practice to a LGA is an innovation because the practice is new to each LA.

Table: The success v. connectedness of 108 local government authorities in the Sabaragamuwa, Wayamba and Western Provinces of Sri Lanka, October 2009-January 2010

	No success	Some success	ALL
No connectedness	42%	1%	43%
Some connectedness	40%	17%	57%
ALL	82%	18%	108

4.2.3. Clean city survey

Rankings are often used to evaluate performance of organizations relative to each other and spur them on to do better. ‘Cleanliness National Indicator for Cities’ by the Department of Environment, Food and Rural Affairs in UK and the ‘Sanitation Ranking of Cities’ by the

Union Ministry for Urban Development in India are two examples where solid waste management parameters are captured and compared nationally using actual measurements of cleanliness. The Clean City Meter of India too is largely concerned with solid waste management and cleanliness indicators but is based exclusively on perceptions of residents. In the present study we combined concepts from published surveys to develop a solid waste management ranking system for Sri Lanka which can be applied anywhere. We worked with the Waste Management Authority of the Western Province of Sri Lanka and Nielsen Company of Sri Lanka to develop and apply the ranking method to five local authorities that sent their waste to a common dumping site called Karadiyana located near a scenic inland water body just south of the capital city Colombo. The results were presented at an event hosted in partnership with the Waste Management Authority of the western Province. The audience of nearly 100 was headed by the Chief Minister of the Western Province and included representative from 23 local authorities in the Western Province including 9 chairpersons or mayors and 29 other officials. The policy brief presented at the event is outlined in Section 5.3.

4.3. Knowledgeable and Demanding Civil Society

According to a 2007 directory published by the Environmental Journalists Association of Sri Lanka there are over 1000+ registered associations in Sri Lanka, with many of them serving at a community level. There are also several national organizations such as Arthcharya, Sevanatha, Consortium of Humanitarian Associations (CHA), Sarvodaya, Girl Guides and Boy Scouts, all with environmental friendly missions.

4.3.1. Direct Interactions with Civil Society organizations

At the initial stages of the project, we confined ourselves to the Gampaha Municipal Council (GMC) jurisdiction to test some of the ideas for linking civil society to local authorities. From the beginning we worked with the Sri Lanka Girl Guide Association as our partner. We also explored the possibilities of involving Sarvodaya and Setei Kyusei, both of which are also national organizations with a local presence in Gampaha. We tried to direct the environmental awareness inherent in these organizations towards activism in pressuring local authorities to practice 3R in the management of their solid waste.

During the second and third years of the project we extended our efforts to Moratuwa Municipal Council and Kaduwela and Bandaragama Pradeshiya Sabhas. The selections were made as opportunities presented themselves. The efforts with civil society groups can be listed as follows with details to follow:

- 3R education for Sri Lanka Girl Guide Association's network of guiders and guides
- Partnership with other local NGOs such as Sarvodaya, Setei Kyusei, CHA (Consortium of Humanitarian Agencies); Arthacharya; and Sevanatha
- Assist local political leaders with their community organization efforts
- 3R societies in schools (initiated in the Balangoda Urban Council in partnership with the National solid Waste Support Center)
- 3R committees in temples

Sri Lanka Girl Guide Association

Sri Lanka Girl Guide Association (SLGGA) is a national organization with a national as well as an international network of members. SLGGA works in partnership with the Ministry of Education and has a presence in schools in almost every administrative division in the country. For the beginning of the project we signed an MOU with the association to incorporate the waste management concept of 3R (Reduce-Reuse-Recycle) into the curriculum, to interact with and make aware over 1000 girl guides and their leaders throughout the country about 3R, take the message of 3R through them to households and to work with local authorities in the implementation of 3R in each local authority jurisdiction.

Although the concept of 3R was institutionalized within SLGGA through the curriculum, the girl guides could not be convinced to pressure their local authorities to become partners in 3R. Informing and educating civil society about 3R is without the logistical support for recycling by the local authority is like putting the cart before the horse we learned.

Sarvodaya Samiti (society), Gampaha

This group was one of the first groups outside of the SLGGA with whom we tried to work but unsuccessfully. Although Sarvodaya's mission matched well with the 3R concept, they probably found it difficult to involve themselves without sufficient project funds dedicated to their organization.

Setei Kiyusei , Gampaha Head Office

This is an organization with its philosophical origins in Japan. They and Sarvodaya are the only organizations which are certified to produce the 'Efficient microbes (EM)' product originating from Japan. Among other things this product is widely used in waste management. Unfortunately, during our collaboration the organization got embroiled in a national controversy regarding certain religious practices by their members and the collaboration did not proceed further.

Sarvodaya Samiti, Lakshapithiya, Moratuwa

In the case of Moratuwa, we were directed by the Sarvodaya Head Quarters to their Samitiya (society) in Lakshapathiya as a good test case. We worked with the Lakshapthiya group to implement a clean city survey and use the results to influence the MMC. The survey was successful but after the paid part of the project was over it was hard to keep the group engaged.

Citizens Group (Gampaha-Bandiyamulla)

The Gamapha-Bandiyamulla citizen group came together in 2007/2008 period at the behest of honourable Ajith Mannapperuma, the mayor of Gampaha, at that time. They worked with the mayor to organize awareness meetings throughout the Bandiyamulla area. They contributed in-kind resources and LIRNEasia provided technical support even before the initiation of the project. With the local authority behind them in providing logistical support the citizen group were successful in getting the community to source separate their waste

and home compost the biodegradable and hand over the non-biodegradables to the municipal truck designated for the purpose.

