estimates that 80% of his staff's time is spent resolving problems between farmers, not preventing problems and carrying out the functions of the office.

In theory, lease titles are kept in two locations. One is kept at the regional level and the other is sent to Georgetown. Cadastral 1:50,000 maps also have backups. One is available for inspection and the other is kept in a vault. Microfilming of documents was considered at one point, but the project was never started.

Management of cadastral projects to date has been disappointing. The cadastral maps produced by the Commission of Lands and Survey are not linked with maps being produced by Mines or Forestry Commissions. The Ministry of Agriculture also had land use surveys done. But even these were not compatible with maps in the Commission of Lands needed for parcels. Perhaps most discouraging is the lack of basic maintenance and preservation of existing maps. Some appear almost rags rotting on shelves.

Lack of accessible, reliable data in the Commission of Lands and Survey has chilled foreign investment. On a daily basis, the Commissioner receives requests for data from foreign investors. Because the Commissioner cannot supply the data, the impression is that the Commission is blocking investment. Requests for land suitable to plant mangos or peanuts must go unanswered, since the Commissioner has no adequate land capability maps at his immediate disposal. In this climate, the Lands and Survey Commission cannot do business professionally.

An index is used to record applications received by the office. In this "application registry," the following information is noted: the applicant's name, location of the plot solicited, the date, a receipt number and the signature of the registry supervisor receiving the application file. A second index is used at the time a lease is issued. Information in this index includes eleven columns of data: file application number; lease number; date of issue; holder's name; number of acres involved; locality of the lease; county; terms of the lease in number of years; expiry date of the lease; annual rental payable; and a listing of actual rental payments.

To locate a property within the system, users of the system must know the lot number, the lease number or must find the property on a map. There is no index by owner, land use, or any other variable.

Assuming there are no complications, applications for a lease take about three months to process.

D. THE POTENTIAL OF A MULTIPURPOSE LAND INFORMATION SYSTEM

A well-organized land information system could provide policy-makers with data on many of the country's development problems. While providing for security of ownership, the system would also help in the relocation of populations to land suitable for sustainable agriculture. The data could also be used for water irrigation projects, police protection, fire

departments, sanitation and the planning of a myriad of other government programs and services.

Clearly, the present property registry system in Guyana is in need of major reform. However, many additional land and land-related problems and issues face Guyana. These problems and issues all require the synthesis and analysis of a variety of data to make decisions. An MPLIS is the approach that many decision makers are turning to as a tool to aid in these complex decisions.

1. Definition of Multipurpose Land Information System

An MPLIS, as the name implies, is a land information system designed to serve a variety of purposes. The MPLIS typically contains a variety of information about land, including ownership, use, cover, soils, geology, zoning and other use restrictions, wetlands, and floodplains. The MPLIS also includes a geodetic foundation, usually the geodetic survey network, which serves as a means to link or integrate the data in the system. Land survey monuments (the coordinates of their location) serve as the pins by which data can be tied together.

The data in an MPLIS consists of a series of layers. Ownership parcels are the base for several layers. Other layers are built from information collected in areas such as soils, land cover, and geology. The common reference framework (the geodetic survey network) makes it possible to combine parcel and polygon data for a variety of uses. The main purpose of an MPLIS is to provide system users with information about land ownership, value, and use.

Each layer of data in an MPLIS is maintained by a custodian for that layer. Thus, the property registry maintains the ownership parcel, the assessment office maintains property tax data, and a planning or similar office maintains data on land use and soils. Various layers can include county, state, and federal agencies. Potential areas for inclusion as the program gets underway are floodplains, wetlands, land cover, soils, a Reference Framework, etc.

Because the MPLIS serves a variety of users, it must be constructed and maintained so that the data in it are:

- Accurate enough to support the uses envisioned;

- Compatible enough to be used in combination with other data sets that are part of the system; and

- Comprehensive enough so that both current and appropriate data are available when needed.

But an MPLIS is more than data, computer programs, and computers. It also includes the staff and the institutional support for its operation. A coordinated program to build and maintain all aspects of an MPLIS is needed for its success.

2. Benefits

Several types of benefits accrue when MPLIS systems are put in operation. These include benefits due to increases in efficiency, responsiveness, effectiveness, and equity.

Greater efficiency results from use of an MPLIS. Costs are lowered due to the reduction in duplication of data collection and maintaining multiple similar map sets. Other costs, while not lowered, will be stabilized, benefiting government operation.

