DEVELOPING PROCESSES FOR DELIVERING DEMAND-LED RESEARCH IN URBAN WATER MANAGEMENT

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Background

An increasingly common requirement of agencies funding water management research is for researchers to ensure their work is demand-led and communicated effectively. Individuals and projects are under pressure to do much more than what was traditionally understood as 'good science'. They are required not only to understand the priorities of potential users, but also to take account of the prevailing institutional context, to undertake research in partnership with implementers and other key stakeholders (e.g. regulatory authorities, civil society agencies, financial institutions), and to communicate results and emerging innovations effectively. However, with little training or experience in these areas, and limited support, attempts to assess demand and establish and develop trust with other key stakeholders, are rarely thorough, and even less commonly, well documented. Communication strategies are generally weak, most often focusing on traditional methods to disseminate results, and only kicking in towards the end of a project. The narrow focus of much technical research and neglect of the political context, compounded by these additional limitations, are increasingly linked to the failure of many conventional water management interventions to have relevant impact (Gyawali et al., 2006).

This paper discusses an approach – the learning alliance approach – that has been developed to address these and related problems and is currently being piloted in a major international research initiative on integrated urban water management known as SWITCH (Sustainable Water management Improves Tomorrow's Cities Health). Integrated urban water management by its nature requires such approaches to forge new partnerships between authorities, traditional implementing agencies and civil society. For example, in the case of the theme of this book, changing the perception of urban water habitats from their role as just a part of the sewage system to being a potentially important component of the city environment that provides multiple services including the mitigation of floods, improved water quality, recreational spaces and a better microclimate to improve residents' health, requires changes in attitude, policy and practice across a range of stakeholders. The paper is targeted at readers who are involved in processes to try to scale-up such innovation in urban water management or achieve impact at the city scale.

The innovation system context

Recent approaches to improving the impact of research and development place greater emphasis on the rapidly changing socio-economic, political and environmental contexts, and on the importance of a diversity of key actors and organisations in effecting an innovatory environment and facilitating scaling-up. Accordingly, the focus has switched from a perception of knowledge and knowledge generation as being exclusively the product of research, to one in which the processes of knowledge acquisition and application by knowledge managers and users are

uppermost, with the linkages and learning dispositions of this constellation of players being viewed as the key to development impact.

This new paradigm derives in major part from work exploring the relationships between science and technology and the economic performance of industrial countries, referred to as 'innovation systems' approaches (see Box 1). Innovation in this context is essentially associated with the commercialisation of technologies (i.e. ideas, hardware, practices), and predominantly derives from 'working with and re-working the stock of knowledge' (Arnold & Bell, 2001) rather than creating new knowledge *per se*.

Box 1. Innovation system definitions from the literature

The "set of institutions whose interaction determine the innovative performance of national firms." (Nelson and Rosenberg)

"..the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies." (Freeman, 1987).

"..the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge ... and are either located within or rooted inside the borders of a nation state. (Lundvall, 1992).

"..the national institutions, their incentive structures and their competencies, that determine the rate and direction of technological learning (or the volume and composition of change generating activities) in a country. (Patel and Pavitt, 1994).

"A system of innovation is that set of distinct institutions which jointly and individually contributes to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies." (Metcalfe)

"All the actors and activities in the economy which are necessary for industrial and commercial innovation to take place and to lead to economic development." (Arnold and Bell)

"At its simplest an innovation system is the groups of organisations and individuals involved in the generation, diffusion and adaptation, and use of knowledge of socio-economic significance, and the institutional context that governs the way these interactions and processes take place." (Hall et al., 2003: 3)

"Innovation systems approaches view innovation in a more systemic, interactive and evolutionary way, whereby new products and processes are brought into economic and social use through the activities of networks of organisations mediated by various institutions and policies" (Hall et al., 2004).

