



Semana temática: Agua y Ciudad

Eje temático: Pautas de los gobiernos locales para la sostenibilidad

Título de la ponencia: Learning alliances for innovation in urban water management

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Resumen:

The Sustainable Water Improves Tomorrow's Cities' Health (SWITCH) consortium - a research partnership focused on long-term improvements in urban water management in developed and developing countries - is piloting innovative research processes that aim for more effective urban water science and wider and more integrated use of research within cities. In this paper, learning alliances are introduced as an approach to build multi-stakeholder partnerships for more demand-led research and wider scaling-up of the use of research findings. The need for an integrated approach to deal with the complexity of urban water management is discussed. Using the example of the city of Lodz in Poland the learning alliance approach is illustrated, and some examples are given on how impact evaluation can be used innovatively in the design and implementation of research partnerships. Finally, some more general lessons learned to date are synthesised from SWITCH and other similar learning projects.

Palabras clave: cities; demand-led research; innovation systems; learning alliances; SWITCH; urban water management

1. Introduction

Research for its users

An increasingly common requirement of agencies funding water management innovation is for researchers to ensure that their work is demand-led and communicated effectively. The underlying rationale is to improve the impact of research on policy and outcomes. Individuals and projects are as a result 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 the private sector) and to communicate results and emerging innovations effectively. However, with little training or experience in these areas, and usually with limited budgets or support, attempts to assess demand and establish and develop alliances 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 towards the end of a project. These limitations, when taken together with the narrow focus of much technical research and the neglect of political context or developmental processes, are increasingly linked to the failure of many water management innovations to have relevant impact (Gyawali *et al.*, 2006).

Complex problems require integrated solutions

The concepts underlying complexity science provide researchers and practitioners some of the tools that are needed come to terms with the dynamics and change processes of complex systems. Though initially complexity science focused on physical and biological phenomena, it has gradually started to gain ground in social, economic and political science. Ramalingam and Jones (2008) distinguish ten key characteristics of complex systems that refer to the system, change, and agents of change. Though it goes beyond the scope of this paper to discuss these key characteristics in detail, the water management systems of large cities display most of these characteristics.

Wicked problems are common in complex systems. Wicked problems can be defined as problems that only can be understood by exploring solutions, and each wicked problem is new and unique. There are no definite solutions and solutions are not right or wrong. Finally, solving wicked problems are one-shot operations as the implementation of a solution will change the problem. Conklin (2006) explains how wicked problems in complex systems often lead to fragmentation. Fragmentation suggests that people consider themselves to separated rather than united and a situation in which knowledge and information is scattered. The fragmentation essentially represents the different views from different stakeholders that all feel that their view is the most correct and their problems are most urgent and need to be addressed on a priority basis.

It is becoming increasingly clear that traditional science - in which increasingly specialised specialists divide complex and wicked problems into small bits and take a linear approach to problem solving - finds it difficult to deal with complexity and to explore solutions for wicked problems. Conklin (2006) argues that the answer to fragmentation – and the start of dealing with complexity and wicked problems – is a creating a coherence in terms of understanding the problem and a shared vision. Creating coherence and developing joint understanding and a shared vision is what Learning Alliances in urban water established by the SWITCH project have set out to do. Learning Alliances enable scientist and practitioners to come together to work jointly in process where the increasing and changing understanding of the problem leads to the emergence of potential solutions (Smits, 2007; Verhagen *et al.*, 2008).

The Sustainable Water Management Improves Tomorrow's Cities' Health (SWITCH) project

The SWITCH project is a major research partnership funded by the EC, with a budget exceeding €20 million, undertaking innovation in the area of integrated urban water management (IUWM). Rather than solely focusing on new research, the project is encouraging learning alliances to help set the research agenda and to put research across different aspects of the urban water cycle into use in cities to help improve integration and scaling-up impacts. This paper reviews some of the experiences gained by the SWITCH consortium in applying the learning alliance approach to this complex research area.

2. The SWITCH learning alliance approach

Summary of 'learning alliance' methodology

A learning alliance is a grouping of constituent organisations from a given system that seeks to effect widespread impact through the adaptation and up-scaling of an innovatory approach (Butterworth & Morris, 2007; Smits *et al.*, 2007). 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 potential solutions together (i.e. working in an action research mode), it is anticipated that mechanisms for addressing institutional constraints and encouraging institutional learning will be generated. The approach in SWITCH is based 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.