The 3R efforts at Soysapura, Kaduwela and Bandaragama

Similar to the Bandiyamulla program, these programs were initiated at the request of the political leadership in each jurisdiction. Two out of the three efforts were fully successful because the political leadership was able to align administrative capacity with citizen participation.

Soysapura

We proposed to a member of the Moratuwa Municipal Council who was also the chairperson of the residents association in a large urban high-rise community called Soysapura to try out an public-private partnership innovation in managing their Samapth Piyas or (Resource Centers) for collecting recyclables.

4.3.2. 3RNewsletter

We used a 3R newsletter under different themes as needed. Altogether six were produced during a three year period

2007 Jun: Sinhala and Tamil combined publication explicating 3R, 1000 copies released on world Environment day at Girl Guides Head Quarters

2008 Jun: E-waste topic, Sinhala 750 copies; Tamil 250; ·

2008 Oct: Stories from LGAs; 750 s, 250 Tamil; distributed to local authorities

2009: Issue on NVQ; Issue on 3R at temples 2200

2010: FSLGA newsletter provided 4 pages in their newsletter to disseminate 3 good practices

4.3.3. Web site

From the beginning of the project 3rasia.org web site was used to record out activities as blogs and to collect 3R related information in one place. To our knowledge, except for one or two of them, solid waste practitioner did not visit this site. In a survey of how they acquired knowledge only 2% of the managers said they used the Internet.

2009 Mar: 267 page loads; 117 visitors; 30 returning

2009 Jun: Partnership with CHA*; CHA advertises 3rasia.org; Also transferred site to 3rlanka.org

2009 Jul 2006 page loads; 640 visitors; 148 returning;

2009 Nov site down

2010 Mar Agreed that CHA will run 3rlanka.org and LIRNEasia will do 3rasia.org;

2010 Apr 651 page loads; 237 visitors; 068 returning

2010 May 359 page loads; 169 visitors; 049 returning

2010 Jun 673 page loads; 283 visitors; 041returning

2010 Jul 784 page loads; 322 visitors; 098 returning
2010 Aug 770 page loads; 272 visitors; 064 returning
2010 Sep 461 page loads; 203 visitors; 060 returning (27/ Sep)
2010 Oct 719 page loads; 201 visitors; 041 returning
2010 Nov 532 page loads; 276 visitors; 041 returning

* Environmental Unit of CHA (Consortium of Humanitarian Agencies)

Overall, our efforts to link solid waste managers at the 335 local authorities to each other showed that external stimulations such as good practices sharing training and facilitation does not work but activities that give them professional pride such as setting standards for their vocation and education, training and certification activities can bring together practitioners as a sustainable network

4.4. Deeper understanding of knowledge to innovation processes

The purpose of the three set of activities linking local authorities to --the knowledge community, civil society and to each other was to understand how such linkages can lead to innovation in local government services, solid waste services in particular. What we learned from the actions is summarized in the next section as conceptual/technological outputs and further elaborated in the outcomes and lessons learned sections

5. OUTPUTS

The expected outputs of the project were generalizable concepts or technologies that will be accepted and adopted or adapted by policy makers and researchers, research users or those affected by the research resulting in changes in behaviour, capacities, actions, or relationships of and. Changes in the state of economic, social, health, political, or environmental conditions was not an objective of this project.

An over view of the outputs are presented in a table, followed by more detailed descriptions.

	Generalizable Concepts/Technologies
A relevant knowledge community	i. Universities are ideally positioned to facilitate cross-cutting research forums, projects or programs that bring scholars and practitioners together, but procedural issues such as archaic and erratic academic calendars in Sri Lankan universities, among other factors, do not allow for productive interactions between scholars and practitioners
A Competitive and cooperative peer community	ii. Application of the NVQ system for skills development in local government can not only build capacity of individuals in local government but foster practitioner networks as a side benefit
	iii. Cooperation through practitioner networks is necessary but not sufficient. Policymakers should implement a system to rank local authorities
	iv. Policy makers should nurture practitioner networks so that knowledge can move from bottom to top as well
A Knowledgeable and demanding Civil Society	v. -
Deeper understanding of the K2I processes	vi. Three scholarly papers have been presented at scholarly venues and submitted to academic journals (APPENDIX 2)
1. Policy Impact	vii. Three policy briefs were shared with policymakers, stakeholders and the general public (APPENDIX 3)

5.1. Universities are ideally positioned to facilitate cross-cutting research forums, projects or programs that bring scholars and practitioners together, but procedural issues such as archaic and erratic academic calendars in Sri Lankan universities, among other factors, do not allow for productive interactions between scholars and practitioners

By all accounts the time has come for universities to view themselves not as centers of knowledge but as just one type of node in a multitude of criss-crossing webs of knowledge. It is up to the universities whether they position themselves as the crossroads or get sidelined. Through the k2i project we were able to observe the universities in Sri Lanka from the vantage point of one small web of knowledge, namely, the knowledge networks in solid waste management in Sri Lanka. One particular observation is outlined here.