An introduction to learning alliances

The idea of Learning Alliances has emerged in the water sector, as in others, both in response to the widespread failure of conventional research to have significant impact (Moriarty et al., 2005; Smits et al., 2005; Smits et al., 2007), and as an instrument to accommodate systemic complexity and facilitate multi-stakeholder processes. Specifically in the urban water context the group of interconnected players typically includes public sector (e.g. line ministries, utilities, municipalities, regulators, educators, research institutes), private sector (e.g. industry, consultants, contractors, financial services), and civil society agencies (e.g. NGOs, media, professional bodies and unions, advocacy organizations).

A learning alliance is a grouping of constituent organisations from a given system, that seeks to effect widespread impact through the up-scaling of an innovatory approach. The more representative the alliance is, the better it will capture the institutional complexities that constitute the realities of the innovation system. Through working on the agreed underlying problems, and contesting and evolving together potential solutions (i.e. action research mode), it is anticipated that mechanisms for addressing institutional constraints and fomenting institutional learning will be generated. The approach is premised on the idea that the key challenge to impact is not in devising new technologies but in bringing about appropriate institutional change within the relevant innovation system.

SWITCH then aims to foster such alliances to facilitate integration and the scaling-up of innovation in urban water management. The main ideas underpinning the learning alliance approach are:

- switching emphasis from researchers devising new technologies – *doing different things* – to improving how the multiple stakeholders in the innovation system work – *doing things differently* – will lead to interventions having greater impact;
- innovations that are generated locally, taking all the relevant stakeholders into account, are more likely to lead to appropriate, integrated and sustainable solutions, to promote flexible and adaptive working practices, and to foster and strengthen the development capacity of local organisations and communities;
- new understanding of knowledge and learning, and the emergence of learning organizations: whereas information can be generated and disseminated, knowledge is viewed as a complex, transformative process, arising less from any accumulated stock of information, and more from intra- and inter-organizational processes in which experimentation – action research – and communication feature strongly.

In dispersed or complex systems, learning alliances may be represented by sets of connected stakeholder platforms typically located at the different levels of administration (e.g. national, city, neighbourhood). Their structure and activities will be designed to optimize relationships, breaking down barriers to both horizontal (i.e. across platforms), and vertical (i.e. between platforms) learning. Alliance members will share a common desire to address an underlying problem, for example, to improve urban water management. They will also share or develop common approaches – visions, strategies and tools – on how this can be achieved. Each platform will group together a range of stakeholders who capture diversity and bring together complementary skills and experiences.

Why do we need learning alliances in urban water management?

Cities around the world are facing a range of dynamic pressures including rapid urbanization and urban sprawl, industrialization, climate variability and climate change. The ecological 'footprints' of cities are ever growing through increasing exploitation of available resources – land, water, energy, food, building materials, finance – while they produce massive streams of waste (solid, gaseous, liquid) contaminating soils, air and water. Conventional urban water management meanwhile, both North and South, is struggling to manage ever scarcer water resources, to deliver water and sanitation services, and dispose of wastewater, without adversely impacting the quality of life of urban populations and the downstream environment. Put bluntly, urban water

management faces extraordinary and complex - or 'wicked' - problems, in which solutions to problems in one part of the system may create new problems elsewhere for others (Rittel and Webber, 1973, 1984, Pacanowsky, 1995, both quoted by Lach, Rayner and Ingram; Gonzalez & Meitner, ?).

The challenge to finding sustainable solutions - economic, environmental, social and institutional - to these underlying problems, is beyond the realm of conventional research approaches, and requires a new paradigm. More of the same type of research that has partly led to current fragmented urban water cycles is unlikely to lead to such a new paradigm, but rather to isolated improvements at best, not without the possibility of unintended and detrimental outcomes elsewhere in the system. Learning alliances aim to create new partnerships that may led to more innovative and in this case, more holistic solutions. Crucially such innovation needs to happen within partnerships that capture the political and institutional challenges to a new paradigm in urban water management, as these are frequently the most difficult challenges to the uptake of otherwise good scientific innovation. Furthermore, without developments in governance, ambitious cross-sectoral improvements in urban water management are unlikely.

