

# **Systematic Land Information Management (SLIM)**

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**Key words:** GIS, public revenue collection, property taxation, concessional credit

## **SUMMARY**

Cities in the developing countries face constant problems with urban management. International financing and development agencies, like World Bank, Asian Development Bank, and UN-Habitat, have devised several programmes and initiatives to solve this problem. So far only limited success has been recorded. The need to raise sufficient financing for city administrations to function effectively is perhaps the main objective of city governance. Plans, objectives, decisions, statements etc. are all irrelevant if there is not the capability to carry them through. This capability requires a sustainable form of income.

In this paper new approaches and methods are sought for the urban problem solving. The first priority is to enable the Local Government Unit (LGU) to generate its own permanent revenue base. Only with steady and predictable annual revenue is it possible to plan actions for sustainable development. Property taxation seems to be the easiest direct revenue source for the developing cities. There are hardly any possibilities, e.g., to use income taxation.

What is needed is a system that allows city managers to identify all taxable units and determine the tax payable. This information needs to be linked to Geographical Information Systems (GIS) and an accounting system that will produce bills, monitor receipts and notify the need for action on arrears. This approach is called Systematic Land Information Management (SLIM).

Two pilot areas have been identified (Gaza City in Palestine and Kanpur City in Uttar Pradesh State in India) where the first attempts similar to this new approach have been made. The results have been quite encouraging.

One later example is briefly introduced. SLIM in the Philippines is a new project where this approach will be implemented as part of ADB financed Development of Poor Urban Communities Sector Project (DPUCSP) and Finnish Government co-financing for the SLIM.

One of the most problematic questions is the initial financing of the approach. Financing schemes where the recipient LGU will need to assume its own responsibility have been recommended. In the Philippines the Finnish Government has agreed to finance the SLIM Approach implementation through a concessional loan. This requires active and creative decision making at the municipal level, as the LGU commits itself to a long term repayment obligation for the initial investment.

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## 1. INTRODUCTION

"Recognising local authorities as our closest partners, and as essential, in the implementation of the Habitat Agenda, we must, within the legal framework of each country, promote decentralisation through democratic local authorities and work to strengthen their financial and institutional capacities in accordance with the conditions of countries, while ensuring their transparency, accountability and responsiveness to the needs of people, which are key requirements for Governments at all levels." (Istanbul Declaration: Paragraph 12, 1996)

The above paragraph from Habitat Agenda and Istanbul Declaration brings forward the key themes of this paper:

- need to promote decentralisation through bigger fiscal autonomy of Local Government Units (LGUs),
- need to strengthen the financial and institutional capacities of the LGUs through introducing new affordable tools for urban management, and
- need for transparency and good governance of the LGUs.

There is not one developing city that currently meets its financial obligations. The solution to this problem is not for central government or international assistance to provide finance, but for the cities themselves to address their financial management. The quickest way to increase the fiscal autonomy of LGUs would be to develop efficient revenue collection.

This paper introduces a new approach to revenue collection, by using systematic land information management to facilitate property tax collection. This approach is based on the pragmatic use of low cost GIS, simplified assessment methods, and computer assisted accounting. The key elements would then be:

- Digital parcel/tax unit map over the whole LGU area,
- Simplified methods for assessing property tax,
- Tailor-made billing and monitoring application,
- Design of an operational GIS application where all taxable units are identified and the billing and monitoring of the revenue collection operations are organised, and
- Well prepared capacity building programme for all players within the revenue collection organisation (LGU tax office).

The revenue collection GIS should be developed in such a way that once it can be proved that additional revenue is being collected the system can be expanded towards the "multi-user GIS" direction.

The approach presented below was developed through experiences of our planning teams in two developing cities: Gaza City in Palestine and Kanpur City in India. The SLIM Approach is already applied in Hargeisa, Somaliland, and it will be soon applied in six cities in the Philippines as part of ADB funded Development of Poor Urban Communities Sector Project

## **2. LGUS AND FISCAL AUTONOMY**

The promotion of decentralisation and thus the increased autonomy of the local government units (LGUs) have been named as one of the key objectives for urban development in the strategy papers of the international financing institutions (Asian Development Bank 2001) and international development agencies (UNCHS (Habitat), 1996, Paragraph 180 (Action)). Also prominent experts on municipal management (Bahl and Linn 1992, Dillinger 1991, Kelly 1999) have strongly called for fiscal autonomy. The autonomy of the LGUs brings forward the need to become less dependent on the central government financial support. Without a revenue source of its own the LGU lacks the necessary resources it should have to run its operations independently from the central government control.

