Perspectives on Municipal Revenue Generation and Cadastral Mapping in Bolivia

for

Democracy Decentralization and Citizen Participation III – United States Agency for International Development (USAID).

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KEY RECOMMENDATIONS

Keep it simple. The design of a technical assistance program to assist municipalities to implement and operationalize cadastres must keep the principal goal in mind at all times --- to develop fiscal cadastres that directly contribute to an immediate increase in property tax revenues. The Bolivian municipal landscape is littered with many costly cadastral projects that have never been implemented.

Initially, DDCP III should select a small set of municipalities (two or three) to assist with increasing property tax revenues. These should be municipalities that score high, 3 or above on the ICMA's "Index of Municipal Development". Once a successful model has been developed for these municipalities, then it can be adapted to municipalities with less experience and capacity. These municipalities should at least have some experience in the collection of the IPBI and demonstrate that they have the political will to actually implement an improved system for the collection of the IPBI. It is essential that the municipalities selected for technical assistance be willing to engage in a serious and prolonged public campaign to educate the municipal population about the benefits of an improved cadastre and to garner their support for its implementation. Ultimately the success of the cadastre projects will hinge on public support as well as the support of political leaders.

The efforts of the DDCP III in increasing local property tax revenues should be framed with the existing system of "Auto-Avaluo" as prescribed in Ley 843 (Ley de Municipalidades). The project should not attempt to develop full-fledged "urban cadastres" as specified in Ley 843 as the other option for property tax collection and regulated in the ***Reglamento Nacional de Catastro Urbano***. These efforts have failed repeatedly in the country.

It is probably best to avoid the use of term "cadastre" – its use will suggest that what is being created is an urban cadastre satisfying the regulations of the ***Reglamento Nacional***

de Catastro Urbano. Use a term that is descriptive and accurate, but that will not confuse the issue – ie. a "geographic property inventory".

Technical assistance to municipalities must be pragmatic. There is no shortage of capable technicians, consulting firms, and even NGOs with knowledge of cadastral mapping in Bolivia, but many do not seem to be pragmatic and often lose sight of the goal of their efforts. It is imperative to use practical, down-to-earth NGOs or university organizations, with field experience in developing urban cadastres to provide the technical assistance to municipalities who wish to implement the cadastre.

The GIS and database software utilized must be low cost and robust. Software programs with annual licensing fees should be avoided.

Perspectivas sobre la Generacion de Ingresos Municipales y Sistemas Catastrales Municipales en Bolivia

por Robert B. Kent

Recomendaciones Claves

Que sea sencillo. El diseño de un programa de ayuda técnica para la implementación y operación de los catastros se debe tener en mente en todo momento la meta principal -- que para desarrollar catastros fiscales que directamente contribuyen a un crecimiento inmediato en los ingresos municipales por la cobranza del Impuesto Predial de Bienes y Inmuebles (IPBI). El panorama municipal de Bolivia esta lleno de proyectos catastrales costosos que nunca fueron implementados.

Inicialmente el DDCP II debe seleccionar un pequeño grupo de municipalidades (2 ó 3) para ayudarles aumentar los ingresos de la IPBI y la tasa municipal sobre las transferencias de inmuebles. Las municipalidades seleccionadas deben tener un 'puntaje' alto, tres o mas en el "Indice de Desarrollo Municipal" del ICMA. Una vez que un modelo exitoso haya sido desarrollado para estas municipalidades, entonces puede ser adaptada a municipalidades con menos experiencia y capacidad. Por lo menos estas municipalidades también deben tener alguna experiencia con la colección del IPBI. Es esencial que las municipalidades seleccionadas para asistencia técnica estén dispuestas de abarcar en una campaña pública para educar el público sobre los beneficios del catastro y ganar su apoyo. Final de cuentas el éxito del programa de catastro depende en el apoyo de la población y los lideres políticos.

Los esfuerzos del DDCP III en aumentar la cobranza del IPBI deben ser enmarcados en el sistema actual de "Auto-Avaluo" como a sido prescrito en la Ley 843 (Ley de Municipalidades). El proyecto no debe intentar desarrollar "catastros urbanos" como son especificados en la Ley 843 como la otra opción para la cobranza del IPBI y normado en el ***Reglamento Nacional de Catastro Urbano***. Los esfuerzos para desarrollar estos "catastros urbanos" han fracasado repetidamente en el país.