At the Rio Earth Summit (1992) *good governance* was identified as a precondition for achieving sustainable development. This was embodied in Agenda 21, the 'global action plan', which through the *Local Agenda 21* initiative urged local authorities to enter into dialogue with their citizens, local organizations and private enterprises as an initiatory step to realizing sustainable development. Although there are multiple definitions of *governance*, most acknowledge the role and importance of civil society and the private sector as well as government, and many associate *good governance* with greater accountability, participation, transparency and equity in the development processes. As a tool or mechanism, learning alliances can provide a key for engaging multiple stakeholders and bringing together their diverse perspectives on a problem and its potential solutions, and enabling new ways of working to emerge, including potentially better governance (Mvumi *et al*, 2006; van Koppen *et al*, 2006).

SWITCH has thus set out to test the propositions that not only can the learning alliance approach provide a safe and more equitable space for city stakeholders to critically examine and negotiate mutually acceptable positions and visions for the future, but that specifically learning alliances can provide support for innovative collective learning and adaptive management – learning together by doing – through multi-stakeholder engagement. By critically examining together the current urban water management situation in their cities, identifying underlying institutional problems, particularly those associated with current relationships between these key stakeholders, and identifying and exploring potentially improved future scenarios, it is envisaged that the city 'alliances' will not only be 'researching' the institutional settings and constraints, but progressively effecting institutional change and improved governance through integrated working processes.

How to start learning alliance processes?

In order for learning alliances to provide a means for jointly solving difficult problems, one first has to establish that key city stakeholders agree that there are underlying problems in urban water management. The term *stakeholders* here refers to individuals, groups or organizations, who have an interest in, influence over, or are (or might be) affected by the issues in question and attempts

to address it. They may be impacted in different ways, and believe in different solutions, but there have to be reasons (e.g. responsibilities, mandates, potential benefits) for each to want to seek resolution of the problem. For example, members of the SWITCH consortium who were involved in developing a joint project are agreed on the widespread failings of conventional urban water management, and aspire to a more integrated management that is more sustainable, less risk prone and more equitable. There are many stakeholders in each partner city beyond the research consortium who too seek integrated urban water management solutions, but there are also stakeholders with very different visions and agendas. Understanding who these stakeholders are in each city, their activities, their motives and their interest or lack of interest is a starting point for establishing a learning alliance (see Box 2). The key stakeholders should form the learning alliances. Stakeholder analysis (and/or institutional mapping) to understand these issues and establish a baseline for the learning alliance is a vital early activity (see Box 3).

Box 2: Key stakeholder types influencing innovation in the urban water management system

- Key organisations responsible for water management and many related sectors that make decisions or effect changes in policy and practice (e.g. policy analysts and advisors, policy makers, municipal/local government personnel both political and bureaucratic, service providers whether public, private and voluntary, regulatory authorities, architects and planners etc);
- People with influence with decision-makers directly (e.g. members of parliament, private sector companies);
- Civil society organisations and individuals who can bring pressure to bear on decision-makers (e.g. NGOs, unions, professional associations);
- Water user groups (e.g. consumer groups);
- Local 'leading lights' (activists or champions) working to address cross-cutting issues such as sustainable development, poverty, gender, and environmental degradation;
- Those who can support, reinforce and strengthen research activities and recommendations (e.g. training and research organisations);
- Those in the media who provide a means by which innovation can reach wider audiences and the public ; and
- Banks and other investment agencies, including the donor community, who fund infrastructure and other activities (including research)

Before further discussing possible ways to develop these alliances we need to identify who can provide the impetus and energy for such a process, and a different approach to research. As with any group activity, momentum for a new enterprise is often provided by one or two key individuals, with backing from their superiors and organisation(s). To set up a learning alliance, every city will need a coordinator to champion the alliance, and a team of enthusiastic co-workers to support her or him with facilitation, documentation and other skills. In addition there is a need for at least one city (or national) organisation – preferably, but not necessarily, that of the coordinator – to host the learning platform. They will need to provide the initial support, space and resources needed by the coordinator to initiate and progress the learning alliance.