## **3. LGUs AND PROPERTY TAX**

The need for independent financing reflects the LGU situation in urban management. No developing world LGU has enough funds to satisfy its development needs. Some even struggle to cover basic running costs, like salaries (McGill 1996). Therefore, increasing local revenues is a vital task. Virtually all countries focus attention on the property tax—the most common revenue source for local governments throughout the world (Bahl 1999). The property tax is the single most important local tax in developing countries (Bahl & Linn 1992, Bahl 1999). Internationally, over 130 countries have some form of tax on property (Eckert 1990).

The traditional theory of fiscal federalism prescribes a very limited tax base for sub-national governments. According to Bird (2004) only "good" local taxes are said to be those that

- are easy to administer locally,
- are imposed solely (or mainly) on local residents, and
- do not raise problems of "harmonisation" or "competition" between sub-national governments or between sub-national and national governments.

Dillinger (1991) argues that the property tax can be a major revenue producer, but that in practice it rarely produces significant revenue. It is also said (Bird 2004) that it is unlikely that sub-national governments in most developing countries will be able to finance any but "hard" (property-related) services out of property taxes and so the "soft" services (education, health etc.) will need to have access to some more elastic revenue sources. On top of this there have been comments on property taxation being administratively difficult and expensive, slow in process, politically unpopular, and hard to manage in high inflation conditions (Dillinger 1991, Bird 2004, Corker & Nieminen 2001, Mou 1996).

In spite of the difficulties mentioned above Bell (2000) supports property tax as being a very defensible source of local revenues. He states that a good local revenue system would generate a revenue stream that is relatively productive and stable over time, is relatively neutral with regard to its impact on private economic decisions, is simple and predictable, and is equitable. Relative to other potential sources of local tax revenues, a local property tax scores well on all of these criteria. Property tax is especially attractive when compared with other potential sources of local tax revenues. The manner in which the property tax is administered, however, greatly influences its productivity, neutrality, simplicity, and equity.

#### 4. USE OF GIS IN LGU REVENUE COLLECTION

Kelly (1999) has emphasised the importance of applicable technologies in the efforts to increase the revenues of the local government units. At the same time he also calls for proper capacity building that would enable the local offices to fully utilise digital base maps, GIS technology and general computer know-how. According to him the data-processing activities need to be properly integrated with the administrative components of property taxation.

Kelly warns against too technology driven approach where overly complex and ambitious systems might cause the system to fail completely. Ignoring the administrative components is a guarantee for computerization failure. According to him there is a tendency to use property taxation to justify tremendous investment into computerized geographic information systems, which emphasises the graphical components of digitised parcel mapping often based on a Global Positioning System (GPS). These systems are usually supply driven by the technology rather than demand driven by real needs of the property tax administration system. Expectations are usually not realised because these expensive high-technology solutions fail to consider all aspects of property taxation, especially its administration interface with tax officials and taxpayers.

Kelly's opinion is that that simple, narrowly defined systems focused on basic operations tend to do better than complex systems. The purpose of property tax information management systems must be to support the administration of property taxation. It is not to provide extensive geographic information on regional planning, urban redevelopment, transportation, the environment, or marketing information to the neglect of basic property tax administrative functions. This opinion is shared by Bernstein (1994) as well as ADB (2001) and UNCHS(Habitat) (1996) in their strategy papers.

#### 5. SYSTEMATIC LAND INFORMATION MANAGEMENT - A NEW APPROACH

Contrary to the somewhat discouraging remarks sited above it is argued (Nieminen 2002) that there is a pragmatic way to use new technologies. One should harness simple database applications (tax billing and monitoring) and Geographical Information System (GIS) tools to improve the revenue collection of the LGUs. If this is done at the same time investing in the capacity building of the LGU staff, there are fairly good chances to get tangible results. The proposed steps to proceed are as follows:

1. New set of priorities within the LGU is agreed upon. This is really a political decision. The politicians have to agree that property tax will become a major source of revenue for the city. While no tax is popular, the popularity of property tax may be increased if a direct link can be shown between tax paid and services provided.
2. The city has to start a special Revenue Enhancement Project (REP), which runs parallel with the normal daily routines of the LGU in close co-operation with the local tax department. This project needs to make a financing plan for the first 3 to 5 years, after which it is expected that the operations have been fully adopted by the local administration.
3. As part of the political priority setting an agreement has to be made that the resulting additional tax revenue will be allocated based on a pre-determined allocation plan. In

other words, an agreement has to be made on how to allocate the new revenue for the daily operations of the city, the development of individual city areas (including the informal settlements), operations and maintenance of the computer facility that will be developed during the original development phase, activities that will be benefiting from the enhanced revenue base created, staff training, and public awareness campaigning. A new concept of “participatory budgeting” that has been successfully implemented in Porto Alegre, Brazil (Vergara & Tonollier 1999), could be used in the efforts to select the priorities for the new revenue allocation.