Probablemente es mejor evitar el uso del término "catastro" – su uso puede sugerir que, lo que ha sido creado es un catastro urbano que satisface las reglas del ***Reglamento Nacional de Catastro Urbano***. Se debe usar un término que es descriptivo y preciso pero que no va causar confusión en el asunto- p.e. puede ser un "inventario de propiedad geografica".

La ayuda técnica a las municipalidades debe ser pragmatica. Hay un buen numero de técnicos hábiles en el trabajo técnico de crear sistemas catastrales y además hay varios grupos o empresas de consultaría y aun ONGs con conocimiento y experiencia en el mapeo catastral en Bolivia. Lamentablemente, muchas veces su trabajo ha quedado incompleto porque las instancias políticas a nivel municipal no ha podido poner las en marcha. En otras instancias, parece que los técnicos y los políticos no ha sido

pragmáticos, no ha mantenido en mente la meta principal – crear un catastro fiscal. Es imperativo que el DDCP III trabaje con ONGs u organizaciones universitarias con una visión muy práctico y además experiencia en el campo del desarrollo del catastro municipal urbano quienes puedan proveer la asistencia técnica necesaria a las municipalidades que quieran implementar el catastro.

Los sistemas de SIG y el software de la base de datos y cobranzas utilizado deben ser de bajo costo, eficiente, y sencillo en su operación. Se deben evitarse por completo los programas de SIG y los de base de datos "software" que requieren la renovación de licencias de uso anuales.

TECHNICAL ASSISTANCE CONTEXT

A key objective of DDCP III is to assist local governments increase local revenue generation. One of the principal ways this can be done is by making the application of existing taxes more efficient. Working within the existing framework reduces potential problems and does not necessitate any changes of national law or policy that can delay implementation of any program significantly as changes are debated and eventually legislated.

CADASTERS IN BOLIVIA: ISSUES AND CONCERNS

The cadastre must be simple. Only information that can be directly utilized to achieve the project's goals should be included in the cadastre's database. The goal is to increase tax revenues --- hence this would be a fiscal cadastre – not a cadastre to resolve legal problems or register land. Nor is the intended purpose of the cadastre to be a planning instrument. Essentially only that information as specified for the application of the Impuesto a la Propiedad de Bienes Inmuebles (IPBI) would be collected for these cadastres.

The cadastral methodology should be simple enough that for a municipality with say 1,000 to 2,000 properties it could be managed on paper. Computer technology is nice … but should not be a pre-requisite for the implementation of these fiscal cadastres.

The individual municipal projects must be designed to allow the cadastral information generated in the fieldwork to be applied to the administration of the IPBI very quickly. There simply cannot be significant lag times between the collection of the data and its use to improve tax revenues. Time is very short.

The "cadastral program" for which the DDCP III provides technical assistance should not be a cadastre as officially recognized in Bolivia. Rather it will be a "geographic property inventory" that will be linked to the system of taxpayer (self) valuation of property and the payment of the IPBI.

Let me explain. Current Bolivian law (Ley 843 – 1986) allows that the IPBI can be collected in two ways. First, the tax can be collected by the application of a system of taxpayer (self) valuation (auto-avaluo) of real property. The self-valuation system depends on the use of a fairly straightforward formula to establish property values. Theoretically, there should be one in place for every municipality that currently collects the IPBI.

Secondly, the law permits municipalities to create urban property cadastres and local valuation systems to establish the value of real property. This, however, is a major

undertaking. The cadastral system must be developed according to a set of norms laid out in the Reglamento Nacional de Catastro Urbano (1991) and approved by the Instituto Nacional de Catastro (INC). A myriad of requirements are imposed under these rules – including, for instance, a tie-in to the national geodesic network, the inclusion of the entire urban area, resolution of problems of "in-held" lots (those without street access), and many others. As a practical matter only a handful of municipalities ever succeeded in meeting these requirements and getting their cadastres approved by the INC and subsequently by the Ministerio de Hacienda (at the moment the only ones seem to be Cochabamba and Quillacolla – and apparently neither has ever put the into practice as fiscal instruments).

However, at the end of March 2004 the INC was dissolved and no new agency or office has been established to take over its functions. Hence, as a practical matter no "official" urban cadastres will be approved until some future date when the legal framework is adjusted to replace the INC's role of review and approval of urban cadastres.