Learning alliances are about creating new or better innovation systems to build bridges between researchers, implementers and policy makers that often work ineffectually in their corners of the sector. The urban water management 'system' or 'sector' (like many other parts of the water sector) has relatively little inherent ability to adapt or learn, and a learning alliance creates mechanisms and a process to facilitate more learning and sharing. The concept of an 'innovation system', mainly applied in the manufacturing sector, is gaining currency in other sectors including agriculture (Arnold and Bell, 2001; Triomphe *et al.*, 2007). Moreover, the consequences of globalisation and regionalisation for more local level innovation systems have been discussed, and challenges noted (Isaksen, 2001). Research from the European manufacturing sector suggests that 'metropolitan innovation systems' are critical in driving both national and international innovation processes (Diez, 2002). If the metropolitan principle also applies to the water management sector, this endorses the city focus of SWITCH and the potential for linking the participating cities and other research agencies into a global learning and innovation alliance. Moulaert and Hamdouch (2006) in their review of the contribution of EU RTD framework programmes to innovation theory, point to the importance of organizational, institutional and cultural innovation, along with the "process character of innovation dynamics". This finding supports the focus of resources within SWITCH on developing the institutional mechanisms for learning and innovation, as well as paying attention to the documentation of process.

SWITCH aims to foster these alliances to facilitate integration and the scaling-up of innovation in urban water management. The project design (implicitly) envisages the following four part outline 'theory of change' through which the desired outcomes might be achieved:

Learning alliances for innovation in urban water management

1. *Setting:* A research consortium of 33 partners linked to 11 major cities¹ where water management is an important issue. City learning alliances provide a structure for city level stakeholder engagement and institutional learning, while a project-level learning alliance provides a structure for more global learning.
2. *Actions:*
 - Resources made available to support demand-assessment by researchers.
 - Joint visioning and problem solving to address institutional constraints and encourage institutional learning.
 - Researchers develop alliances with other actors.
 - Attempts to establish demand and develop alliances are monitored and documented.
 - A communication strategy is developed and deployed early on in the project.
3. *People:* Researchers (national and international) link with city service providers, city planners, regulatory agencies, private companies, environmental groups and NGOs, community groups and user associations, consultants etc.
4. *Outcomes:*
 - Researchers understand the priorities of local users and take account of the prevailing institutional and political context in their design.
 - Researchers undertake research in partnership with implementers and other key stakeholders,
 - Research results are communicated appropriately and on time.
 - Learning alliances become networked learning organisations.
 - Research is used by local actors to improve water management in cities.
 - Results are scaled up and have impact beyond the focus cities.

Learning alliances should ideally be formed from connected stakeholder platforms at the different levels of administration (e.g. national, city, neighbourhood). Their structure and activities should build on existing formal and informal networks and be designed to optimize relationships, breaking down barriers to both horizontal (i.e. across platforms), and vertical (i.e. between platforms) learning. Alliance members should share (or come to share) a common desire to address an underlying problem, for example, to improve urban water management. They will also be willing to share or develop common approaches – visions, strategies and tools – on how this can be achieved. Each platform groups together a range of stakeholders who capture diversity and bring together complementary skills and experiences.

A common problem in following a learning alliance approach is that in the early stages of a project or programme the activities are seen as too vague, and it is not sufficiently clear what they will do and why they need funding (this was certainly the case within SWITCH). 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 funds cannot (or should not) be committed to a set of tasks that the alliance did not formulate or at least adapt. However, it is vital that learning alliances identify objectives, quickly start some joint activities, and monitor their progress against set objectives. For example, it was suggested in the SWITCH project (Butterworth and Morris, 2007) that:

- After 6 months some city learning alliances will have a core 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

¹ Accra, Alexandria, Beijing, Belo Horizonte, Birmingham, Cali, Chongqing, Hamburg, Lima, Lodz, Tel Aviv and Zaragoza.

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 plans will have been developed by the management team identifying key urban water management stakeholders (non-members) that the alliance seeks to influence.

- After 5 years it is envisioned that there will be an active series of city learning alliances in all 12 SWITCH cities having successfully completed a series of action research activities based upon the needs of participants. Effectively communicated results will have led to wide-scale uptake of research results both within the focus cities and elsewhere linked to learning through national platforms and a global learning alliance.

3. The example of Lodz, Poland

The presence of 18 streams has been a key factor in the history of Łódź. Providing an essential water resource, they were part of the reason why Łódź, located right in the centre of Poland, was transformed from a provincial town to major manufacturing centre. Efforts to revitalize the city are again looking to water to provide inspiration. The polluted streams that were once canalized and buried underground are being recovered and cleaned. Alliances of city managers, academics, activists and investors are aiming to again utilize the power of these restored rivers in a different way: as an attractive centerpiece for new urban development and revitalization. Ecologically-focused restoration of rivers and associated green spaces in the city aims to help to reduce flooding risks, improve the water quality of streams and aquatic habitat, and provide a spur to economic development and regeneration.

