

DATA AND INFORMATION MANAGEMENT: ESSENTIAL BASIS FOR SUSTAINABLE URBAN MANAGEMENT AND DEVELOPMENT

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ABSTRACT:

Management of the urban environment and urban development require well organized data and information as a basis for decision making, planning and policy development. Such data and information needs to be up-to-date, reliable and complete, and moreover be available at the time of need. The latter is especially relevant in the case of disasters such as fires, flooding, earthquakes and volcanic eruptions.

Current and future impacts of the on-going climate changes increase the need for geo-referenced data and information on environment, biodiversity and public health, in support of preparation, protection, mitigation and reconstruction.

It is important that urban authorities devote more attention and resources to data and information management in order to be able to cope with the present and future challenges of ever growing cities with increasing impacts on their surroundings, and moreover to deal with the impacts of environment and biodiversity on the cities, their population and economies.

SOD, Woerden has a long and successful track record of certified training and education in the field of data and information management for authorities, including urban government. The courses provided by SOD cover a wide range of subjects from metadata and digitizing, to enterprise content management and geo-information management. While focused on the Netherlands, SOD also has initiated similar training opportunities in Belgium and Surinam, and efforts are under way in other countries.

P. Geerders Consultancy has considerable experience as a consultant and trainer in the field of methods and technologies for the provision of information in support of decision-making, planning and policy development related to integrated management and sustainable development of natural resources. Besides in various countries of Europe, he has worked in Latin America and the Caribbean region. Since several years, P. Geerders works as a freelance teacher with SOD.

The paper presents a vision on training and education of urban authorities in information handling and management.

RÉSUMÉ:

La gestion de l'environnement urbain et le développement urbain nécessitent des données et des informations bien organisées comme base pour la prise de décisions, la planification et l'élaboration des politiques. Ces données et les informations doivent être : actualisés, fiables et complètes, et d'ailleurs être disponibles au moment du besoin. Ce dernier est particulièrement important dans le cas de catastrophes comme les incendies, inondations, tremblements de terre et éruptions volcaniques.

Les impacts actuels et futurs des changements climatiques en cours accroissent le besoin de données et des informations géo-référencées sur l'environnement, la biodiversité et la santé publique, en support de la préparation, la protection, l'atténuation et la reconstruction.

Il est important que les autorités urbaines consacrent plus d'attention et de ressources à la gestion des données et de l'information afin d'être en mesure de faire face aux défis actuels et futurs des villes en vue de l'augmentation de leurs impacts sur leur environnement, et d'ailleurs pour faire face aux impacts de l'environnement et la biodiversité sur les villes, leur population et leur économie.

SOD, Woerden a une longue expérience réussite de la formation et éducation certifiée dans le domaine de la gestion des données pour des autorités, y compris le gouvernement urbain. Les cours offerts par SOD couvrent un large panorama de sujets à partir de métadonnées et la numérisation, jusqu'à la gestion de contenu d'entreprise et la gestion de géo-information. Bien que centré sur les Pays-Bas, la SOD a également lancé des formations en Belgique et au Surinam, et des efforts similaires sont en cours dans d'autres pays.

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P. Geerders Consultancy a une expérience considérable en tant que consultant et formateur dans le domaine des méthodes et des technologies pour la provision de l'information à l'appui de la prise de décisions, la planification et l'élaboration des politiques liées à la gestion intégrée et développement durable des ressources naturelles. D'ailleurs dans les différents pays de l'Europe, il travaille en Amérique Latine et la région des Caraïbes. Depuis quelques années, P. Geerders travaille avec SOD comme formateur freelance.

Le document présente une vision sur la formation et l'éducation d'autorités urbaines dans l'organisation et la gestion de l'information.

1. INTRODUCTION

City planners and local politicians all over the world usually think and talk in terms of higher, wider, larger, and more. As a consequence, most cities in the world show a tendency to "develop", which in practise translates into "growth" of the number of inhabitants, the number of industries, the number of houses, offices, streets and other infrastructures, and of the surface area covered.