During the project period of 2008-2010 we interacted with almost all individuals in Sri Lanka with expertise in solid waste management. The Solid Waste Forum that was facilitated by the K2I project was a venue that attracted these individuals. We chose to work closely with Faculty of Forestry and Environmental Science at the University of Sri Jayawardenepura because of their commitment to provide their students with a quality education experience. In spite of their dedication we found that the university was not able to give the experience they wanted. The internship relationship we maintained with that department for three years point to one possible reason.

As per agreement with the Faculty of Forestry and Environmental Science at the University of Sri Jayawardenepura, we provided two internship opportunities per year for that department. In spite of our best efforts, the experience was less than satisfactory for both parties largely because the students were not able to spend a dedicated amount of time for their training.

A regular academic year is fundamental to the functioning of a university and the time spent on study leave, examinations, and the release of examination results should not take away too much time from the educational experience of the students. Yet universities in Sri Lanka do not have set starting date for their academic year. A typical academic year at our universities consists of 27% of time devoted to study leave and examination compared to say, The National University of Singapore where only 12% is devoted to such. In Sri Lankan universities, the study leave and examination periods are spread throughout the year making it difficult for outside institutions to interact productively with students or faculty. This day and age universities alone cannot provide the up to date knowledge required of university graduate. Partnerships with employers in industry, government and non-governmental sector are essential. Universities have to adjust their academic calendars to facilitate better interactions with the outside world. In fact, leading universities across the world use a trimester system with one semester left free for research, internship and additional instruction.

Proposals submitted to the Ministry for Higher education by letter May 25, 2011:

- i. All universities should be required to maintain a regular academic calendar with one out of three semesters dedicated to research, internship or additional instruction. Details of such a calendar have to be worked out in consultation with all the stake holders.
- ii. In order to ensure that universities are able to admit students by the designated date, either, the Department of examination should commit to releasing the GCE (A/L) well before the proposed start date of Aug 10 (say),
- iii. or, the university admissions should be based on an aptitude test similar to the Scholastic aptitude Test (SAT) of USA, with the subject-wise results of GCE (A/L) used only to validate that the students have passed the requisite subjects at an appropriate level of competence as required by each academic program.
- iv. In order to incentivize faculty to carry out scholarly activities during the third semester, their salaries should be based on a 9-month academic year with additional funds awarded on a competitive basis for research during the third semester. As it is practiced in the universities in the US, the 9-month salary can be distributed over 12-months to ensure financial stability for the faculty
- v. Research has to be defined broadly to include all forms of scholarship as expounded first by Ernest Boyer and widely recognized by the higher education community worldwide. The four forms of scholarship are Discovery, Synthesis, Application and Dissemination. I have shared these ideas with the University Grants Commission of 2011-2006 and the wider university community.

A sample academic calendar for Sri Lankan universities can be as follows:

Semester	Activity	Duration,
1, Start Aug 15	Orientation	1
	Instruction	7
	Recess	1
	Instruction	7
	Study Leave	1
	Examination	2
	Vacation	2
2, Start Jan 10	Instruction	7
	Recess	1
	Instruction	5
	New Year Recess	2
	Instruction	2
	Study Leave	1
	Examination	2
3, Start June 01	Instruction/Research/Internship	11
ALL		52

Semester Start Dates for Two Selected Universities in Comparison to those Proposed

	University of Delhi	National University of Singapore	University Sri Lanka Proposed
Semester 1	Jul 21, 2010	Aug 2, 2010	Aug 15, 2011
Semester 2	Jan 03, 2011	Jan 10, 2011	Jan 10, 2012
Semester 3	May 22, 2011	May 08, 2011	Jun 06, 2012*

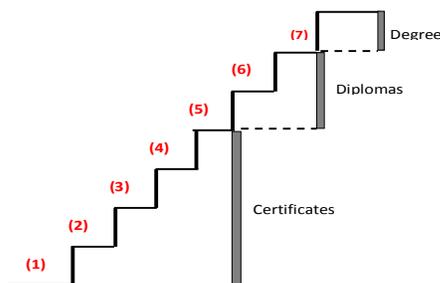
*Late start taking into account the special recess required for the Sinhala and Tamil New Year

5.2. Application of the NVQ system for skills development in local government can not only build capacity of individuals in local government but foster practitioner networks as a side benefit

Services provided by a local authority require a range of technical, managerial and interpersonal competencies. The National Vocational Qualifications Framework developed by Tertiary and Vocational is typically used in vocations in construction, manufacturing etc., but, a pilot study in developing a certification system for solid waste operations assistant vocation demonstrates the utility an NVQ framework for not only skills development in the sector, but, also for bringing together the solid waste managers as a practitioner network. Competency standards, or documents that specify what a worker should know and can do in a given vocation, are typically used in vocations in construction, manufacturing etc., but not for vocations in government.

Services provided by government require a range of technical, managerial and interpersonal competencies but they have not received much attention. Local government sector is particularly important in this regard since the mandate of a local government authority in Sri Lanka is the regulation, control and administration of “all matters relating to public health, public utility services and public thoroughfares and generally with the protection and promotion of the comfort, convenience and welfare of the people and all amenities within such area.”

The National Vocational Qualifications (NVQ) Framework developed by the Tertiary and Vocational Education Commission (TVEC) provides the opportunity for standardizing and developing vocations in any sector.