4. The REP will make a review of the current property taxation system and determine whether this is a suitable basis for development of a new (possibly computerised) system. If it is not, then recommendations must be made for changes to the present system. Typical problems include:
  - Significant numbers of properties are not taxed because of loopholes in the current law. Can these be blocked?
  - Complex and expensive procedures make it difficult to bring new properties into the taxation network. Such are, e.g., the requirement that properties have to be registered before they can be taxed, and complex and expensive valuation methods.
  - There are no up to date maps showing the location and extent of new properties
  - There is no simple mechanism to keep the rate of tax in line with inflation
5. The REP should produce a detailed study, which will examine what is needed to establish a viable property tax system. Any viable system will have the following five main components:
  - Compliance with laws and rules
  - Information on properties to be assessed and the assessment of each property,
  - Management of information,
  - Adequate equipment, and
  - Adequate staff, including staff training.
6. The minimum information required will usually consist of a map of all taxable units, showing their location, and where possible further information required to determine the tax payable. In many developing cities the rate of growth is so high that conventional mapping techniques are unable to cope. The use of digital mapping allows the map to be updated quickly and inexpensively. It should be understood that as a priority this map will be based on the requirements of the property taxation system. At first the intention is only to create a fiscal cadastre, as the experience has shown that efforts trying to link legal cadastre and fiscal cadastre will cause unnecessary delays in the implementation of the tax collection system (Dillinger 1991).
7. Links to planning information should be developed where these can be established at little or no additional cost or effort. Although land use planning and planning of utilities are not directly linked with tax collection they can be used for future valuation of taxable units.
8. Definition of the taxable basis for properties. Many property taxation systems are based on colonial systems, often ones that have been replaced in the original colonial country. A typical problem is that colonial systems are based on the assessment of property values. Rather than use valuation, new methods of assessment and in

particular bulk assessment are being developed, which require less skills and are far quicker and less expensive.

9. Design of automatic billing and monitoring system should preferably be based on the prevailing manual billing and collection system. The monitoring application will be built to follow the results of the revenue collection. This part is essential in order to make the tax collection enforcement as transparent and efficient as possible. Training of staff on all levels of administration is essential.
10. Implementation of GIS based revenue collection system will commence once the digital map base and the automated billing databases are in place. The necessary building blocks are the map and attribute databases. The GIS system has to be able to handle all operations in revenue collection including: creating a new property unit in the system, valuation, tax bill delivery, tax collection, arrears control, and splitting and/or amalgamating two property units. It is important to accept the principle of hardware and software independent system design. This also helps to minimise the actual investment costs during the procurement phase.
11. Systematic training is essential. There needs to be training on all levels of LGU administration. The training programme needs to be agreed upon at the same time when the system design principles are fixed.

The whole development process will take from 3 to 5 years depending on the size of the LGU and the existing hardware/software configuration, computer literacy of the staff, willingness to adopt new ideas, political resistance of the local decision-makers etc.

It is only after the revenue collection has proven results, that the expansion of the GIS system should be discussed. The expansion of the GIS technology would then be financed from the additional revenues already collected. If done on the basis of agreed principles of priority setting this would minimise the need for future outside financing.

If the steps mentioned above are followed, the final outcome would be a functionally and financially operational local revenue collection system that brings additional income to the LGU instead of being a burden to the city. The whole process would ensure that the operations have been done in a transparent way. The results would be measured using a set of success indicators to verify financial viability, accountability and responsiveness to the needs of people.

## **6. EXPERIENCES FROM SLIM APPROACH – THREE CASES**

The examples shown below represent different starting situations in LGU revenue enhancement schemes in different countries. Although they provide useful information, further more extensive research is required to test the arguments put forward above and develop a universal recommendation

Both Gaza and India examples below are typical grant money projects. The threat of being discontinued after the outside support ceases is apparent. Ways to get the recipient LGU committed need to be sought. The Finnish Government supports an arrangement where a concessional credit would be offered to the recipient LGUs. This would motivate the LGU,

as there would be an obligation to treat the GIS development and mapping as an investment to enhance the LGU revenues. Only full commitment from the LGU can guarantee a success.