Even in those few municipalities that did receive official approval of their cadastral systems, sailing has not necessarily been smooth and the official urban cadastres have not been able to be applied. Why? Well, the political ramifications could be more than problematic. Take the case of the metropolitan municipality of Quillacolla (Cbba.) whose cadastre was approved by the INC after considerable review and subsequent iterations. An analysis of the new valorization rates that would be applied to real property showed that tax assessments would rise about 400 percent. Because this would be so politically unpalatable, the municipality appealed to the Ministerio of Hacienda asking that it allow them to phase in the increases over 5 to 10 years. The Ministerio refused. Bottom line … the municipality balked and the increased valorizations have not been applied and the cadastre has not yet been utilized as the fiscal cadastre it was intended to be. Apparently the municipality continues to use the taxpayer valuation system (auto-avaluo).

APPROACHES TO THE DELIVERY OF A TECHNICAL ASSISTANCE PROGRAM TO MUNICIPALITIES

As a practical matter, it seems there is really only one alternative – develop a program that dovetails with the current taxpayer self-valuation system. This approach would address two key problems faced by municipal authorities in administering and collecting the IPBI – 1) tax evaders who fail to declare property and pay taxes on it and 2) tax "cheats" who do declare their property and pay some taxes on it, but under report its value.

How would the cadastre be created? Assuming that the municipality had none in place, it seems there are two approaches that might be practical. The first would be to approach the problem using traditional surveying methods. Teams of topographers could survey the urban area down to the block level. These surveys would include streets,

sidewalks, and the property line of each block where it meets the sidewalk. Modern surveying equipment would allow the automatic entry of these survey data into a geographic information database (GIS).

Subsequently, teams of assistants (these would likely be engineering students working on the project through some kind of convenio) would visit each surveyed block with tape measures and survey sheets and to catalog each property. They would attempt to visit each property (and enter it) in order to measure the land area of each property and determine the building area. They would also collect the basic descriptive data on each property as required to assess the IPBI (construction materials, service provision, street type, etc.). No data beyond that required to identify the property and to generate a taxpayer self-valuation form would be collected. Efforts to add more information should be strongly opposed – in almost all cases such information, while "nice" will not help generate more local revenue. Rather it will take more time to collect, catalog, and store for some future unspecified use.

Subsequently the property valuation data will be loaded into a database that would be used to generate the auto-avaluo property tax declarations. Instead of following the standard practice where the property owner fills out the form and then signs it, this system would have the form created by the municipality and presented to the taxpayer. The taxpayer would then be asked to sign the form. The signed form would serve as the legal auto-avaluo statement. If a taxpayer objects to the data presented on the form, then the municipality could revisit the property for a re-evaluation. However, it would be important to make it clear to the property owner that while it is possible that the municipality made a mistake which over rated the property value, it just as well might have made a mistake and undervalued the property. If that were the case then the valuation of the property could actually increase.

A second approach would use a combination of aerial and traditional survey methods as well as "head's-up digitizing". Aerial survey costs have dropped considerably in recent years. For instance, the Servicio Nacional de Aerofotogrametria (SNC) can currently produce air photos at a scale of 1:10,000 in both paper and digital versions that can be used to produce cartography at 1:1000. An area of 4,000 ha. in Cochabamba was recently flown at a scale of 1:10,000 at a total cost of $7,000.

One method would be for aerial photography at 1:10,000 to be flown of the municipality by the SNC. At the same time, the topographic crews survey the town's streets, but only create a centerline grid for the street network. This grid is entered into a GIS system. Subsequently, the digital aerial photos can be superimposed over the centerline grid. Using "heads-up" digitizing, operators can "fit" the aerial image of the block to the centerline grid and then draw in (eye-ball) the curb lines, sidewalk-property line boundaries, apparent property lines, and edified areas of the each property. This approach obviates the need for survey teams to visit each property and measure property lines and constructed areas. Some field checking of boundaries will surely be necessary in some cases where building overhangs and vegetation may obscure the image in the

aerial photos. In any case, descriptive property information consistent with that required on the taxpayer self-valuation system will need to be collected by survey parties.

At the Universidad Mayor de San Simon, CLAS personnel suggested another approach. They noted that satellite imagery with satisfactory resolution (1 X 1 m2) can now be purchased very economically. IKONOS imagery is currently available from Space Imaging Corporation. The cost of this imagery is $27 for km2, with a minimum purchase of 100 km2, that is $2,700. CLAS has the capacity to take the basic IKONOS imagery and rectify it so that it would be suitable for use in a municipal cadastre for perhaps another $4,000. Using the rectified satellite imagery the basic urban cartography as well as individual property parcels as well as building "footprints" could be digitized. CLAS personnel suggested that this approach could greatly reduce the cost per property parcel for a cadastre. For example, they noted that the unitary cost for each property parcel in the cadastre they completed of Colcapirhua was about $19, but that utilizing this approach, individual parcel costs, including the fiscal field survey, might be driven down by as much as one-half to two-thirds.