For any vocation, the NVQ framework essentially provides 3 types of qualifications comprising of 7 levels. Each level is characterized by increasing (a) process complexity (b) learning demand and (c) responsibility. The increasing levels of responsibilities, e.g., would be as follows:

- 1 Entry
- 2 Work under supervision
- 3 Work under some supervision
- 4 Work independently
- 5 Supervise others
- 6 Manage
- 7 Plan

In applying the NVQ framework to SWM, we worked with the Tertiary and Vocational Education Commission of Sri Lanka to define a vocation called “solid waste operations assistant” at NVQ Level 2 to recognize the increasingly complex tasks performed so called ‘garbage collectors.

Competency standards can be developed only with the participation of those who are engaged in a particular practice and excel. They lead the formulation, testing and certification as well.



Assessors congratulating an NVQ Level 2 recipient

A total of 45 solid waste managers were involved in the process of developing, certifying and applying competency standards to the vocation of solid waste operations assistant. These individuals spent 5 days per person on average during a 12 month period, while some spent more than 10 days per person. They often travelled long distance, sacrificing their week-ends, because they felt their knowledge was valued. In their own words:

“We did not realize we had this knowledge until we went through this process”

“Now that the curriculum is done and the process is complete I am going to miss the Sundays we spent here”

With their help, within a period of one year we were able to:

- a) Establish a nationally recognized Solid Waste Management Training Center at the Balangoda Urban Council
- b) Register 17 solid waste managers as assessors
- c) Assess and certify over 50 municipal solid waste workers as operation assistants
- d) Facilitate a Waste Management Professionals' Association dedicated to the professional development of its members and the progress of the waste management sector as a whole.

5.3. Cooperation through practitioner networks is necessary but not sufficient. Policymakers should implement a system to rank local authorities

Competition is part and parcel of private service provider environment but, more often than not, government service providers are free to operate as monopolies. In the absence of competitive market forces, ranking surveys can be used to create incentives for performance in government.

Local government systems typically comprise of a multitude of institutions and therefore are ideal for such surveys. Selecting the top 3 among hundreds of institutions will not create real competition. A proper evaluation should distinguish not only the strong from the less strong but the strong from the weak as well. We demonstrate the feasibility using a survey of 5-cities bound by a common waste disposal site.

'National cleanliness Indicator for Cities' survey carried out by the Department of Environment, Food and Rural Affairs in UK and the 'Sanitation Ranking of Cities' survey by the Union Ministry for Urban Development in India are two rare examples of comprehensive ranking surveys used to evaluate the performance of local authorities regarding their cleanliness and/or solid waste management.

A proper ranking of local authorities calls for a scientific survey of (a) premises receiving services and (b) public spaces in a given locality. Such surveys are too expensive to be carried out across all local authorities in a country. However, a survey can be tailored to address localized issues and hence carried out at a lower cost.

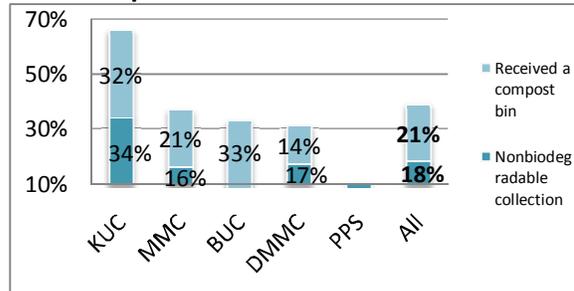
For example, in a pilot survey, we focused on the issue of reducing the waste sent to the Karadiyana, a waste processing facility located next to Bolgoda, a natural body of water near Colombo, Sri Lanka, and surveyed five local authorities that send their waste there. Carried out in partnership with the Nielsen Company of Sri Lanka, the survey consisted of two parts:

First, Face-to-face questions using a questionnaire were asked by the enumerator from each person who is knowledgeable about waste disposal at a given premise. The questions concerned the services provided by their local authority in terms of **source separation, waste collection and cleaning and other.**

Second, observations were made by trained enumerators about the **cleanliness of public spaces** in the vicinity of and within a 10 meter radius of each premise.

The results were organized to depict the performance of each local authority (LA) in comparison to their neighbors, and a percentage score was assigned to each indicator or sub-indicator of interest. Discussion here is limited to the 5-LA area as a whole. The 5 LAs are abbreviated as DMMC, MMC, BUC, KUC and PPS.

Source Separation

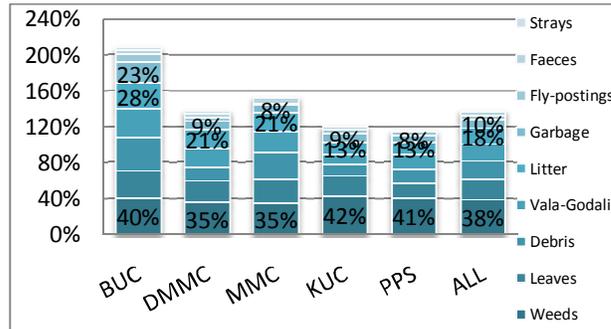


Only 18% of the houses receive a collection service where non-biodegradables are collected separately. Only 21% of the households have been informed that they can purchase a compost bin at a reduced price. KUC performed best and PPS worst.

Waste collection

68% of the houses have a door-to-door waste collection service, and, of those, 78% say there is a specific day for the service and 86% say the service is regular.