This form of city development results in an increased negative impact of cities on their surrounding environment: noise, contamination, waste, change of local climate, use of energy, loss of space for nature and loss of biodiversity. Frequently, solutions to these negative impacts are derived in an ad-hoc way and on a case by case basis. This often results in solutions that cause other problems and that are not sustainable. However, sustainable solutions require a holistic approach recognising that cities and their surrounding environment really form one system. Such a holistic approach is offered by the concept of integrated management, which takes into account all relevant aspects and interests and tries to reach a balance in which sustainability is the main criterion.

In order to be able to include all relevant aspects, integrated management of the urban environment requires well organized data and information as a basis for its decision making, planning and policy development. Such data and information needs to be up-to-date, reliable and complete, and moreover be available at the time of need. The latter is especially relevant in the case of disasters such as fires, flooding, earthquakes and volcanic eruptions.

The task of urban managers and planners is even more complicated by the possible impacts of current and future climate changes, for example droughts, increased rainfall, inundations, insect plagues and allergies. To be able to manage these impacts, as part of the whole system, geo-referenced data and information is needed on issues such as environment, biodiversity and public health. This geo-information, complementing traditional "paper-based" information, forms a valuable asset for preparation, protection, mitigation and reconstruction in relation to the impacts of climate change.

SOD, Woerden has a long and successful track record of certified training and education in the field of data and information management for authorities, including urban government but also ministries, provincial governments and water boards. The courses provided by SOD cover a wide range of subjects from metadata and digitizing, to enterprise content management and geo-information management. While focused on the Netherlands, SOD also has initiated similar training opportunities in Belgium and Surinam, and efforts are under way in other countries.

The courses are usually given at the location of SOD in Woerden, but SOD also offers options for courses by mail and online (Skype) courses.

P. Geerders Consultancy has considerable experience as a consultant and trainer in the field of methods and technologies for the provision of information in support of decision-making, planning and policy development related to integrated management and sustainable development of natural resources. Besides in various countries of Europe, he participated in projects and other activities in Latin America and the Caribbean region. Since several years, he has worked as a freelance teacher for SOD and in this capacity has developed and presented several courses relating to the management of geo and non-geo information.

Based upon their experience, the authors feel that urban authorities should devote more and specific attention and resources to the issue of data and information management within their organisations. This will prove to be a valuable investment strengthening their capabilities to cope with the present and future challenges of ever growing cities, with increasing impacts on their surroundings, and moreover to deal with the impacts of the changing environment and biodiversity on their cities, their population and their economies.

The paper will present a number of key issues related to data and information management by urban authorities.

2. APPROACH

2.1 "Know thyself"

An essential prerequisite for integrated management of the urban environment is to know the situation in detail and with a holistic perspective. Only on the basis of this knowledge, it is possible to make responsible decisions that really and definitively solve problems, do not cause problems elsewhere (not even after some time) and are sustainable. This knowledge (in the form of data and information) relates to many aspects of the urban environment, including physical, chemical, biological, social, economical, industrial, even cultural aspects.

Moreover, it is important to have access to this data and information not only about the current situation, but preferably also to historic data and information, which provides us with a possibility to detect changes and to understand processes.

On the basis of this understanding, numerical models can be developed that support integrated management by making forecasts of future changes, and assessing the impact of certain actions or measures through simulation.

2.2 Regular updating

Unfortunately still many decisions concerning urban planning and development are made on the basis of outdated information. This can result in unwanted and unexpected consequences of actions or measures. Furthermore, in many countries (including the Netherlands) local authorities can be held legally responsible for any resulting damage for the public or for companies.

It is therefore important that local authorities ensure that their information basis is well updated, which implies that the cost related to the acquisition of the data (hours, equipment, subcontracting) should be included somewhere in the yearly budget.

Another important issue in this context is the proper dating of information. It is often not easy for a user of information to identify how old or how recent the information is. For instance, many city maps do not have a date, and if they have it is usually the date of printing, which does not say anything about the antiquity of the underlying map data. The same is valid for other types of information.