SOFTWARE ISSUES

A key consideration is whether geographic information systems software can be obtained that is both robust and of low cost. Many commercially available systems are quite expensive. AutoCAD 2005 costs $3,470 and ArcView apparently runs about $4,000 with a $2,000 per year license maintenance fee. An extremely attractive option might be ILWIS 3.2 developed and distributed by the ITC in the Netherlands. CLAS at the Universidad Mayor de San Simon in Cochabamba has utilized the ILWIS software for the cadastre of Colcapirhua. They report using two software systems – one based on ILWIS to keep track of the geographic information and then a second, articulated, system to maintain the database on property characteristics and tax information. Documentation from the ITC website states that effective January 2004, a permanent license of this software is now available for E 100 (currently about $125).

Others, notably CEDESCO personnel, who have implemented cadastres in several small municipalities in the Chapare (Chimore, Shinhota, etc.), suggest that in actuality the ILWIS software is problematic because it must be programmed in order to make it useful for the specific task at hand and that it is better to use commercially available mainstream systems like Arc/View. Conversations with CLAS personnel however suggest that they have made the necessary modification in the ILWIS system to make it suitable for the reality of small to intermediate municipalities in Bolivia.

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INTERVIEW NOTES

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23 March 2004

Proyecto Integral de Desarrollo Municipal de Batallas – Corporacion Andina de Fomento

Sistema de Catastro Nucleo Urbano Batallas Karhuisa (BID)

We traveled to the municipality of Batallas – about 75 km from La Paz. The town has perhaps 2000 to 3000 residents. It is the municipal capital with various districts – total population of around 18,000.

Guillermo Marin and I traveled with Lic. Fernando Perez Gonzales. Perez was a key person in the implementation of the cadastral system that was set up there. Work began in something like October 2001 and was finished by January 2002. However, to date the system has not been operationalized. A copy of the CD is copied onto my machine here.

Apparently there were about 1200 properties in the town. The land survey and cadastral data gathering work was by four encuestadores who did the detailed work recording the characteristics of each property as well as measuring the actual size of the buildings and one surveyor who did the basic survey work down to the street level. On average each encuestador (they worked alone) could do about 6 properties per day. The most that could be done was 10 … but that Perez, an extremely knowledgeable and experienced person in cadastres, only attained level. So for most folks, say 5 to 6 properties per day.

They established four "geo-economic zones" in the city to set the rates for the neighborhood factor. (the Instituto Nacional de Catastro told them there should only be 2 in a town of that size – they demurred and set up 4!).

This project was financed with funds from the BID. The funds were originally to be spent in El Alto (and these folks did do a project in El Alto – Distrito 6) but political issues kept them from continuing there. So Batallas was selected – a small rural town. The total cost of BID funds was approximately $20,000. The municipality purchased a computer and printer – perhaps spending $1000 and also hired a cadastral technician

from its funds as a permanent contribution. That individual was not at the office today when we visited … and didn't show up during the nearly three hours we were there.

The project has been essentially finished for over two years … but it has not been implemented. Why is a good question. We got no satisfactory answer to that question when we were there – although we did not push it. After the visit, and back at the office, Guillermo had a few ideas – perhaps it was observations from the Instituto Nacional de Catastro to which the finished "system" was sent … and these kept the municipal government from moving forward. Perhaps the political will to implement the system evaporated after it was finished … Perez said he believed that the system would be in "action" by August 2004 when it was time to pay property taxes again.

Currently, Perez said that the municipality collects about $2000 per year in property taxes. Apparently, he or the municipality did a calculation that suggested that the implementation of the cadastre right now would bring in $50,000 per year. Sounds good … no idea of how realistic those figures are … and perhaps that is why it hasn't been implemented! Almost no one is paying what they should!

The idea is to produce the bills (that is do away with the auto-avaluo essentially) for each property with the basic property info and characteristics … and then deliver them to the property owners. This is the same approach that was used in Cajamarca and Huancayo when we did the Proderin cadastres 15 years ago … we just ignored the law in a way! Perhaps owners had to sign the form to indicate their agreement or some thing like that.