Researchers from the University of Lodz have been co-operating with the City of Lodz Office since the mid 1990's, and that was the basis for their joint application to join the SWITCH project. This co-operation has substantially enhanced since the Lodz SWITCH Learning Alliance has been established. The process started in March 2006, engaging initially the stakeholders with the most critical perceived roles in water management. Over time, additional important actors have been identified and involved, and a learning facilitator was appointed and engaged into the process (November 2006). Stakeholders have started to trust the learning alliance and it has become seen as a safe, non-competitive, constructive environment providing both local and international opportunities for learning and sharing (Butterworth *et al.*, 2008a).

Learning alliance development

The initial phases of learning alliance development included developing and training a facilitation team, developing a website and communication mechanisms and at least three major workshops on different urban water management research areas. The workshops were held with the curious, motivated and constructive participation of all the groups of stakeholders, with each workshop extending the forum to a larger group identified by the participants in the initial stakeholder analysis and through the activities and discussions. Each of the workshops was run with the help of the methodology learnt and developed by the SWITCH facilitation team, which contributed to the outputs such as workshop documentation to grasp the process and take it to the next phase. Initially, the stakeholders expected conventional meetings without specific outputs, and with disbelief that the process would continue, they seemed confused about the roles they were meant to play in the process.

With time, their repeated attendance, more and more active participation, voices heard and recorded, and trust that the Learning Alliance is a group where they can constructively share their viewpoints, confidence that ideas shared would contribute to a more efficient integrated management of water-related issues in the city began to show. The challenges that still have to be overcome, however, involve the willingness by the top decision-makers to actively engage in the process and to take ownership of integrated problems faced by all the stakeholders in the city. The day-to-day culture in water management still comes across as based on isolated actions by stakeholders to be focused on solving problems and meeting goals within separate organizations rather than meeting the city goals in an integrated way. Integration of stakeholders into the learning alliance group has been an initial step to working on solutions to the problems together in the forum. A visioning workshop – an entirely new approach and methodology accepted with interest and enthusiasm - was the first real foundation towards identification of common goals and then working out strategies that would lead to a plan for integrated water management on the ground.

Visioning to set joint objectives

In January 2008, a visioning workshop was organized and considered an important test of the maturity of the learning alliance. The workshop brought together over 50 participants representing about 25 organizations and institutions, including both decision-makers and their ‘right hands’. Before the workshop, the higher decision-makers and executive levels in these organizations had not yet actively participated in the learning alliance. Realizing the seriousness of the workshop goals they seemed not to want to miss a chance to express their views and emphasize their commitment and involvement in the water management issues. A key success was constructive discussions and group activities, and there was evidence of a common willingness to contribute and seek specific changes, rather than to criticize and dwell in the past. This is a positive attitude shift that the SWITCH learning alliance has sought to encourage. The workshop methodology was considered interesting by the participants, who evaluated it as being innovative and helpful. The participants expressed pride in Lodz that has a vision for better urban water management and that they contributed to establishing it. That vision is that by 2038 ‘Lodz Uses Its Water Wisely’ and:

‘The city’s resources management is based on an efficient and integrated system ensuring access to information for all. Investors and authorities respect ecological properties of land and waters. Infrastructure serves the functions and requirements of an environmentally secure city, is reliable, meets the needs of all the city’s population and assures good status of aquatic ecosystems. Green areas - river valleys along open corridors – provide space for recreation and are the ‘green lungs’ of Lodz. The population’s common and in-depth ecological awareness contributes to exceptional quality of life. Our city is a leading centre for innovation, education and implementation in Poland.’

Subsequently the methodology has been adopted for a visioning process focusing on a wider issue than water management: the revitalization of the city as a whole especially its historic and neglected ex-industrial zones.

4. Impact evaluation of learning alliances

Better impact evaluation that builds on tested methods for monitoring and demonstrating impact of multi-stakeholder processes is probably one of the most promising approaches towards more constructive dialogue and engagement with learning alliances. While any research project requires monitoring and evaluation (M&E) as part of its process for reasons of accountability in the use of resources, projects undertaken within a framework of a multi-stakeholder process require multiple layers and types of M&E. Multi-stakeholder processes, such as Learning Alliances, have

been promoted as means to achieve an improved research process. So it is necessary to have a way to track and judge whether the approach is fulfilling the goals and activities intended. Since research embedded in multi-stakeholder processes is meant to increase and improve learning, M&E activities should also help to promote greater learning at all levels. M&E needs to be seen and carried out as a regular activity that allows learning to take place and enables lessons learnt to influence the direction of a program.