Problems in Cleanliness



In terms of cleanliness of public spaces, rotting leaves was the major problem for 28% of spaces. Litter was found in 18% and garbage piles in 10%. Fly-postings, stray animals and faeces were not serious problems.

Local authorities offer a variety of services including prenatal clinics to crematoriums. The solid waste services ranking surveys can be expanded to capture the effectiveness of these other service as well. Such a survey will go a long way in creating a competitive environment among neighboring localities.

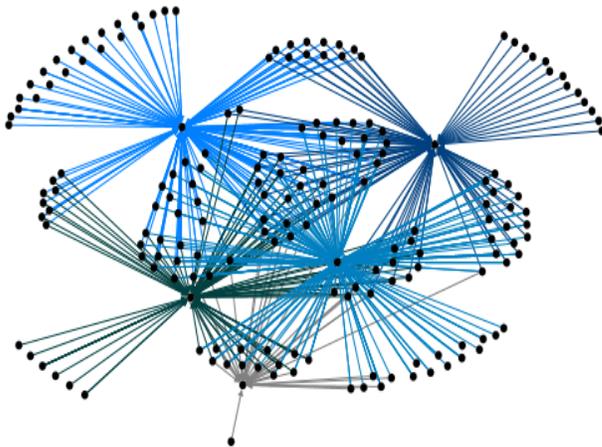
5.4. Policy makers should nurture practitioner networks so that knowledge can move from bottom to top as well

Increasingly it is being understood that knowledge produced in the context of work is driving innovation and growth in the economy and society. Yet attitudes of academics or top bureaucrats, in the developing world in particular, are shaped by an archaic top-down world view.

A map of knowledge seeking activities of solid waste managers in 217 local authorities shows an active network which is distinguished by established knowledge hubs and some emerging hubs. Nurturing these networks with care and understanding is the smart thing to do, by academics or policymakers.

The emerging importance of mode-2 knowledge or knowledge produced in the work places vs. Mode-1 knowledge or knowledge produced in formal settings such as universities and research institutes was predicted by Gibbons and others in 1994. With empirical evidence for the importance of mode-2 knowledge just beginning to emerge, it is becoming evident that companies indeed value knowledge received from suppliers, customers and even competitors more than those from formal sources.

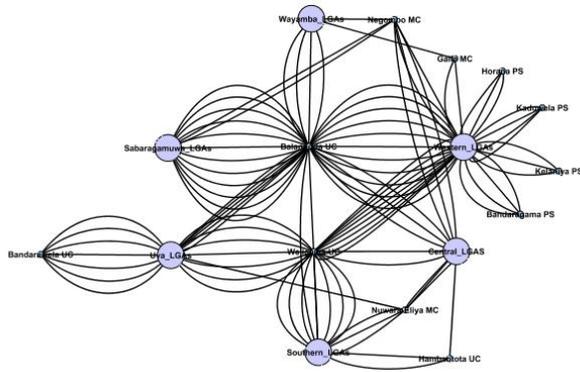
In order to see whether similar trends are observable in the local government sector, in 2010, we surveyed the solid waste (SW) managers in 217 LGAs in 6 out of nine provinces in Sri Lanka, asking them, among other things, "Who did you contact in the last 12 months to seek information you needed to improve your practice?".



All knowledge-seeking activities, Oct-Dec 2009, with each line denoting a request to one of the five hubs

Of the 217 managers surveyed, 174 in all reported 614 linkages to knowledge sources. The multitude of dots depicts the 174 knowledge seeking local authorities and, the lines, their links to five hubs with: (1) central government, 39% (bottom right hub) (2) peers, 29% (top left) (3) provincial government, 7% (bottom left) (4) university, 6% (bottom most hub) and (5) others, 18% (top right) .

A closer look the category of ‘Peers’ revealed the presence of solid waste managers at the Balangoda Urban Council (UC) and the Weligama UC, respectively, having 39 and 23 other solid waste managers, respectively, citing them as knowledge sources.



Peer to peer knowledge-seeking activities Oct-Dec 2009

In the figure, the 6 larger dots denote the knowledge seekers clustered by the province to which each belongs and the smaller dots denote the knowledge sources. Balangoda Urban Council (UC) and the Weligama UC, the two major source hubs, are placed in the center of the figure. The 12 lines connecting Balangoda UC, for example, to the large dot on the upper left depicting the Sabargamuwa Province represents the solid waste managers from 12 local authorities in that province seeking knowledge from the solid waste manager at the Balangoda UC. Other lines similarly depict other knowledge seeking activities. This kind of knowledge mapping research led to identification of not only the two national hubs but other emerging hubs.

6. PROJECT OUTCOMES

The expected OUTCOME of the project is the extent to which the set of generalizable concepts or technologies detailed under Outputs in Section VI are adopted or adapted by policy makers and researchers, research users or those affected by the research resulting in changes in behaviour, capacities, actions, or relationships of and. Changes in the state of economic, social, health, political, or environmental conditions was not an objective of this project.

An over view of the outcomes are presented here as a table with extent of adoption of adaptation ranked as (High: √ √ √ Med: √ √ Low: √). Detailed descriptions follow.