Perez said that the catastro can produce revenue in other ways too … notably the need of property owners, at some time, to "regularize" (legalize?) their property. One needs an official plan of the property to do this … and the municipality can produce these. If you want to borrow money or sell your property, you must have this.

He talked about the implementation of a cadastral office in the municipality. His vision is that there would be five employees or so in such a unit. These would be a boss, a junior boss, and three or four support personnel. When questioned that this seemed a lot, he didn't seem to think so, noting that the municipality has some 50 to 60 employees (this seems like a lot if it is true). Talking with Guillermo afterward it seemed to us that two people would be more than adequate to maintain this system once it was set up – a staff-support person and a technical/professional person.

Geodesic control points – the IGM will place these for $400 each – if you want to tie your system into the national geodesic network.

One innovative element of the geo-economic zones is that they do not use street center lines to establish these, rather a more realistic approach which looks at property frontage and can place divisions in the middle of blocks.

Another issue – commercial property – how is that dealt with? My sense is that it is not included in the property tax since they pay other taxes. This part of the picture is not clear to me.

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24 March 2004

Instituto Nacional de Catastro – INC

Interview with Arq. Alberto W. Candia Gonzales – Director Ejecutivo and Arq. Nancy Cruz Barrientos – Jefe de Area Tecnica

Guillermo Marin, who arranged the interviews, accompanied me.

The institute was founded in 1998 – it has had four executive directors in that time period. Its functions have been to train, provide normative direction, and to supervise urban cadastres in Bolivia. (cadastral norms are laid out in the **"Reglamento Nacional de Catastro Urbano"** 1991 – Ministerio de Asuntos Urbanos, Direccion Nacional de Catastro Urbano). Its director believes it has been successful in these areas, but has not been successful in actually executing cadastres (a charge also under its list of responsibilities).

Effective 31 March 2004 the INC ceases to exist as an official government agency. Decreto Ley 2627 of 30 December 2003 mandates this end (severe budgetary constraints forced the government's hand and other agencies are also being closed. It is being dissolved. No new agency or existing office is currently slated to take over its functions. In the absence of any further direction (which has apparently not been forthcoming from the ministerial level to which the INC reports) all of the agencies equipment and records will be handed over to the Servicio Nacional de Patrimonio del Estado.

Ley 843 de Reforma Tributaria de 20 de mayo de 1986 provided for the implementation of municipal cadastres which could be used to assist in the levying of property taxes. The new law provided for the replacement of the existing self-evaluation (auto-avaluo) system with an evaluation system administered by the municipality. In the absence of a municipal fiscal cadastre the old auto-avaluo system remains in effect.

BID Project 1075 – para catastro urbano $4.3 million are to be spent. This is under the umbrella of the Unidad de Descentralizacion Fiscal – Ministerio de Hacienda.

Major cities. Of the nine department capitals in the country, the director estimates that approximately 65 percent of the urban population is included in the cadastre. In 1998 the INC approved Cochabamba's cadastre, however the city did not include the property valorization component. It is not clear to me from the notes I have if the city now uses the fiscal cadastre to charge property taxes. La Paz comes close to establishing property valorization rates that are close to the real situation. Hence taxable base is higher in La

Paz on average … and more money is earned for the city … it also has a high number of "reclamos" on property valorization.

They noted that the INC had recently approved the cadastre for Quillacolla (CCBB). And they believed it had been done by the Universidad San Simon of Cochabamba. Over all it was a pretty good job they said, but noted that there had been several iterations back and forth between the INC and the municipality in getting the final product "right". However once the cadastre was finished (with the new evaluation rates etc) it was determined that for most taxpayers the replacement of the current auto-avaluo system would mean tax rate increases up to 400 percent. That is too hot of a potato for any politician to touch … so, so far the municipality has not implemented the cadastre. The INC (with the support of the municipality) appealed to the Ministerio of Hacienda asking that the increases be stepped so that it would take several (five to ten years) before the full effect of the new valuations would be felt. Hacienda refused to consider the request.

Stagnated cadastral projects – Tarija – the "levantamiento" was bad. Egregious errors in their plans forced INC to disapprove the cadastre. Sucre also stalled or not implemented – still done on the old paper registers. They didn't say, or I didn't catch, what the problem is in Sucre.

Colcapirwa (Cbba) – is an example of a successful cadastre? Not sure here … it was mentioned.