However, the types of M&E that are usually applied within research projects to assess activities, outputs, and outcomes are not always appropriate to such wider objectives. A broader focus than M&E of specific technologies developed by the research process, that also looks into the way in which the process (or learning alliance) facilitates demand-driven research, the flow of knowledge, linkages and coordination between stakeholders and their sectors, and opportunity and capacity for knowledge to be adopted and used, needs to deploy additional methods. The required behavioural changes within such processes necessitate different approaches than the traditional indicator-style method and since M&E in a multi-stakeholder process should also be a learning mechanism for all stakeholders, traditional M&E approaches that are not normally used in a participatory manner are not sufficient. Novel approaches or uses, as described below, do offer better opportunities for working with and understanding the dynamics of multiple actors and their behaviours but they often require more time, resources and varied skill sets to effectively carry them out. These are frequented underestimated.

Promising methodologies that SWITCH learning alliances have identified started to experiment with, adapt, and apply include social networks (adapting the logical framework with an actor-orientated focus); social network analysis to map relationships between stakeholders, outcome mapping to look at the more immediate changes in the behaviours, relationships, actions or activities of the people, groups, and organisations influenced by a project; Impact Pathways analysis to describe chains of outcomes that contribute to eventual impact, Most Significant Change (Davies and Dart, 2005) to capture stories about change, and scoring ladders to assess mainly qualitative change more objectively (Sijbesma and Postma, 2008) and process documentation (Schouten *et al.*, 2007).

Example: Monitoring learning alliance outcomes

With relatively limited resources for monitoring, SWITCH learning alliances have initially agreed to implement a relatively simple method (scoring ladders) of monitoring in all cities using a mix of common and city-specific objectives and indicators (Butterworth and Da Silva, 2008b). Five objectives (four are shared with other SWITCH cities, while one was added to specifically monitor issues related to social inclusion in Lodz) each with related indicators are being used in Lodz to monitor learning alliance progress:

1. We know who learning alliance members are, and how to communicate with them effectively
2. Regular, effective and innovative events capture interest of learning alliance members
3. Demonstration activities are undertaken within a framework for scaling-up
4. We understand why change is occurring in relation to integrated urban water management, not just what happens
5. Issues of social inclusion (gender, poverty and other marginalised groups) are systematically mainstreamed across all SWITCH activities in the city.

For the third objective, demonstration activities are undertaken within a framework for scaling-up, indicators are the availability of demonstration plans, the level of ownership of these plans, and commitments made to scaling-up implementation. An example of how scenarios are developed based on the indicators and how these are used to assess progress is given below:

Scenarios for objective 3	Score
Demonstration activities are initiated without significant discussion in the learning alliance	0
Demonstration activities are decided after limited consultation with some members of the learning alliance	25
Demonstration activity plans are consistent and integrated within LA plans (city storylines) and are supported but without clear commitments to scaling-up	50 benchmark
Learning alliance members with potential to scale up demonstration activities proactively made suggestions and proposals that were addressed in demonstration plans.	75
Learning alliance members maintain a keen interest in demonstration activities at all stages and report back against their initial commitments to scale-up interventions.	100
Justification of score (Januray 2008)	Score awarded
<p>There is evidence that learning alliance members do undertake proactive efforts towards upscaling and replication of the demonstrative solutions, the most significant examples being:</p> <ul style="list-style-type: none"> • requests by the Head of Architecture and Urban Planning Department of the City of Łódź Office to consult the learning alliance members on the approval for the external investment plan for the Sokolowka Valley redevelopment plan • an invitation to cooperate on the development of the city spatial plan in the area of the river corridor and protection, which opens possibilities for implementation at a city-wide scale, • The Economic Chamber Polish Waterworks asked the SWITCH Łódź team to publish an article about the project in the chamber's quarterly journal, which is circulated to 400 member organizations. 	75

Example: a perspective on the Lodz learning alliance

The most common form of process documentation being used in SWITCH are semi-structured interviews with learning alliance members. Andrzej Czaplą is an engineer in middle management at the Łódź wastewater treatment plant and was interviewed in June 2008. Many organisations are involved in water and wastewater management in Łódź and it is institutionally complex, says Andrzej. This is where he sees the SWITCH supported learning alliance having an important role: he says it was the first attempt to improve communication between the different organisations and to provide a cross-institutional platform to share information and discuss water and sanitation issues. Andrzej mentioned that through the learning alliance he first met some people that he only knew by name before. He went on to say that SWITCH is giving an overall picture of how everything is working together in the city and is addressing the issues in an integrated way. This is needed by the individual organisations that themselves only work on a small part of the system. He says that the learning alliance has enabled the participants to ‘send signals’ about key issues to the city authorities, and to ‘open the eyes’ of people to areas that are beyond the scope of their own jobs.