### **6.1 Municipal GIS (Gaza City, Palestine)**

In 1998 the Finnish Government financed the Palestine Finland Land Management Project, among other things, to assist the Palestinian Authority to register some 7,000 ha in the rural area of Gaza Strip. It was decided that rather than use conventional surveys, the boundaries would be determined using orthophotomaps. This approach proved to be quite successful.

Because of success in the use of orthophotos in the rural areas of Gaza, similar approach was also applied in the Gaza City in the World Bank funded project (1999-2001) to develop GIS for Gaza City (population 300.000 inhabitants). Orthophotos were used as an effective tool in the assessment of the properties. The assessed property information was linked with the existing GIS based tax collection system and the digital map base of the Gaza City. The local city staff was trained to use the new tools. The emphasis was in developing a system that supports the city in collection of property tax and monitoring of building permits.

The use of the comprehensive mapping and billing would be to increase the tax net from 50% of taxable properties to closer to 100%. The new system would also mean that all properties were taxed at the same level; currently there are wide variations in tax for similar properties, the only difference being the date the properties were brought into the tax system. The combined effect of increasing the tax net and using a standard level of tax would be to increase annual revenue to USD 6 million. The repayment period for the new system would be six months and thereafter the property tax system would generate approximately four times the current income. The costs of running the new system would have to include realistic allowances for replacement computers, regular mapping updates, and increased staff costs, to retain skilled workers. These costs have to be offset against the ability to raise taxes in line with inflation and the ability to tax rapid action against arrears of tax.

The present war situation in Gaza area has made it impossible to continue the work initiated during the Finnish project. It is not sure whether any of the systems developed are in place any more.

### **6.2 Revenue collection GIS (Kanpur, India)**

Kanpur City is located in the State of Uttar Pradesh, India. Total area of Kanpur is 340 sq. km, with a population of 2.8 to 3.0 million. One of the main problems of the Kanpur Nagar Nigam (KNN=City Corporation) and Kanpur Jal Sansthan (KJS=Kanpur Water Company) has been the extremely low tax revenues. A part of the Dutch Government supported Institution and Community Development Project (ICDP 1995-1998 and ICDP2 1998-2001) was to find ways of improving tax revenue.

It was decided that in order to improve revenue collection a systematic approach was needed. This included:

- Production of a new base map to identify all tax paying units (houses),
- Development of a methodology for identification of tax paying units,

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Mr. Jukka Nieminen  
SLIM

7/7

- Use of a Geographical Information System (GIS) to support property taxation,
- Reorganization of the revenue collection system (operated manually by some 120 Revenue Inspectors) to utilise the GIS, and
- Training staff in the use of the new system.

The ICDP project Phase 2 (1988-2001) was a major undertaking in the city of Kanpur. Then KNN was believed to be committed to implementing the system and continuing the computerisation of the system on its own. In 2002 there was a change in the management of Kanpur City. It appears that the development project has been discontinued after the new Director of the City Corporation started in the office.

### **6.3 Capacity Building in GIS and Tax Mapping in Local Government Units (SLIM) – Six Cities in the Philippines**

Early year 2004 the Philippines Government and Asian Development Bank started a development project called **Development of Poor Urban Communities Sector Project (DPUCSP)**. Already during early phases of the DPUCSP preparation (in 2001) the Government of Finland was invited to fund one part of the DPUCSP project through a concessional credit scheme. This marked the beginning of the preparations for the **Capacity Building in GIS and Tax Mapping in Local Government Units (SLIM) project**.

SLIM is a new approach to generate revenues to Local Government Units (LGUs) in the Philippines. Modern Geographical Information System (GIS) tools are used to enable the LGUs to identify the taxable real property units. SLIM has a well developed monitoring system to assist the LGUs in tax and business license collection. Six LGUs in different parts of the country will initially participate in the project (Baguio, Angeles City, Bacolod, Iloilo, Cagayan de Oro, and Iligan). Existing tax collection procedures will be linked to SLIM.

SLIM also contributes to poverty mapping and GIS tools development for strategic planning of the LGUs. It fully supports the ideas of the recently appointed economic adviser to the Philippines Government Dr. Hernando De Soto (1989, 2000) through giving the required tools to collect base map information for the identification and registration of the titles for the urban poor. Thus the development of SLIM component of DPUCSP fully contributes to the main objectives of the President's new 10-point Agenda that was announced in July 2004.