Others that have done cadastres – San Ramon and San Julian in Santa Cruz. I believe that the San Ramon cadastre was not approved by INC because its cadastre was done on a "plan regulador" – and lacked the planimetric accuracy and detail necessary for it to be approved by INC. Totora (Cbba) did a catastro of "historic patrimony" or something – but without normas and so that cadastre was also disapproved (but apparently it was not a fiscal cadastre). Cobija – did a cadastre too, but had only one page of normas/reglamento – from the tone of the discussion, it seems it was not approved either.

The case of Batallas – they said there were many problems. These included – 1) no link to the national geodesic network, 2) enclosed lots with no street access, 3) no methodology for the establishment of the property valorization scheme, 4) the inclusion of rural areas within the urban cadastre's area, and 5) not following the normative scheme for identifying property areas – the second tier areas should be called "distritos" but these folks called them "unidades vecinales". There may have been more …

Also noted that all the work done in Batallas cost upwards of $400,000!!!! Wow.

Santa Cruz was noted. A different case – they requested not to do a cadastre, but to capture those who were not paying ("recuperacion de mora). Noted that of about 200,000 lots in Santa Cruz, only about 60 percent pay. They want these to pay. As I recall there was also some discussion about re-doing their valorization table … but I am not clear on this.

Approved cadastres. Noted that at the end of 2003 … they sent a list of approved cadastres to the Ministerio de Hacienda (? – I think) to be legally approved so that the municipalities could use their cadastres to charge taxes. The list has been published int La Gaceta del Estado – they suggested looking back about one month to find the legal publication and list of names.

The name of the Department of Geography at the University of Dusseldorf came up again. Apparently they have developed a GIS system for use by small municipalities – this bears investigating.

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25 March 2004

Municipio de La Paz – Oficina de Catastro –

Accompanied by Guillermo Marin – we visited the Director de Informacion Territorial – with Arq. C. Rodolfo Mercado Mercado. We also chatted briefly with Arq. Msc. Jorge Valenzuela V. Oficial Mayor de Gestion Territorial.

Re: cadastre – there are 93,000 predios now registered in their system. They have been working progressively to increase this with aerial photos (now rectified) flown over the city some years ago. This is a slow process but progress is being made. Large areas of the city lie outside the area covered by the aerial photographs and if land owners want to include their property in the cadastre then they must pay for a levantamiento topografico and other requirements and present these to the municipio to get the property registered. This costs each owner about BS 415, while it only costs about BS 160 to do it for those that are within the aerial photo area. The whole universe of predios in La Paz is calculated at about 206,541 predios … finishing this will be slow going.

Another piece of related information – the PMC (Patron Municipal de Contribuyentes) has about 191,000 people registered (this is completely independent of the cadastral registry).

La Paz's cadastre has not been approved by the INC. One reason for this is that it only covers part of the city. So it still operates with a modified auto-avaluo system. I never quite got it clear how the payment of the impuesto de bienes y inmuebles differs between the two groups of folks – those in the cadastral system and thos outside it.

The cadastral system that they use here in the municipio is actually two systems – it is an alfa-numeric registry system he said with two articulated but not integrated systems. The cartography is carried in Auto-Cad, which the property data is carried by a separate system (SIFCA – Sistema de Informacion Fiscal Catastral Automatico) developed or adapted to the La Paz situation by an consulting company some time ago. Apparently they own this system and can go in and change the command codes if they need to.

For the 93,000 properties in the system, the municipality can provide "Certificado Catastral". As noted in other interviews these certificates are not exactly titles, but they are close to it and essential if one wants to get a bank loan, sell your property, etc. These take about one month to provide to property owners. Total fees for this are BS 100. In bad times it took as long as 3 months to produce these documents. Now it is possible for the property owner to track the progress of their request via the WEB – cool!

SIMAT – Sistema Municipal de Administracion Tributaria

Big issues now for the Cadastral Office –

Privatization of the cadastral office – this is being pushed by the current director and the mayor. A proposal has been put forward to do this. A private firm would be given the concession of running the cadastre – the concession would be 10 years. The firm would need to invest in more aerial photographs of the city as well as equipment etc. This figure was unclear, but it seemed that $7 to 8 million would have to be invested to get this off the ground. Two reasons are used to justify this semi-privatization – to get the entire metro area included in the cadastre (the city does not have the funds to do this) and to increase revenues. The director estimated that the current take of BS 140,000,000 could be increase upwards of 70 percent to about BS 200,000,000. The company would have an incentive as well to see this happen because it would receive some percentage of the revenue increase from their management of the system. They have put out a pre-bidding call for interest in such a thing to firms and got a pretty good response the director said. This could take up to two years to get this all settled.