Box 3: Tools for learning alliances to undertake stakeholder analysis and monitor their effects might include:

RAAKS is a diagnostic framework and participatory methodology for analysing complex multi-stakeholder situations and for designing effective co-operation and communication strategies. Developed from the agriculture and rural development sector the tools and exercises can be easily adapted for use in urban water management (www.kit.nl);

Outcome mapping Outcome mapping is an monitoring and evaluation tool developed by the International Development Research Centre (IDRC) that rather than assessing the development impact of a programme focuses on changes in the behaviours, relationships, actions or activities of the people, groups, and organisations with whom a development programme works directly (www.outcomemapping.ca);

RAPID includes a range of expert methlogies focusing on ensuring the policy impact of research. The mapping political context tool kit includes tools for stakeholder analysis and other useful methods. www.odi.org.uk/RAPID/Tools/Toolkits/Mapping_Political_Context/Stakeholder_analysis.html

To kick off a learning alliance, the coordinator and colleagues need to identify and contact the different types of stakeholders (see Box 2) with interests in integrated urban water management. Figure 1 presents these aspects of influence and affect as a matrix, and will be referred to again under *lessons learned*. Only a few stakeholders will probably be interested or willing to join the learning platform initially, and the coordinator and first members will have to draw up engagement strategies for building and fostering relationships with others (e.g. recruitment, influencing or outcome mapping). It is imperative that the diverse groups in boxes 2A, 2B and 1B are well represented; and particular attention will be needed to ensure adequate representation from groups and individuals from 2A, who while being strongly affected have only low influence. The 1A group, who are both little affected and with minimal influence, would be the least prioritised for representation.

Figure 1. Stakeholder types according to aspects of influence and affect

CLA Stakeholder matrix	A. Low influence (on realization of purpose)	B. High influence (on realization of purpose)
1. Little affected (by work & realization of purpose)	1A: Least priority stakeholder group	1B: Useful for decision and opinion formulation, brokerage
2. Strongly affected (by work & realization of purpose)	2A: Important stakeholder group; probably marginalized & in need of empowerment	2B: Critical stakeholder group

Having scoped the stakeholder community and secured favourable responses from a sufficient number, the coordinator will need to organise some kind of initial meeting or event to bring them together. Whether this is considered an *inception* meeting for the learning alliance, or a precursory meeting(s) to its launch, will depend on the dynamic of the local urban water management discourse and the context of the city in question. The preliminary meeting will provide the first collective opportunity for the corrdinator to share the project's aims, and introduce the learning alliance and its underpinning concepts, and for the stakeholders to critically discuss the challenges of urban water management, identify potential ways forward (e.g. opportunities for action research), and indicate potential contributions (i.e. skills and resources).

More important than any particular agenda for these meetings will be the need to effect local buy-in and ownership of the process by a critical number of diverse local stakeholders. To this end the coordinator will need either to have, her or himself, significant facilitation skills, or to commission a facilitator. Local ownership here must not however be misconstrued to allow 'hijacking' of the process by an elite, and the establishment of a cartel. Learning alliances have to be inclusive if they are to successfully address and improve the way the urban water system works. Whether formally or informally constituted, the city learning alliances (or platforms), will need to agree or select and endorse the role of the coordinator and that of a small supporting secreteriat or management team, who together will be charged with taking action points forward. Issues that the membership and its management team will need to consider at an early stage will include:

- how are alliance activities to be funded, and costs and benefits shared?
- how will the alliance communicate and share information and ideas amongst its membership (e.g. workshops, reports, e-mails, newsletters etc)?
- how will the membership's capacity and training requirements be assessed and addressed (particularly in the sphere of action research and information and communication technologies)?
- how will a comprehensive mapping of urban water management stakeholders be undertaken?
- what research activities will the alliance commission, and who and how will these be undertaken?
- how will inter- and intra-organisational learning (e.g. double-loop learning) be assured?
- how will the alliance engage with influential stakeholders outside the alliance?
- how will the alliance (or management team) draw upon potential support (e.g. training) to make it more effective?
- how will the alliance monitor and evaluate its performance generally and the activities of the management team?
- how will processes be documented to ensure that lesson learning is optimised, and available to share with other city learning alliances?

The final point, documentation, requires special attention but is frequently neglected. Process documentation is a tool that helps project staff and stakeholders to carefully track meaningful events in their project, "in order to discern more accurately what is happening, how it is happening and why it may be happening" (ref missing). Process documentation not only describes what happened, it also explains how it happened and investigates why things happened the way they did (Schouten, 2007). This kind of information is crucial to scaling-up innovation processes that cannot easily be replicated in other locations because of the different contexts.

Growing participation

Initially small, perhaps with representatives from as few as a dozen but more likely two dozen organizations, the city learning platforms in SWITCH are anticipated to grow over time, both as new stakeholders are contacted and as the activities of the alliance are undertaken and promoted. To be an effective microcosm of the wider innovation system, membership will as discussed need to include representatives from diverse user groups and communities, public and private service providers, regulators, policy makers and legislators, and researchers, together with documenters and disseminators.

From a functional perspective, expertise and costs will also play a part in determining the size of particular events. Management capability and effectiveness of workshops above a certain size, for example, may be a limiting a factor; although electronic networking allows for higher numbers. Public sector and civil society organizations tend to be more readily available to attend stakeholder or participatory meetings. Poorly represented or marginalised civil society groups (e.g. ethnic minorities, poor women and children etc) may feel intimidated by the scale and activities of certain gatherings, and proactive initiatives may need to be taken to ensure their representation and fullest participation. Private sector players are typically more conscious or critical of nominally unproductive activities, and thus often more difficult to engage with. Their clearer focus on a single bottom line – profit – can however provide fresh momentum and the rationalisation of alliance activities.

It is important, as far as possible, that organizational stakeholders are represented by (the same) dynamic individuals, with decision-making potential and/or access to key decision-makers. This is particularly key for public bodies where improvements to the system will require that beaureaucratic constraints are addressed. The actual influence of these individuals to bring along their organisations in innovation and change is a critical area.

Sustainable funding

Significant expenditure is incurred during the setting-up phase of learning alliances or knowledge networks, which typically may take as`long as 12 to 36 months. The absence of, or limited, funds during this vital period is likely to scupper the establishment of a locally-driven, fully functioning alliance. Research projects will typically need to allocate their own resources to such activities, at least for an initial period, because in most situations, such knowledge sharing and capacity building activities in water management are underfunded and resources scarce.

The objectives of the city learning platforms are however expected to be in line with those of statutory authorities and other stakeholders (including donors and agencies funding research) with interests in urban water management. Thus, through its activities, the alliances will be contributing to and facilitating delivery of the responsibilities of several urban water management stakeholders. This situation should allow for and encourage *quid pro quo* arrangements, and indeed membership of an alliance should be premised on joint sharing of costs (e.g. staff time, facilities and other resources) and benefits. Direct funding opportunities might too be explored, and finances sought either for the setting up and running costs of alliances, or for specific research activities. Commissioning action research which is to be expressly undertaken by member organisations in new partnership arrangements, is one way to actively ensure new ways of working are explored, and to provide incentives for the participation of less well resourced stakeholders (e.g. civil society organisations).