Improved responsiveness is a second class of benefits that accrue to an MPLIS. Titles can be issued more quickly due to availability of a complete, coordinated database. New technologies and new data, such as location data from global positioning systems, can be added to the database quickly and easily.

Improved effectiveness of government is a third benefit of an MPLIS. Improved access to data and analyses stored in the system, and ability to use them for additional tasks, improves the government's effectiveness. This in turn makes government more competitive, whether within departments, within the country, or competing in world trade. Improvements in the land-transfer process, providing an equitable basis for property taxation, and providing information for resource management and environmental planning can be expected with the carrying out of an MPLIS.

MPLIS systems are perceived to be more fair and equitable than manual systems, since land information technology can incorporate detailed information without the real or perceived biases that are sometimes associated with manual systems. Use of the system will increase since users believe they are being treated more fairly.

In sum, the benefits of an MPLIS system are many. Early savings due to reduced data collection and storage, and sharing of data among system users can be expected. Over the longer term, benefits will accrue from increasingly complex analyses and capabilities as well.

3. Design and Implementation of an MPLIS

The design and carrying out of an MPLIS is a complex process. As noted above, an MPLIS is more than computers and computer programs. Therefore, setting up is much more than buying the hardware and software on which the system will operate. The hardware, software, and other components of an MPLIS need to be carefully matched to the needs and characteristics of the total organization.

To develop and carry out an MPLIS that matches the system to users' needs, seven steps that are critical to the success of an MPLIS include:

- Determining the scope of the system;

- Introducing MPLIS technology to the community that will develop and use the system;

- Assessing user needs;

- Performing systems requirements analysis;

- Designing the system;

- Designing the implementation plan; and

- Designing pilot projects, demonstrations, and benchmark evaluations.

At present, the Government of Guyana counterpart for modernization of the registry probably would be an Inter-Institutional Commission for Registry Reform.

a. Determining Project Scope

A critical first step in MPLIS design and start up is to figure out the scope of the project. Decisions must be made concerning what agencies and functions the MPLIS is expected to serve. The key is to include enough participants to capture the major benefits of an MPLIS and still limit the project so that the government can manage it and finance its construction and operation. Even at this early stage, it is important to consider not only what data files may be included but how they will be maintained and updated. A database without proper maintenance will deteriorate quickly and usually doom an MPLIS to failure.

b. Introduction of MPLIS Technology

Technology introduction has two purposes. First, it exposes an organization to new ideas, methods, and equipment that form an MPLIS. This step is designed to address questions about the MPLIS system. For example, what new equipment, techniques, and methods will be used? How will the products and services produced be changed? What are the potential costs, benefits, and other implications of MPLIS technology? Second, technology introduction introduces prospective participants to the process of setting up an MPLIS. How will the organization make the transition to the MPLIS? Why and how will users participate in the user needs assessment? What is the likely long-term role of users as to the use and maintenance of the MPLIS?

An MPLIS, by definition, involves many separate agencies and people. Because of the many different perspectives of such groups, a leader to help the process is necessary. Therefore, if a leader has not emerged in the "deciding the scope" step, one needs to be clearly identified in the "introducing technology" step. This leader must sell the vision of what an MPLIS can accomplish to users of the system, and to policy makers who must fund and support the system. Realistic assessments of costs, benefits, and institutional changes necessary are critical to successful implementation.

c. User Needs Assessment

The first step in a user needs assessment is to identify potential users of the MPLIS. Next, determination must be made of what each user does, how each user does it, what data and techniques each user uses, and how each user might be able to use MPLIS technology. Among the questions a needs assessment addresses are the following:

- Who uses the land records in this organization?

- What kinds of data does this organization manage?

- How are the data used (as to analyses done, decisions made, and information products generated)?

- How often are the various types of records used and updated?

- Who is responsible for data maintenance?

- What improvements might be possible through automation (for instance, what can be done more efficiently or more effectively, and what new things are possible)?

Needs assessments usually consist of surveys and interviews with potential users of the MPLIS. Earlier studies, documents, and legislation should also be examined. Needs assessments are helpful in identifying the goals and objectives of a project, and refining the scope of the MPLIS project.

A substantive needs assessment is the key in facilitating the design of the MPLIS system. To be of maximum use, potential users must have a good understanding of an MPLIS and be able to articulate how an automated MPLIS will affect their jobs and responsibilities. Therefore, constructive results from a needs assessment depend on doing a thorough job in providing a sufficient understanding of MPLIS technology. Potential users must understand that an MPLIS involves much more than the automation of their existing procedures.

d. System Requirements Analysis

This step uses the results of the user needs assessment to develop the technical requirements of the MPLIS. These requirements include hardware and software configuration, sources of data, management procedures, data accuracy requirements, and the kinds of products that the system is expected to produce. Assessment ensuring that expectations are reasonable in light of current technology is important. Other factors include staffing and staff training that will be needed, space needed for staff and equipment, security considerations (both in public access areas and for backup databases in case of disaster), costs, and how improved efficiencies will be monitored.