	Generalizable Technologies/Concepts)	Acceptance / Adoption/ Adaptation	Comments
1. A relevant knowledge community	1. Universities should facilitate cross-cutting research forums, internships or research programs to learn from practitioners, Current mode of operation in universities does not allow for productive interactions between scholars and practitioners	-	The concept was shared at several scholarly venues and presented to policymakers, but, we are yet to receive feedback
2. A Competitive and cooperative peer community	2. NVQ system for skills development in local government	√ √ √	Co-implemented with government agencies and adopted widely
	3. Cooperation through practitioner networks in necessary but not sufficient. Policymakers should implement a system to rank local authorities	√ √ √	Co-implemented with government agencies and is expected to be adopted widely
	4. Policy makers should nurture practitioner networks so that knowledge can move from bottom to top as well	√	Shared with policy makers but response not known; shard at conferences, but, acceptance as a paper in journal is pending
3. A Knowledgeable and demanding	5. Civil society organizations should not try to do what the government should be doing but try to make government work better	√	Concept partially developed. Paper abstract submitted but not accepted

Civil Society			
4. Improved waste management services	6. A Coopetitive environment is necessary for improving services by local government	√ √	Concept fully developed. Submitted for publication
5. Deeper understanding of the K2I processes	7. Four scholarly papers from above (APPENDIX 3)	√	None accepted for publication yet
6. Policy impact	8. Three policy briefs (APPENDIX 3) 9. Project director was offered and she accepted the offer to serve as the national coordinator for the Federation of Sri Lankan Local Government Authorities	√ √ √	Two out of three policy briefs accepted and adopted

7. OVERALL ASSESSMENT AND RECOMMENDATIONS

IDRC is committed to building networks for development with universities and citizen groups playing a key role within these networks. The K2I Action research Project which was funded by IDRC for three and half years spanning the 2008-2011 period has given insight into these networks in the context solid waste services provided by local government in Sri Lanka.

The importance of effective government services for development is unquestioned. There is increasing interest in knowledge networks for local governance. Our action research showed that

- Connecting the solid waste managers in local government authorities (LGAs) to each other as **a cooperative yet competitive peer community is the most cost-effective way to improve performance in government service delivery.**
- Civil society's role in developing countries needs to be critically examined because in the context of solid waste management **civil society to be content to occupy a familiar niche away from the policy world.**
- **Universities are poorly equipped to deal with external actors.** Universities in developing countries should be assessed for their knowledge capacity and their willingness and the ability to interact and learn from the external world because universities are no longer perceived to have a monopoly in knowledge production and dissemination.

Recommendations

7.1. Linkages to universities

Although we successfully implemented all tools listed in Section IV in regard to a relevant knowledge community, the response from the knowledge community, i.e. the universities, was disappointing. The desired response was to have the universities view local authorities as providing a rich source of problems and data for their research and teaching. However, the response of the university faculty or students was lukewarm. Upon closer examination, we figured that universities in Sri Lanka cannot be compared with universities in the developed world. University teachers and students in Sri Lanka spend more time than even other universities in the region, delivering/attending lectures, setting/sitting exams, waiting for exams or exam results and other matters, leaving little time for research or activities outside of the universities such as internships that LIRNEasia offered (See Section 5.1).

To further understand the nature of universities in the developing world we decided to use the Carnegie Classification of USA as a starting point. In order to obtain a benchmark which is comparable but at a higher level of performance compared to developing country universities we used data from South Africa. The work was supported initially by internal

LIRNEasia funds but the work had to be shelved until after the required activities under the K2I project were complete. Given the relevance of the research question, –i.e. what type of universities are there and how does a university’s contribution to innovation vary with the type of university?”, and the fact that the K2I project led to the research question, that work is documented in this report as part of the K2I project results (APPENDIX 2).

We recommend an in depth study of the capacity of universities, in the South Asian region. The study should involve metrics on faculty quality and number and type of graduates (e.g. doctoral, masters, bachelors, diploma) and type of program (Academic v Professional; Scientific and technical v. Other) for a start. Several action research studies similar to the one conducted here should be conducted to present rich descriptions of how universities actually interact with the outside world.

7.2. A Knowledgeable and demanding civil society

The second type of linkage that was to be tested was that between an LGA and its citizens, specifically, citizens in the role of users of solid waste services provided by the LGA. The plan was to work with the guides and the guiders of the Sri Lanka Girl Guides Association (SLGGA) to educate them about 3R and have them become the community leaders who request/pressure their local authorities to manage their solid waste using the 3R principle. Although we managed to have the 3R concept institutionalized at the SLGGA, they were not effective in taking the message to LGAs. We worked with other established NGOs such as Sarvodaya who had a network of community-based membership organizations but that too did not work out because these organizations had their own projects to worry about. However we do not have the expertise analyze deeply the reasons for our failures. Therefore, we cannot make any recommendations in this regard

7.3. Linkages among peer Practitioners

This is an area which is largely ignored in knowledge network literature or in funded projects. In our action research we had the most success in linking practitioners in solid waste management to each other in a sustainable manner. We achieved this largely by engaging them with an existing national framework for vocational qualifications. There is a high likelihood that this network of solid waste practitioners will continue well after the project because they are bound together by their role as certified assessors at the Tertiary and Vocational Education Commission and they have already organized themselves as Solid Waste Management Professionals Association.