Setting objectives

A common critcism of learning alliances is that in the early stages they are too vague, and it is not sufficently clear what they will do and why they need funding. This is a familiar characteristic of demand-led processes which seek to include and involve representatives from such diverse stakeholder groups. The agenda cannot be set from the beginning and available funds not committed to a set of tasks that the alliance did not formulate. However, it is vital that

learning alliances identify objectives, quickly start some joint activities, and monitor their progress against set objectives. For example, it is suggested in the SWITCH project that:

- After *6 months* some city learning alliances will have a management team headed up by a locally endorsed coordinator, and will enjoy reasonably effective and networked communications, one or two may even have created their own website. Inception meetings will have been held, and funding for a number of action research projects identified. Some of these activities will have been commissioned, and newly formed partnerships between members will be initiating this research. In-house expertise, capacities and skills of the membership will have been mapped, and made available. Initial 'outcome mapping' plans will have been developed by the management team, identifying key urban water management stakeholders (non-members) who the alliance will seek to influence.

- After *5 years* it is envisioned that there will be an active series of city learning alliances in all demonstration cities (see Figure 2 - not all cities in the SWITCH project are shown due to lack of space) having successfully completed a series of action reserch activities based upon the needs of participants. Effectively communicated results will have led to wide-scale uptake of reseach results both within the focus cities and elsewhere linked to learning through national platforms and a global learning alliance. This will involve not just all the focus cities and learning alliance members but also other cities and stakeholders working to scale-up innovations made by the project.

Figure 2. Representation of SWITCH's different city learning alliance platforms
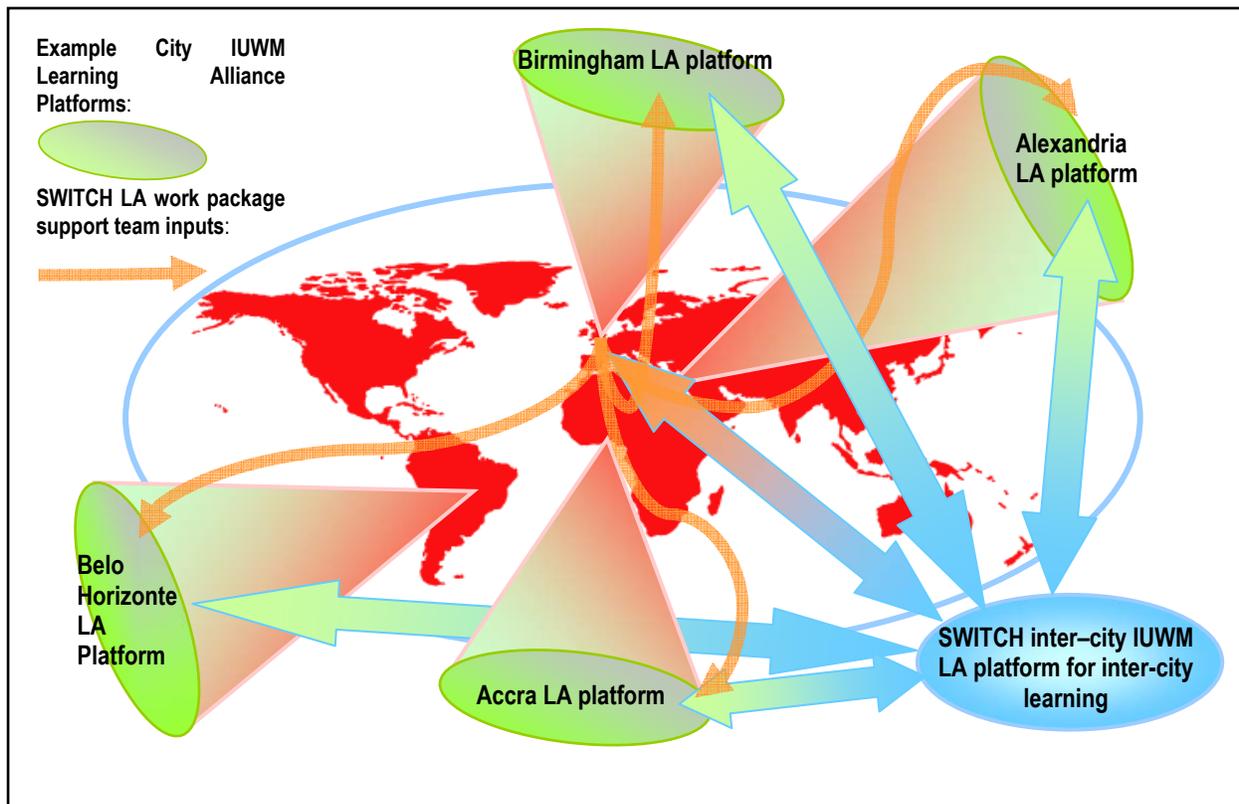
Lessons learned