Andrzej says that he or his colleague have attended all of the 5 or 6 learning alliance meetings held to date. These meetings take a large amount of his time and for him that is scarce: sometimes the whole day. But it is worth it, he says. He was happy to be involved in the development of the SWITCH programme and is looking forward to the results it will generate. In fact, he would now like to see a higher intensity of meetings and events including smaller workgroups to take up specific issues. It has also been useful to learn from other cities and countries on how similar problems have been tackled like creating retention to deal with flood flows, and he cites the example of Birmingham from SWITCH as well as similar learning opportunities he has had from Krakow through the Polish Association of Water and Sewerage Operators, visits to Germany and contacts with the International Water Association. He has particularly encouraged the SWITCH

learning alliance to address stormwater management issues since 50% of the city has combined stormwater sewers, and the plant struggles to cope with peak flows of highly diluted sewage. He mentioned this as an example of an issue to be picked up, recognizing that SWITCH and the learning alliance are only at the beginning of their journey.

5. Lessons learned from SWITCH learning alliances

SWITCH has piloted application a number of innovative methodologies to seek integrated and sustainable improvements in urban water management by doing science better through learning alliances. Lodz, the example given above, has been one of the most successful cities in operationalising the approach. Mid-way into this ambitious project, some preliminary conclusions and recommendations can inform the implementation of the remainder of the project and similar initiatives.

Arguably, there is not yet sufficient consensus on whether the SWITCH project is about new research or creating a learning sector within these cities through the learning alliance approach (the underlying theory of change for the project is contested). The allocation of resources and decision-making power within the consortium still suggests the former is dominant. It is understandable how the paradox persists of strong spoken and commitment on paper to a learning alliance approach that translates into weak actual support and financing for the approach in practice. The nature of the research project development process itself is far from ideal for such multi-stakeholder driven and demand-led research.

Unfunded proposal development processes (or more correctly, self-funded proposal development processes where the strongest institutions can invest more) do not lend themselves to a participatory process in project design especially involving multiple types of stakeholders and developing countries. Furthermore, research funding generally targets the outputs (new research) rather than the process and its outcomes (e.g. stronger communication, capacity building and institutional reform through a learning alliance) that is needed to underpin a strong innovation system. Ideally the objective of SWITCH would have been the transformation of cities and the urban water sector to learning and innovating systems, but this might not have been funded? The implications of a learning alliance approach to research do require project design, planning and phasing to be done differently. This needs to address issues such as partner selection and allocation of resources with a process and outcomes in mind and including more encouragement and support for scientists to develop and use new skills. In SWITCH it would also arguably also have better to avoid thematic or disciplinary focused work packages and to build a stronger matrix management model (Butterworth *et al.*, 2008c).

Unfortunately, multi-stakeholder research processes are also expensive. Costs of change are high and frequently underestimated. While many partners will readily contribute inputs in kind and their own time, the initial facilitation, training and capacity building inputs needed are considerable. SWITCH has illustrated the difficulties of securing additional funding for such 'software elements' in research. For a variety of reasons city learning alliances have been allocated small and uncertain budgets for short periods (e.g. 18 months) and learning alliance platforms at other levels have not attracted any coherent investments. Reasons include the uncertainties of stakeholder-driven approaches for research institutes and the potential squeeze on budgets (for 'traditional' research activities) when funds are put into learning alliance type activities, resistance to change and the momentum of business-as-usual in sector organisations, as well as the weak involvement of cities and non-research providers within management. Within SWITCH, one impact of the high costs of learning alliances has been to focus on the city level. While this is a

good entry point, the neglect of learning alliance platforms at other levels (e.g. the national level to influence policy) and the global or consortium level is likely to undermine potential wider impact.

Any demand-led research process needs to balance the sometimes conflicting interests of research providers and users. The rules of the game for allocation of project resources need to clear together with the role of individuals or agencies engaged in decision-making. Within SWITCH there has not been a clear process yet where learning alliances could veto or challenge particular pieces of research as not being demand driven or high priority, nor influence allocation of resources towards other more important research activities.

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Acknowledgements

SWITCH is an action research programme co-funded by the European Commission and implemented by a consortium of 33 partners from 15 countries (www.switchurbanwater.eu).