In his essay on choice and competition in the public services Jules Le Grand identified three avenues available to the general public for receiving better services from public sector organizations. Viewing these same factors from the vantage point of a service provider we note that their inclination to provide a good service depends on (1) their capability and motivation (2) demands from superiors and (3) demands from users. Although the participation in knowledge sharing activities with peers may increase the capability of a

service provider and motivate him or her to perform, some service providers will need additional motivation and additional pressure in the form of demands from superiors or demands from users to translate the knowledge to innovation. We hypothesize that an element of completion in the solid waste sector will positively affect all three factors cited here.

In a volume of case studies titled *Reinventing Public Service in India* Vikram K Chand notes that the transmission of leading practices through NGO activities such as ratings and report cards help sustain innovative practices. Taking a leaf from their study we introduced an element of competitiveness into the solid waste sector in Sri Lanka. The role of competition in the evolution of communities of practice is largely ignored in the literature. The literature emphasizes the cooperative behavior yet the CoP concept will not work in the public sector without an element of competition to spur service providers to do a better job. Competition can be a means of not only spurring service providers officials, but spurring on their political leaders or the even the general public into action. Since we were able to carry out the ranking survey and disseminated the results only in the last few months of the project, the literature provides strong evidence as to success of such in motivating political leaders as well as administrators into action.

Our recommendations in regard to practitioner networks are as follows:

- Nurture professional networks by engaging them with existing structures for education, training, standard setting and other activities that can bring them together as a cooperative group
- Facilitate the development and implementation of ranking of public services in order to bring an element of competition

APPENDIX 1

Partnerships during the Project Period

Type	Description	Contact	Contribution
Central Government	Tertiary and Vocational Education Commission	Dr. T Piyasiri, Director General Mr. Kapuge, Director Mr. Ekanayake	Develop the national competency standards for solid waste operations assistant (NVQ or National Vocation Qualification Level)
Central Government	Western Province Waste Management Authority	Priyantha Kodituwakku Nalin Mannapperuma	Participate at seminars, workshops, and stakeholder meetings organized by K2I. Distribute and collect good practices survey forms on behalf of LIRNEasia. Participate actively in developing NVQs Join with LA to organize Solid waste research forum
Central Government	National Solid Waste support center	Engr L Mangalika	Participate at seminars, workshops, and stakeholder meetings organized by K2I.
Central Government	Central Environment Authority	Lal Fernando Jalthota	Participate actively in developing NVQs Participate at seminars, workshop
Provincial Government	Commissioners for local government	Alahakoon, Central Hathialdeiya, Uva Pandikorale, South Viraj Perera, Wayamba	Jointly conduct blogging workshops for LGA personnel; distribute and collect good practices survey forms
Semi-Gov	Federation of Sri Lankan Local Government Authorities	Members of the Council and National Coordinator, Ms. Hemanthi Gunasekera	Serve as the boundary partner representing the 330+ LGAs
Local government	45+ local authorities	Solid waste managers	Participate actively in developing NVQs Provide training facilities for the sector by preparing themselves as training centers Create environment to exchange expertise of solid waste managers Make provisions for undergraduates to work as interns in LAs Design and participate in

			action research conducted by K2I Participate at seminars, workshops, and stakeholder meetings organized by K2I.
Industry	Burns Waste Management	Sumith Jayawardena Nirosha Nissanka	Training partner organization. Since 2008 Aug , Nirosha took up an appointment at the National Ozone Center but continued to serve as a consultant to our training program.
Industry	Holcim	Mr. Asela Iddawela	Use non-biodegradable and unrecyclable waste from The Gampaha Municipal council as fuel in their cement kilns
Industry	Plastic Recyclers Association	Mr. Iliyas	Link up with LGAs as trading partners and provide assistance with awareness programs
Industry	Nielsen Company of Sri Lanka	Mr. Jinendra Kothalawela	Sample survey of five local authorities to rank their solid waste management
University	University of Sri Jayawardenepura (USJP)	Dr. Hiran Amarasekera and Ms. Nilanthi Bandara	Invite one LGA solid waste manager to 2008 annual USJ forestry and environment science research symposium; Provide space for exhibit at university gold jubilee exhibition; design a course that requires interaction with solid waste divisions at LGAs; Invite papers from solid waste managers for the 2009 annual research symposium. Conduct a training session in partnership with CEA on paper presentation; Send three interns via LIRNEasia to work at three LGAs.
University	University of Sabaragamuwa University of Vocational Technology	Dr. Prof. Kapila Goonesekera, Vice Chancellor	Discussions to develop a tertiary qualification certificate course for senior managers in solid waste at LGAS (parallel to an NVQ Level 5)

	National Institute of Health Sciences	Dr. Piyaseeli	
CSO	Sri Lanka Girl Guides Association	Ms. Kanthi Fernando, Chief Commissioner Ms. Priyantih Rakapaksa, Project Officer	Serve as the boundary partner affecting the behaviour of nearly 50,000 girl guides across the country
CSO	Consortium of Humanitarian Agencies	Director, Environmental	Co-develop the 3R newsletter and the 3Rlanka.org Web site

APPENDIX 2

List of Scholarly Papers

(Details can be found at <http://lirneasia.net/projects/2008-2010/knowledge-to-innovation/>)

