

## Citizen Initiatives for Sustainable Urban Resource Use

### Prologue: Imagine...

*Setting – Major cities around the planet, sometime in the early to mid-21<sup>st</sup> century.*

*6:35 pm, Lahore (Pakistan):* Naima arrives home from work and logs onto the internet. Along with the chat programmes that automatically log in, the recently installed Air Guardian (AG) software also launches. She had volunteered to host an AG monitoring station and it was given to her free of charge as part of a drive by some local and multinational corporations to develop an air quality monitoring system in Lahore. While checking her email, she opens the AG website for a quick visual overview of the air-quality situation in Lahore that evening and her neighborhood.

*9:05 am, New York (United States of America):* Danish runs into his office, out of breath and late. Before heading out for the meeting he was meant to be at 8 minutes ago, he plugs his Personal Exposure Profiler (PEP) into his PC. While commuting to work, PEP measures Danish's exposure to key toxic air-pollutants and maps it spatially, pinpointing areas where exposure was highest. Some months ago New Yorkers had become concerned about air-quality in the busier parts of town and the perceived lack of action by the city government. Danish was amongst the many concerned citizens who had to walk in those areas of town, and as a software engineer had had an incentive to contribute to the development of PEP. The system had worked remarkably well, pinpointing areas of town where air quality was poorest at specific times of day. The NY government had responded to the data provided by the PEP network and had enacted the appropriate traffic restrictions.

*10:05 pm, Manila (Philippines):* Again, for the sixth day in a row, Lennon noted that the entire neighborhood's Water Watch Network (WWN) had indicated lower than usual flow to them. WWN allowed Lennon and his entire neighborhood to know what was happening in terms of their collective water situation – some of them had volunteered to house the flow units (like Lennon), while others had volunteered to host quality monitoring equipment. Using the information that volunteers provided across the city, neighborhoods on the WWN had noticed the pattern of water provision, especially during water scarce periods – more affluent neighborhoods tended to get more water and WWN provided the evidence. Lennon had decided to volunteer for WWN and contacted the student group at Manila University that was administering the system. The flip side of the WWN was that the water utility was more aware of the state of its own distribution network.

*5:05 pm, Kabul (Afghanistan):* Nadia logged on to the Kabul Water Utility's Citizen Input web page and entered her daily water quality findings. The computer sciences department at Kabul University had set up the server and software that would log the observations and complaints of citizens some years ago – the Internet had become quite popular during Kabul's reconstruction – and the public utility had found this a very efficient way to monitor the state of their system and maintain a record of their system's history. Nadia was amongst the few volunteers in Kabul who had been selected to provide the daily drinking water quality snap-shot and using a simple kit provided by the local UNEP office, she would record her daily findings and transfer them to a centralised database accessible to anyone on the Internet.

### Introduction

As we move into the 21<sup>st</sup> century, it is expected that most of the world's population will live in urban areas and, concurrently, it is urban areas that will see the greatest population growth. Bearing this in mind, we must think about natural resources in terms of the urban context. I will not define in a very strict fashion what I mean by resources but generally these will include renewable forms like water, air and renewable energy (e.g. biomass, solar and wind), along with non-renewable resources like minerals and fossil fuel stocks. The flow, availability, quantity and quality of such resources is of great importance in urban areas.

Two key urban resources are air and water. Both are necessary for survival and have quality and availability issues associated with them. Problems of access to and availability of clean water and air are especially hard hitting in urban areas in the developing world, where burgeoning populations are straining these resources. Thus, the shift to a more sustainable use of these resources is absolutely essential for the survival of the 21<sup>st</sup> century city. Of course, there are other resources in urban areas that have sustainability issues

associated with them (e.g. land-use, energy, urban agriculture) and more still that may arise as we progress into the 21<sup>st</sup> century. However, I will use water and air to demonstrate the concept I wish to put across.

To shift to a more sustainable use of urban resources, citizens need to understand the resource situation – What is the current state of the resource? Is it in a safe, consumable condition? Is it in adequate supply? And so on. The problem is one of information, definition, articulation and objectification of a resource's various attributes (quality, quantity, flow, availability patterns etc). It is only when citizens take an active interest in a resource and develop a basic understanding of it, will there be a chance to use it in a sustainable manner. This will occur when citizens are able to acquire and, further, disseminate information about a particular resource – information gathering and information sharing communities, bound by a common responsibility to the resources they depend on.

### The Idea

The idea is both a prediction and a hope. Simply put, citizens can and will start taking initiatives to understand and consequently control their resource situation by improving the information they have on that resource and their ability to act collectively. These initiatives will be taken by NGOs, businesses, academia and individuals, all in resource constrained urban areas. Urban residents will have greater and greater access to communications infrastructure (of special note is the Internet), making it easier for them to communicate and collectivize their thoughts, opinions and actions, something that will grow as these technologies become cheaper and more pervasive.