2.3 Vulnerability, resilience, limits

City development usually has an impact upon the surrounding environment: fields, forests, water systems, and on the local biodiversity. Information on these forms an important basis to estimate the vulnerability of the environment and biodiversity, and to develop scenarios that minimize impact while maximising the intended goals of the development.

Information also serves to assess the resilience of the surrounding environment and biodiversity, as a basis for urban planning and development.

In this context, and to ensure sustainability on the long term, limits should be applied to the urban development, e.g. to the location and size of buildings. These limits should be based upon the above mentioned information on vulnerability and resilience.

2.4 Impacts of climate change

In the whole world, climate change already has a considerable impact upon society. These impacts include: freak weather like sudden and heavy rainfall, draughts, and tornados, changes in biodiversity, allergies and diseases, with related disasters like forest fires, floods and mud slides. The changes in weather patterns could also have special impacts on buildings, drinking water supply, drainage systems and sewage water treatment. Urban authorities need to include these aspects in their planning for the future, and well organised information on these aspects would form a valuable basis for their considerations.

2.5 Geo-information

While traditionally, information is included in documents, like books, reports, letters, etc., there is an increasing role for geo-information: information related to a specific position or region. For instance, most environmental and biodiversity information is bound to a certain place, and usually also to a certain moment of measurement or observation.

A special case of geo-information is formed by advanced observations from the air and from space. These technologies, often denoted with the generic name Remote Sensing, include a wide range of special sensing systems carried by satellites or aircraft, which allow mapping a large number of characteristics of the observed area on the ground, from heights ranging from a few kilometres (aircraft) to about 500 km (polar satellites) and even from 36.000 km (geo-stationary satellites).

In this context, there is an increasing interest for the use of small, often unmanned and remote controlled platforms for Remote Sensing from heights ranging from 500 m to about 2000 m. These platforms, usually ultra lights or RC model aircraft or helicopters, provide their users with an optimum flexibility concerning the observations: height, detail and moment in time. This can be especially important in case of disasters.

2.6 Integration of information

The users of information are generally not interested in the source of the information, as long as the information is updated, complete, reliable and available at the time of need. As the relevant information usually is acquired and managed by different organisations, this brings along the need for a careful process of integration of information. This problem was discussed in detail at a NATO Advanced Research Workshop, held in Istanbul, Turkey in 2006 (Coskun, H. Gonca et al, 2008). Special attention in this context needs to be given to the integration between geo- and non-geo information, as well as to the quality aspects of the information.

Recent experience, especially in disaster situations, learns that still much needs to be done to improve the integration of information from different sources and entities, in order to improve the value of the information for the final users.

2.7 Operational urban management

Integrated management of the urban environment should be considered an operational, permanent activity of the urban authorities, with the specific objective to support urban development with a well organized data and information base for decision making, planning and policy development. Such data and information needs to be up-to-date, reliable and complete, and moreover be readily available at the time of need. The latter is especially relevant in the case of disasters such as industrial accidents, fires, flooding, earthquakes and volcanic eruptions.

Current and future impacts of the on-going climate changes increase the need for geo-referenced data and information on issues such as environment, biodiversity and public health, in relation to preparation, protection, mitigation and reconstruction.

2.8 Training and education

Data and information management at government entities, including urban authorities, could be improved by dedicated training and education on document and information handling and management. In this context, we recommend to include subject such as: metadata management, document handling and information retrieval, records management, enterprise content management, business intelligence, databases, e-mail

management, geo-information management, data policy and data protection, and customer-oriented information provision.

3. CONCLUSIONS AND RECOMMENDATIONS

In order to strengthen the capabilities to cope with challenges of ever growing cities with increasing impacts on their surroundings, the authors feel that urban authorities should devote more attention and resources to data and information management of their organisation. Moreover, this will help them to deal with the impacts of the changing environment and biodiversity on their cities, their population and their economies.

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