1. Classification and Benchmarking of Universities” presented at the World Universities Forum in Hong Kong, Jan 2011 (Submitted to Journal of the World Universities Forum)
2. Coopetition for Local governance (Submitted to Journal of Public Administration and Development)
3. Limits to Environmental citizen ship (Submitted to Inter-Asia Connections conference organized by the University of Hong Kong and the Social science research Council of USA)
4. Practitioner Networks as Self-Organizing Systems: A Study of Solid Waste Manager Networks in Local Government in Sri Lanka (Submitted to Journal of Knowledge Management and Practice)
5. Practitioner Networks as Self-Organizing Systems: A Study of Solid Waste Manager Networks in Local Government in Sri Lanka (Submitted to Journal of Knowledge Management and Practice)
6. Qualifications of solid waste managers and their performance (Presented by Chammi Gunatilake to the 2009 Annual Sessions of the Sri Lanka Association for the Advancement of Science)
7. A Framework for Assessing Solid Waste Management by Local Authorities (Presented by Dr. Sujata Gamage to the 2011 Waste Conference in Khulna Bangladesh; to be submitted to a journal)
8. Factors affecting the effectiveness of site composting programs conducted by local government authorities in Sri Lanka (Presented by Prof. Nilanthi Bandara to the 2011 Waste Conference in Khulna Bangladesh Waste Conference in Khulna Bangladesh; to be submitted to a journal)
9. A competitive environment for sustainable solid waste management by local authorities in developing countries (Presented by Chammi Gunatilake to the 2011 workshop on Improving Eco-Efficiency: Green Growth for Local Governments, 6-8 May 2011, CIFAL Jeju held at Jeju, South Korea)
10. Developing human Resource capacity to provide effective and environmentally sustainable solid waste services (Presented by Nirosha Nissanka at the 2011 workshop on Green Cities held at Jeju, South Korea)
11. Assessing solid waste disposal practices (Paper in preparation authored by Sujata Gamage, Nilanthi Bandara and Chammi Gunatilake)

APPENDIX 3

List of Policy Briefs

(Details can be found at <http://lirneasia.net/projects/2008-2010/knowledge-to-innovation/>)

1. Access to local theses curtailed by Sri Lankan university libraries for fear of plagiarism

Sent to Scidev.net in July 2008 (APPENDIX 4)

2. Knowledge Networks for Skills Development in Local Government

Launched at a public event on August 9th, 2011

3. Need for a regular academic calendar in the universities

Submitted to the secretary to the Ministry Higher Education regarding the need for a regular academic calendar in the universities, May 2011

4. Ranking survey on Solid waste management at 5 local authorities

Presented to relevant heads of local authorities at a public meeting co-organized with the Waste Management Authority of the Western Province on July 12, 2011, to heads of local authorities

5. Videos

Good Practice: Green Bucket (http://www.youtube.com/watch?v=xfUnY_FBsHk)

Good Practices: Public-Private Partnerships (<http://www.youtube.com/watch?v=LLIDEqcnXMA>)

NVQ for Local Government (<http://www.youtube.com/watch?v=s55QQB37LvE>)

APPENDIX 4

“Access to local theses curtailed by Sri Lankan university lib
July 2008

Much is expected of universities in developing countries as institutions driving a knowledge economy but reality is rife with behaviours that contradict.

Take the case of post-graduate theses. To access a thesis produced in a university in Sri Lanka you need to demonstrate that you have a legitimate reason for wanting to view these documents. You can visit a library to view the documents but you can not photocopy any of the pages, not even the abstract. You may write down your own abstract of the abstract but not the abstract itself. Some universities restrict access altogether to undergraduates. These rules are apparently a result of a collective decision taken by university librarians in response to rampant plagiarism where material from approved theses are often copied liberally and submitted as new material. The national library of Sri Lanka makes a good effort to keep track of post-graduate theses and make them available on line but they seem to follow the example of the university librarians and restrict access to the abstracts or the full text.

These restrictive practices may actually promote further plagiarism. If access to theses is curtailed, plagiarists will take the effort to jump through the hoops and copy the materials they need. Since the material is not easily accessible in general, the plagiarists have a higher chance of escaping detection. In contrast, if the full text of all theses is freely available on line anybody can quickly check the authenticity of a document or part of document using easily available software or even by visual inspection.

The real reason for rampant plagiarism too is worth further scrutiny. In Sri Lanka, judging by the resumes presented for job applications, gathering certificates, diplomas and degrees is a popular past time and universities are responding liberally to this demand although they may not have sufficient man power. In a 2005 survey of faculty in social science and humanities faculties in Public universities Sri Lanka universities we found that only 30% of faculty members held a PhD. 46% held masters degrees while 24% did not have any post-graduate qualifications.

Notwithstanding these deficiencies most departments offer post-graduate programs, because these programs offer an important source of income for the academics. The classes are typically offered by faculty members who already carry a heavy undergraduate teaching load. How many essays or dissertations each faculty member is required to read is anybody's guess but it is obvious the situation is ripe with temptations for short-cuts by teachers and students both.

The real solution to the problem of plagiarism is perhaps some birth control accompanied by better quality control for post-graduate degree offered by universities. However the librarians could alleviate the problem to some extent by doing exactly the opposite of what they do now. They should insist that all theses are submitted as PDF documents that are

posted on the Internet for free and open access. The exemplar in access is the Theses Canada Portal which comes with this simple set of instructions ***“The electronic theses and dissertations on this site are for the personal use of students, scholars and the public. Any commercial use, publication or lending of them in libraries is strictly prohibited.”*** Simple as the instructions sound they would present a paradigm change for librarians in Sri Lanka.