There is no rigid principle being outlined here, just general guidelines. As stated already, I feel that two of the biggest resource concerns for urban areas in the 21<sup>st</sup> century shall be water and air. I believe that citizens will attempt to solve these resource issues on their own, using solutions that they build with readily available communications, computing and sensing technology. The form these initiatives will take could be along the following lines:

- Identification and articulation of the problem: Determining whether there is some resource problem and identify what sort of information is required. For instance, it may be obvious to citizens that they have inadequate access to clean water, or breathe poor quality air.
- Acquisition of funding: Businesses, NGOs, government agencies, research organizations are all potential sources of funding for such initiatives. A lot of bodies have money to donate to a good cause for the sake of their public image and the greater social good, especially for resources as important as air and water.
- Build a solution: Use off-the-shelf technology and put together solutions, using volunteers/academics/researchers/students interested in the design, development, innovation and implementation of the solution.
- Pick volunteers to help: Volunteers could host equipment, or make observational reports to a central database – notion of volunteers who represent and provide information about a particular resource in a specified urban area. Volunteers are only to provide some time, host equipment and/or make some sort of brief reports.

I would like to stress at this point that I do see technology being used, especially computing and communications technologies. These technologies are already becoming more accessible and pervasive, a trend that is going to increase in the 21<sup>st</sup> century. The degree of sophistication of the technology will depend on the constraints and the creativity of those involved in making a particular solution. A solution could be as simple as an on-line “complaints and observations database” to something as sophisticated as a wireless sensor network that reports specific environmental data. Also, it is important to note that the degree and nature of involvement of citizens may vary. For instance, citizens may simply be required to make a daily observational report or may be required to host and maintain monitoring equipment.

Moreover, it is not being suggested that such citizen initiatives replace the work that governments do. Rather, the idea is to supplement and enhance the work of the government in these domains. Government agencies in developing countries are especially slow to respond and low on capacity, which may be part of the reason that citizens take such initiatives. The efforts of citizens in monitoring resources in urban areas

will assist governments in better planning and management of those resources.

Finally, for the above to work certain assumptions have been made. The first assumption is that citizens have a desire to change things for the better and that there is potential for collective action. This may require that the citizens of a particular country have a basic understanding of the problems they face and some ability for collectivized action. The second assumption is the existence of basic resources to initiate the positive change i.e. time, people, technology and access to adequate funding. The final assumption is that governments are willing to listen to their citizens and will work with rather than against the initiatives that citizens take. If a citizen initiative provides better information on a particular problem, the responsive government will take that information and use it for better planning and problem solving.

#### **An Example: The Volunteer Internet-based Environment Watch**

I feel that we have already begun to witness these technology-based citizen's responses. I initiated and was involved in one such response, called the Volunteer Internet-based Environment Watch (VIEW). This system was developed in Pakistan by a group at the Lahore University of Management Sciences (LUMS), over a year spanning 2004–2005. It was initiated by university students, professors and research associates banding together to solve a problem: lack of an air quality monitoring system in Pakistan's major cities. The idea was fairly straightforward. Plug and play environment-monitoring devices, data acquisition devices (DAD), for PCs were developed and distributed to volunteers all over the city of Lahore. Whenever a volunteer logged on to the Internet, the DAD sent air quality data associated with a particular city area to a central server for storage, collation and analysis, thus establishing a regular, city-wide database for air quality. Anyone on the Internet could access this database for an air quality analysis of his or her locality or the entire city. The idea was simple, cost-effective, voluntary and based on the interest of citizens.

#### **Conclusion**

VIEW is a case of the kind of citizen self-help that I feel will begin to manifest itself as we progress through the 21<sup>st</sup> century. VIEW looked at the issue of air quality, but there is scope for much more work. Other such efforts have also begun – NICTOR in Australia where business and government have banded together to develop a monitoring system for urban water supply or the Wireless Sensor Networks for Monitoring Water Supply Systems at MIT.

The scenarios I painted in the beginning were meant to give a feel for the range of activities that could be undertaken – as hi-tech as the (hypothetical) example of Danish in New York or as simple as Nadia in Afghanistan. As urbanization increases, especially in the developing world, citizens will band together to better understand and manage key urban resources. More and more cities across the world may begin to see such citizen efforts develop and as this "movement" grows, more citizen groups may spring up as they learn from those already involved. As mentioned already, I see this both as a prediction and as a hope – the initiatives and involvement of citizens as key stakeholders in urban resource challenges will likely be a solution for moving to more sustainable resource use in the 21<sup>st</sup> century.