The project duration would be four years during which the following results would be reached:

- each LGU will get their staff trained to use the application
- each LGU will get an accurate digital property tax unit map of its entire area
- each LGU will get computer hardware and software to run the application
- each LGU would get a transparent and efficiently running tax collection department
- tax payers would get a transparent and fair treatment as all units can be identified
- the generated additional funds would be allocated to such activities that the LGU council deems important (e.g. poor urban community upgrading in accordance with DPUCSP).

A feasibility study of the project was completed in December 2003. The Ministry of Foreign Affairs of Finland carried out an independent appraisal of the project in March 2004 to verify

Mr. Jukka Nieminen  
SLIM

8/8

the compliance of the project with the principles of the Finnish development cooperation as well as the commitment of the Government of the Philippines and the suitability of the project to the Local Government Units.

The evaluation resulted to a favourable recommendation, which led the Ministry for Foreign Affairs of Finland to take a positive stand on issuing an interest subsidy to the concessional credit for the proposed project. This decision was forwarded to the OECD consideration on 8 June, 2004 and on 22 July, 2004 it got a no-objection status for implementation. The final decisions on issuing the interest subsidy and the guarantee for the credit can be taken when the Government of the Philippines has completed the internal arrangements required by the Philippines regulations and informed its readiness to enter into final agreement with the Finnish consultant.

The total duration of SLIM Project is four years followed by 12.5 years of payback of the loan. As there would be a grace period of four years after the completion of the project it is envisaged that the LGUs have plenty of time to recover the credit even before the first instalment is due. With as small increase as 20 % in tax collection starting from year 4 the cumulative real property tax collection would exceed cumulative debt servicing by year 11. If the system is in place by the end of year two the break-even time would be already between years 5 and 6, i.e. during the four year grace period.

The fiscal crisis in the Philippines has slowed down the final steps of the project preparations. The modalities are now discussed between the Government of Finland and the Department of Finance and Department of Interior and Local Government of the Philippines.

## **7. CONCLUSIONS**

Use of modern technologies in the Local Government Unit (LGU) revenue collection can be a good investment. To be successful the use of GIS and mapping has to be closely focussed, and its introduction very carefully planned and implemented. One of the great advantages of property tax is that there can be a very close relationship between tax paid and services provided. No tax will ever be popular, but providing direct linkage to services should improve acceptability. By improving the income stream for developing cities is believed to be a major contribution to improving urban management in the developing world, including:

- the need to promote decentralisation through bigger fiscal autonomy of LGUs,
- the need to strengthen the financial and institutional capacities of the LGUs, and
- the need for transparency and good governance of the LGUs.

Through the use of a concessional credit scheme the recipient LGUs will have an opportunity to get a fully functional GIS platform for property tax collection and demonstrated revenue enhancement results before the actual payback has even started. At the same time the donor's wish to get a full LGU commitment for the actions required will be satisfied.

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Mr. Jukka Nieminen  
SLIM

10/10

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## BIOGRAPHICAL NOTES

Jukka Nieminen is a GIS specialist and urban & regional planner with 30 years experience in urban and regional development in Europe, Africa, Asia and the Middle East.

He initially worked with urban and regional planning in Finland (1973-82) where he took interest in the use of microcomputers in physical planning activities. He then moved to Saudi Arabia (1982-85) to do regional planning and to develop microcomputer based applications for the Al Baha Principal Emirate and the Ministry of Municipal and Rural Affairs (Riyadh).

In 1988 Mr. Nieminen joined the UNCHS (Habitat) as Special Adviser in Data Management. In this capacity he was responsible for data advisory activities and development of microcomputer based applications for the human settlements till the end of 1995.

In 1996 Mr Nieminen joined a private Finnish consulting company where he is in charge of international GIS activities, disaster management, and R&D on GIS applications in the developing countries. The development of SLIM and FAST MAP approaches have been an integral part of his responsibilities.

October 2002 to September 2003 Mr. Nieminen worked for UN-HABITAT in Libya as Senior Planner – GIS Coordinator during the initial phases of the development of GIS framework for the Urban Planning Agency of the Libyan Government.

As of October 2003 Mr. Nieminen has prepared and negotiated for a SLIM project to six cities in the Philippines as a Finnish parallel financed part of ADB “Development of Poor Urban Communities Sector Project” (DPUCSP). This project will be financed through a Finnish Government Concessional Credit. He is also negotiating and preparing a Finnish Concessional Credit project for the GIS Development of Guiyang City, Peoples Republic of China. Both of these concessional credits have been approved by the Finnish authorities and the OECD in June-July 2004.

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