In the meantime, the other current push was to try to extend the automated system – they need to work with GIS. But I wonder, why bother if they are going to contract out the operation. Why not just wait?

He then handed us off to Moises (the head of the cadastral data section) who walked us (me really – Marin had been director of this unit for two years – 2000-2002) through the process of creating the "Certificado Catastral". The operation seemed pretty efficient – Guillermo commented after we left that in his opinion this was the best-operated cadastral office in the country.

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26 March 2004

Servicio Nacional de Aerofotogrametria (SNA) – interview with Col. Vito H.Ledezma Miranda, Gerente General. Guillermo Marin and an officer also met with us.

The colonel noted that SNA had considerable experience in the area of urban cadastres –

1989 – El Alto

1992 – Cochabamba (air photos, restitution, and hard copy maps). He claimed that Cochabamba's cadastre is the only cadastre "to date" officially approved by the INC.

Sucre – they did the air photos and restitution. Cost about $100,000. 40,000 predios. Program has not been implemented … problems with not having capable people in the municipality.

Colcapirhua – 1998 – they only did the air photos, then delivered them to the Proyecto CLAS which then did the rectification of the photos and produced the cartography

Quillacolla – 2003 – SNA did the aerial photography, 5,000 ha., while the company GeoImpro (?) did the restitution

They did other flights for: Oruro, Tarija, Santa Cruz, Sacaba, and Punata (CIDINCU)

The colonel noted that there were economies of scale if one bundled several municipalities together – for example – they are doing the BID project for the six largest cities in Bolivia – to do all six as a package, they charge $400,000. However, if only La Paz were bid by itself (and it is part of the six) it would cost $200,000.

Today they can take aerial photography at 1:8,000 or 1:10,000 to get maps at 1:1,000.

Costs have come down dramatically in the last few years according to the colonel – they have just flown 4,000 ha. in Cochabamba (1:10,000) for a total cost of $7,000 for the aerial photos. Quillacolla, flown at 1:5,000 and 5,000 ha cost $20,000. The restitution for Quillacolla, according to what he knew, cost around $100,000.

Time – it takes a while to do things – he said doing the cartography on the 4,000 ha would take about 3 months.

Quillacolla is apparently using ArcView – initial licensing fee -- $4,000 with $2,000 per year annual fee.

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29 March 2004

Centro de Levantamientos Aeroespaciales y Aplicaciones SIG (CLAS). Universidad Mayor San Simon, Cochabamba, Bolivia. Guillermo Marin and I with Enrique Fernandez S., Director, and Holger Utermohlen, Responsible de Proyectos.

This is an impressive operation. The center focuses on extension work utilizing geo-techniques (cartography, remote sensing, and geographic information systems) for natural resource management and other applications (including urban cadastres).

Our discussion focused principally on the cadastre of Colcapirhua, Cochabamba which they have recently finished. They noted some of the successes of the cadastre project in that municipality. Principally the fact that before the cadastre was completed, the municipality only had about 8,000 parcels identified, but that after the cadastre this increased nearly 50 percent to about 12,000.

They undertook the project utilizing the aerial photography flown by the SNC. As I recall this was flown at 1:10,000. The imagery was expensive, costing about $40,000. CLAS then did the rectification of the imagery and linked it to the national geodesic network. This was time-consuming and costly. At the end of the day, they said per parcel cost of this work ran about $19 per parcel. Total project cost ran about $250,000!

They noted they had many difficulties working with the municipality. The municipality added many additional variables to the cadastre data collected by the project. They seemed to feel that many of these variables were unnecessary and only served to drive up project costs without really advancing the goals of the project – improving tax collections. They noted for example that the municipality has just asked them to add in 20 cm interval contour lines so the project can also be used to plan a sewer system for the municipality.

Software. They have modified ILWIS software to serve as the basic GIS for this project. They claimed to have modified it in a manner so that it is suitable, indeed more than suitable, for the realities of the medium sized Bolivian municipality. The system is not a fully integrated property cadastre, that is, as I understand it, the geographic data is carried on the ILWIS system and then articulated via parcel codes to the property tax database that then can be used to generate tax forms and bills.

Key problems. The municipality has not implemented the improved property tax system yet. It was not abundantly clear why this has not yet happened. The implication from the discussion was that the new system would cause property tax rates to rise dramatically and that there was not the political will to do so. It was not also clear if the system had received approved by the INC, but based on the previous conversations with INC personnel, it had not. Political will seemed to be the principal stumbling block to the implementation.