At this early stage – the project has only been running for a year – in the testing of the learning alliance propositions, the SWITCH experience is only able to offer some preliminary insights into the suitability of learning alliance approaches for delivering more demand-led research in urban water management. More in-depth analysis from projects in other locations and sectors is available elsewhere (see for example Lundy, 2004; Smits et al., 2005; Smits et al., 2007). However, some key issues arising will be of interest to readers interested in following similar approaches. The main lessons to date have been:

- *allocate realistic funding* for learning alliance processes. The SWITCH project has experienced a slow start in setting up learning alliance structures because inadequate funding was allocated to these processes in the project design phase. It is not easy to convince researchers of the value of learning alliances, or to quantify the value of research being put into use, especially when the costs of stakeholder processes are seen to be at the expense of further investment in 'their research'.

- *identification and involvement of stakeholders.* In line with learning alliance principles on equity and sustainability, but because of the perennial difficulty of ensuring adequate representation and voice of those *stakeholders* with least influence but highly affected (box 2A in Figure 3), SWITCH created a separate work package to ensure representation and accommodate more detailed research on aspects of social inclusion. However, action addressing these issues needs to be mainstreamed.

Figure 3. City Learning Alliance Stakeholder Matrix

City learning alliance stakeholder matrix	A. Low influence (on realization of city learning alliance aims / IUWM)	B. High influence (on realization of city learning alliance / IUWM)
1. Little affected (by city level activities, implementation of CLA aims / IUWM)	1A: Least priority stakeholder groups (not expanded)	1B: Useful for decision and opinion formulation, brokerage ▪ **Civil society organisations and individuals who can bring pressure to bear on decision-makers:** - NGOs - Unions - professional associations ▪ **Local 'leading lights' (activists or champions) working to address:** - poverty - gender - environmental issues ▪ **Those who can support, reinforce and strengthen SWITCH's activities and recommendations** - training and research organisations - financial organisations ▪ **Those in the media who provide a means by which the learning alliance**

		can reach the public - print media - radio and television - others ▪ Key land-focused and property stakeholders including land market speculators, planners, and developers
2. Strongly affected (by city level activities, implementation of CLA aims / IUWM)	2A: Important stakeholder group; probably marginalized & in need of empowerment ▪ **Socially excluded groups** – Ethnic minorities, inner city or peri-urban communities, women, children, the poor and other particularly marginalised and vulnerable groups and individuals who typically lack voice ▪ **Water user groups** - consumer groups - irrigation groups	2B: Critical stakeholder groups ▪ **Key organisations responsible for UWM, including organisations who make decisions or effect changes in policy and practice:** - policy analysts and advisors, policy makers - municipal / local government personnel (political & bureaucratic) - service providers (public, private & voluntary) - regulatory authorities ▪ **People with influence with decision-makers directly:** - members of parliament, city mayors - private sector companies - others

- *create the right incentives* for stakeholders to participate in learning alliances. Although required in some countries, direct payments to participants are rarely desirable. The main incentive for participating in learning alliances should be the actual delivery of demand-led science that meets the needs of the learning alliance members. Not only does this mean identifying and researching the alliance's prioritised issues, but doing research in partnership, and ensuring the learning alliance to be involved in issues like site, partner and methodology selection. Capacity building opportunities such as training opportunities and scholarships for masters or doctorate students can be linked to learning alliances and cities to build their capacity in the longer term. At least some project resources should be completely flexible and at the disposal of the learning alliance, for example, for specific case studies they want to investigate.