Software functionality (for instance, can the computer programs do what is needed) is a major consideration in requirements analysis. A review of several vendor packages is a good

place to begin. However, the final consideration is what the system needs currently are and the expectations for the near-term future. These requirements can then be clearly defined in any request for proposals that are issued.

Hardware costs, while not inexpensive, are a small proportion of total MPLIS costs. Hardware should be selected that can meet the needs of the software (software selection should be made first), and handle data volumes that are projected. Since data volumes and system uses often continue to grow, buying as large a computer platform as possible is recommended.

e. System Design

System designs vary from the simple to the very complex. The design may include a model for how the system is organized institutionally. It may also include such things as data models and the form of hardware and software. The data model itself may be made up of several components including data flows, user interface methods, and how data are to be indexed and archived.

In this step, many decisions must be made that involve tradeoffs. Decisions must be made regarding speed, flexibility, and detail that the MPLIS will provide. Here again, likelihood of success is enhanced if the decisions made regarding system design build on the results of the user needs assessment and requirements analysis completed earlier.

f. Implementation Plan

Once an MPLIS is designed, a plan is needed for implementation. A major consideration in setting up an MPLIS is how the shift will be made from the current manual system to the new automated system. Most such plans call for incremental implementation and work plans. Work plans may include details on what is to be done for a particular task; who is responsible; when the task is to be started and expected completion date; and what are the resources, in terms of data, staff, and funds. Further discussion of the incremental approach is included below on funding requirements and benefit streams.

g. Pilot Projects

Pilot projects, demonstrations, and benchmark evaluations are designed to test all the design and development work on a small scale, before full commitment is made to the new system. For example, a new property registry system might be tested in one or two departments before being set up country-wide. Pilot projects provide the opportunity to fine tune the system, gain experience with the hardware and software, and try out different options for solutions to particular problems. This is also a good time to produce products to show policy makers that the system can deliver what system designers claim it can.

4. Funding Requirements and Benefit Streams

The financing of an MPLIS presents several problems. For example, costs of MPLIS systems tend to occur early in the life cycle. Costs for hardware, software, and data (often amounting to 75 percent or more of total system costs) must be paid for before the system can go into operation.

Benefits, on the other hand, tend to be generated as a stream over a longer period than costs. This means that total benefits do not equal total costs until 5-10 years of operation. Further, benefits are often of the intangible variety—such as having more accurate data faster and being able to generate new products that were not possible before. Not only are many benefits intangible, many are unknown or not expected when the project begins. These factors all combine to make it difficult to develop a precise economic evaluation of an MPLIS before it is put into operation.

To ensure continuing financial support of an MPLIS by policy makers, they should be clearly briefed on costs and benefits that are to be expected with an MPLIS. The implementation plan should also consider incremental ways to put in place the various pieces of an MPLIS. The ability to phase in certain costs should also be analyzed in terms of the immediate needs of government (and the private sector) for output from the system. That is, a particular need to improve the property registry system, revise the property tax system, or solve a specific environmental or land use problem may make it necessary to give priority to items not foreseen in a strict cost analysis.

One way to develop a priority list for funding MPLIS costs is to consider the components of the system itself. For example, a geodetic foundation is often funded first, since this is the foundation (that is, the basis for spatial coordinates) by which all "layers" of data can be linked and analyzed. A base map is often developed as an early step, to be used as a background for other spatial data layers. Computer hardware and software are needed immediately to produce high-quality graphics often required to maintain support for the system. Finally, people and procedures are needed to operate and maintain the system.

This suggests that the major area where decisions can be made to carry out an MPLIS incrementally is regarding the construction of specific data layers. Here again, the most demanding needs, coupled with availability of resources to fund these particular applications, can help in making these tough choices. As additional funds and needs surface, more data layers can be added. This approach makes it critical that a comprehensive plan be completed before any part of the system is begun. Such a plan will ensure that pieces added later will drop neatly into place and provide the output that is needed.