Fernandez and Utermohlen noted that they believed that it would be possible to greatly reduce the costs of undertaking a property tax cadastre by utilizing IKONOS satellite imagery available from Space Imaging Corporation. This imagery is available for $27 per sq. km with a minimum purchase of $2,700. The imagery has a resolution of 1X1 m and is perfectly adequate for the development of a property tax mapping system – ie. a cadastre. They noted that they had the capacity in house to geo-reference this images and utilize them for cadastral maps. This would push up the cost by perhaps another $4,000, but then for about $7,000 one would have the basic cartography of street networks, parcels, and constructed area and the remaining property tax data could be obtained by field survey without necessarily having to enter properties to do measurements with

surveying tapes. They suggested that while the costs in Colcapirhua ran about $19 per parcel, using this approach the parcel costs might be driven down by one-half to one-third.

They said that upon request they could produce estimates of the costs for undertaking a cadastral mapping program in a municipality within the general vicinity of Cochabamba (ie. Valles Altos) and another for a municipality in a more distant location (ie. Misque or Aiquile).

I was impressed with the practical down to earth approach of CLAS's key personnel. They seemed like the kind of people who could keep the principal goals in mind and not lose sight of the point of the cadastral exercise – ie. to increase property taxes.

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29 March 2004

Sergio Paserin. Director Ejecutivo, Centro de Desarrollo Comunal y Municipal, Instituto Boliviano de Estudios Municipales. (CEDESCO - IBEM). Tiquipaya, Cochabamba, Bolivia. Guillermo Marin and I met with Mr. Paserin.

Mr. Paserin explained something of how their programs worked. They are engaged in training people to work in municipal governments. This training is really degree oriented and distinguishes this unit from almost any other organizations working in Latin America today he asserted. The center began its work in 1994 and is an arm of the Company of Jesuits (Catholic Church).

They educate students to obtain degrees, as *Bachillers -- Tecnico Medio*, in four distinct areas – Public Administration; Municipal Development and Environment; Topography, Cartography, and Territorial Planning; and in Public Works Administration. These degrees are offered under the aegis of the Universidad Catolica de Bolivia, San Pablo. The students complete a four-year program in two years of intensive training – typically 9 hours of instruction per day (half of the time is spend in the classroom and half in practical studies – at least that was my understanding). There are supplemental activities on Saturdays.

Students are who are enrolled in the school must be selected by their local municipal governments. They must also pass a rigorous exam for entry. The municipalities provide housing and food for the students during their studies at the school and CEDESCO pays for the cost of instruction. Only one municipality currently pays some of the costs of educating its students, San Julian (Santa Cruz). The municipality pays 40 percent of the total cost.

To date the school has graduated three classes in Topography, Cartography, and Territorial Planning and one class in Public Administration. The first class in Municipal Development will graduate this year … and the first set of students in the Public Works

Administration class will begin next year. When all programs are functioning, Paserin said there will be a total of 180 students studying at any one. There are 25 instructors, many part time, and 28 staff personnel.

CEDESCO has worked in the area of municipal cadastres. They worked on a cadastre for Tarija, but it was not a positive experience. Subsequently it seems they have focused on small municipalities, principally in the Chapare region. He listed six or seven municipalities – Bulobulo, Entre Rios, Sinahota, and Chimore among others. Most have between 600 and 1,000 property parcels. He said they have developed a successful model of cadastres for small municipalities utilizing a system that integrates Arc/View, Access, and AutoCAD. When we asked about the ILWIS system and its utility for such a system, he suggested that it was too cumbersome and required additional programming to be effective. They tie their system into the national geodesic grid, but tie it in through the INRA (Instituto Nacional de Reforma Agraria) rather than the IGM (Instituto Geografico Militar). They use three control points and he claimed it only cost about $100 for each control point. He said the margin of error was about 10 cm. The approach they use is to only survey the street network. Teams of field surveyors using surveying tapes do the detailed worked of property parcel identification and the determination of constructed area.

They have had their cadastres approved through the Prefectura, which then for forwards them to the Bolivian Senate that apparently approves them. (Subsequently Guillermo Marin said he had never heard of such an approval process – seemed irregular to him).

Pasarin noted that in some areas they have been successful in getting big companies (the cement plant in Capinota) or hotels (eco-tourism hotels in the Chapare) to pay property taxes although they never had previously.