- *communicate results effectively.* At its heart, a learning alliance is a platform for experiential learning, communicating the findings from that learning, and receiving effective feedback. To maintain the interest and momentum of the alliance partnerships, and to provide for and embed adaptive responses, it is necessary to generate and share this learning effectively. This will necessitate regular communication of results, often in different and unusual forms to meet different stakeholders needs (e.g. interim publications such as working papers and draft policy briefs for discussion, video diaries, newsletters, interactive websites, and exposure visits etc).

- *focus on learning for change.* Learning alliances are intended to be forums for learning, learning that is linked to action research, pilots or demonstrations with results that are intended to be implemented or scaled-up by some of the participants. However, learning needs to be planned for and encouraged, otherwise the alliance will remain a platform for information sharing and little more. Such action-orientated activities and a focus on learning, or more broadly, capacity development, distinguish learning alliances from other kinds of networks (e.g. communities of practice) that typically only involve the same types of participants (e.g. just researchers) and are restricted to sharing information and/or more conventional research by external 'experts'. Meaningful innovation is fundamentally about changing institutional and social relationships, and developing more effective ways of learning. Technology aspects still seem to predominate, with information often misrepresented as knowledge, and ideas on knowledge management confined to association with technology uptake.

- *invest in facilitation and documentation.* Effective facilitation of meetings and other activities, and good documentation, provides a powerful incentive for participants to be involved in learning alliance processes. However, all scientists without extensive action research experience, and especially more junior researchers, are unlikely to have the skills required for facilitation or process documentation. Investment in staff with specialist facilitation and process documentation skills will often be warranted, or substantial training to build these competencies.

- *Build upon existing structures.* In most cases learning alliances will be built on existing stakeholder-platforms or network arrangements, which may not be legitimately by-passed (or parallel structures created), but will not primarily exist for learning. Promoting institutional learning and change is essential, but incorporating this into the existing dynamic without appearing to be subversive, requires trust to be built and consolidated. This is a time consuming process.

- *Conflict is inherent to change.* Those benefiting from the status quo are happy to continue dictating play but unlikely to voluntarily concede to rule changes by others. Resistance to change is often the norm and has to be understood and tackled. Learning alliances need good facilitation to draw stakeholders together and enhance negotiation and conflict management:

  - existing elites will tend to exclude some stakeholders, deliberately or otherwise. Apparently *ineffective communication* may otherwise be *politically effective*.

  - private sector players with competing interests – and busy schedules – do not readily appreciate inclusive *participatory approaches.*

  - representation frequently excludes more vulnerable households and minority groups.

- *don't underestimate time needed and resistance to change.* Learning within an alliance where the participants will often change from event to event, often requires going backwards to move forwards and the slow pace of progress is a common complaint. There are also many good reasons why urban water management is fragmented, and more holistic approaches will rarely come easily or fast just by sitting people around a table and sharing information. Real change in the positions of individuals, and crucially the organisations represented by those individuals, is slow and hampered by existing organisational cultures in which powerful individuals are reluctant to see the *status quo,* and their particular grasp of power and resources, diminished. Included amongst these factors are skewed incentives in the existing

system, skews in the communication systems particularly with respect to information and communication technologies, inward-looking institutional cultures in which information is often misrepresented as knowledge, and ideas on knowledge management confined to association with technology uptake. Learning through action research in new partnerships can however eventually overcome many of these barriers.

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