Plans to monitor benefits need to be included in implementation plans for the system. Expected benefits should be labeled as such and documented when practical. Also, procedures should be developed to help identify and quantify unexpected benefits that are certain to occur as the system continues to operate over time. The importance of these unexpected benefits is very important. Experience with prototype MPLIS systems shows these unexpected benefits account for most of all benefits. (Thus, while they are called

unexpected because we are unable to identify them specifically, they are "expected," since we know that many benefits of this type will occur.)

Once an analysis is made of the potential costs and benefits, a set of measurable objectives can be developed against which actual performances of the system can be compared. While it is unlikely that targets will be met precisely, they will provide a general indication of how well the MPLIS is operating and suggest any modifications needed in the implementation plan.

5. Monitoring and Evaluation of an MPLIS

As the above section suggests, it is a good idea to include a mechanism for monitoring and evaluation in the MPLIS plan. Using the measurable objectives and priorities developed by the system's builders and users, this monitoring will provide guidance both to system operators and policy makers who must continue to ensure financial support.

For the proposed MPLIS, Guyana should take advantage of international donor and academic experience in the Caribbean (Trinidad, Jamaica, Venezuela, St. Lucia and other registry projects), and tenure projects in other countries with a Dutch/Roman legal system overlaid with British Law.

SECTION V
TENURE POLICY PROJECT

USAID's P.L. 480 Program calls for the Government of Guyana to begin tenure policy reforms. Recommendations from the IDB, World Bank, FAO and others strike a similar cord.

Guyana has been making significant progress since 1988 in opening its economy. Few countries have made greater stride toward structural adjustment and democratization. In the area of property rights, however, issues of market rates and divestiture have not been addressed. In large part, this is due to the lack of institutional capacity within the country. Financial constraints and limited staff make it difficult for the Commissioner of Lands and Survey to address the issues in hand. Nevertheless, the problems remain urgent.

A program of policy development and applied research is proposed to clarify these problems and devise more effective strategies for dealing with them, along with addressing issues of institutional capacity.[27] The program of policy development and institutional strengthening should include applied research, workshops, consultancies, and training to explore these questions and to enhance the ability of the Agricultural Ministry technical and policy staff to deal with them.

Basic to the idea of the program is that divestiture or leasing should not be considered in isolation. It is a critical and formative element in shaping Guyana's future land policies. In this context, the Ministry of Agriculture and the Commission of Lands and Survey are confronting many complex, technical issues in the tenure field. These include:

1. How can property tax revenues be collected effectively?

2. How can lease rents be established at market rates?

3. How can market values be established for land to be privatized?

4. How can land divested be provided efficiently to medium and small private farmers?

5. How can security of tenure be assured to the small and medium farmers? How can their freedom to make land management decisions be expanded?

6. How can small and medium farmers most effectively interact with the larger economy for technical advice, inputs and marketing?

7. What institutional constraints must be addressed for privatization to be carried forward? How can they be addressed in the current climate of fiscal austerity?

8. What are the linkages between tenure and a sustainable environmental policy for a rational use of agricultural land and forestry land?

These issues arise directly in the divestiture and leasing contexts. They can be addressed through exploration of the following issues:

1. What obstacles and opportunities exist to the expanded participation of small and medium family and private farmers as land recipients under the divestiture/leasing program?

2. What are the major categories of land recipients, who are being excluded, and to what effect?

3. What is the nature of the conflicts over land which trouble the divestiture/leasing process? Are there ways to implement divestiture which would reduce their incidence or to better manage their resolution once they do arise?

4. How are different categories of recipients using the land? Are they investing in improvements? Do they need greater security of tenure? What other constraints on investment may be operative?

5. Are there needs by these farmers for the alienability and mortgagability of land, or are they finding other ways to adjust land access to variations in their labor and capital endowments over time and to obtain access to funds for investment?

6. To what extent are the dispositions of land in divestiture/leasing being adequately recorded and, in those circumstances in which it is legally appropriate, registered? To the extent this is not happening, why not, and what strategies might be effective in providing security of tenure for these land recipients?

7. Are there community structures of administration which can administer land effectively?

8. Given the withdrawal of the state from many functions in the agricultural sector, how well are the needs of these farmers for credit, inputs, and market access being met?

9. What patterns of informal and formal collaboration and organization are being created by farmers to help them interact with the larger economy, and what can be learned from these initiatives about both their needs and their effective means of addressing them?

10. Is there a potential role for grass-roots farmer organizations in promoting and facilitation titling programs?

11. To what extent will women participate in the divestiture/leasing process as beneficiaries or otherwise be affected by it?

12. What does the planned divestiture/leasing suggest with respect to land policy in Guyana more generally?

13. What do the experiences elsewhere in the Caribbean suggest about the viability of particular strategies or solution to problems of divestiture/leasing and tenure policy in Guyana?

14. How would those strategies or solutions need to be adjusted to Guyana's particular circumstances?

The program of policy development and institutional analysis proposed here has three central points of emphasis: (1) applied research on divestiture, leasing and related issues; (2) relevant comparative experience from other Caribbean countries; and (3) a continuous process of policy exchange stimulated by the first two points of emphasis.

A. Applied Research:

Policy making needs to be far better informed about what is happening on the ground in divestiture and lease situations. Problem parameters will be redefined and sharpened in the process. This will be achieved through:

- case studies of state land divestitures;

- development of a broader if elementary data base on state land divestitures and leasing programs generally; and

- information gathering in connection with a series of consultancies focused on problem areas in land policy and divestiture/leasing.

B. Access to Comparative Experience

Policy making needs to be informed by empirical data. It also need the land policy experience of other similarly situated countries. This is critical both in evaluating the feasibility of possible strategies in divestiture/leasing and in placing divestiture/leasing in a broader, longer-term land policy context. The need would be addressed through involvement in an institution with expertise in the comparative experience and the transfer of that expertise through:

- short-term training overseas;

- study tours to nearby Caribbean countries;

- periodic workshops in Guyana; and

- the series of consultancies.

33

C. Continuous Policy Dialogue

The objective must be continuing, broad discussion of policies throughout the life of the project. This would be achieved through:

- basing the research in a local institution with a clear commitment to policy discussion and the facilities to pursue that objective;

- creation of regular opportunities for discussion of policy options. This is achieved through seminars on preliminary research findings, the results of study tours, and consultant findings and through three major policy workshops;

- ensuring ongoing, active participation in thinking through the policy implications of research findings by officials from several agencies concerned with land policy through establishment of an Advisory Committee for the project;

- seeking opportunities through publication in media which receive wide distribution to encourage broad public discussion of policy options.

While recommendations will emerge over the life of the project, and some should be acted upon before conclusion of the project, an effective conclusion of the project will require:

- a high-level workshop to review findings and prepare a package of recommendations:

- publicity for and public discussion of those recommendations;

- development and discussion in a donor/government seminar of preliminary recommendations. This includes development of start up scenarios with personnel, financial and other requirements.

D. Institutional Arrangements and Staffing

The project would be carried out by the Ministry of Agriculture with another institution, possibly a university or research center.

The Ministry of Agriculture is proposed as the implementing unit. The present Minister brings to the project an understanding and commitment to research on land issues. The MOA will be very actively involved in stimulating public discussion of land issues throughout the country. The MOA's activities fit well with the emphasis of this project, and its work seems to attract the attention of policy makers.

The role of the university or research institution is threefold: (1) to provide land tenure and research methods expertise, filling a resident senior researcher post and identifying expatriate consultants; (2) to help expose local research staff and professionals to diverse experiences with land tenure through on-the-job instruction, planning of short-term training,

and organization of workshops; and (3) to stimulate a continuing policy exchange and dialogue on land issues.

The research project will be headed by one expatriate senior researcher who, with a MOA counterpart, will be responsible for day-to-day management of the project. They will work under the direction of the Minister of Agriculture, in consultation with senior staff of the university/research center. They will be supported by a MOA-based research staff of three additional local professionals. The four local researchers will be an economist, a lawyer, an agronomist and a geographer. They will participate in the design of fieldwork for the case studies, in data entry and analysis, in report preparation, and in dissemination activities like the proposed seminars and workshops.

The Carter Presidential Center in Atlanta is supportive of holding a series of seminars and workshops on tenure concerns. The University of Guyana is also interested in the topic. These two institutions may wish to participate in or sponsor future conferences or workshops with the selected university or research institution, and the Ministry of Agriculture.

The project must be firmly nested in a single institution to ensure effective administration and accountability. A mechanism must be found which can bring to bear on problems the diverse comparative advantages regarding land issues of the many units in the Ministry of Agriculture, in other ministries, and in the university. It is proposed that an Advisory Committee be created for the project. Institutional membership would be agreed upon by the Ministry of Agriculture and select donors, and senior technical staff charged to represent institutions. The Committee would meet at least three times a year to review project plans, act as a sounding board for initial research findings and discuss the policy implications of those findings. The intent is not just to mobilize the expertise within the various institutions concerned with land policy, but to create among key staff of those institutions an understanding of and commitment to policy recommendations generated by the project. This is best achieved through their regular participation in the process.