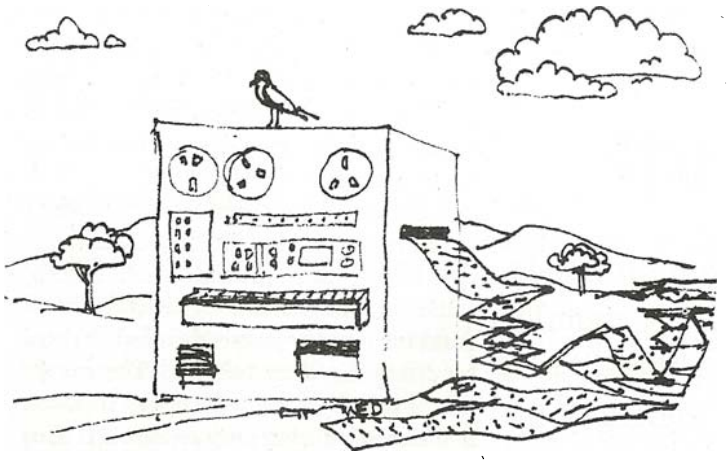

Finding land's potential

One of the main activities of scientists at the CSIRO Division of Land Use Research over the years has been their land resources surveys. These set out the principal characteristics of areas and enable people to make rational decisions about how land should be used. Since 1947, the scientists have surveyed about 2 million square kilometres of northern Australia and most of Papua New Guinea.

The information gathered during surveys covers vegetation, soil characteristics, climate, whether land is hilly or flat, and much more. It helps people decide the potential of particular areas for uses ranging from agriculture and forestry to highway construction. Interpretation of aerial photos provides much of the information, and this is supplemented by on-the-spot observations at field sites. Information is also drawn from existing literature, maps, and climate data.

Up to now, survey findings have been available only from printed reports. A lot of editing has been needed to make the reports manageable, and this has meant that large amounts of data considered less significant have been discarded. Some of this information might have been useful to some people interested in a piece of land surveyed, but it has been lost.

Scientists at the Divisions of Land Use Research and Computing Research in Canberra have now devised ways to reduce this wastage. Instead of just publishing the information in reports, they store it in computers. The details that any user wants can be readily extracted. The scientists have also devised techniques for increasing the reliability of survey data by reducing the room for subjective judgement in its collection.

The first requirement for a resources survey is aerial photos. These give a good indication of the vegetation and land-form patterns, and photo-interpreters use them to divide an area into regions. The idea is that regions should contain little variation, and similar regions are grouped to form mapping units. The writers of survey reports then draw on the photo, field, and other data collected to prepare descriptions of each mapping unit.

The division of a survey area into regions has been essentially an intuitive process. But now Mr Garry Speight of the Division of Land Use Research has worked out a less subjective method. It is based on a check-list of land attributes; boundaries are drawn to mark defined changes in the land surface, for example from plain to slope, from lower to higher relief, or from denser to sparser stream network. He has also worked out ways to reduce the subjective element in other parts of the data-collection process.

A research team led by Mr Speight is trying out these methods in a survey of the Chimbu area of the Papua New Guinea highlands. One requirement is a big increase in photo-interpretation work, but the outcome promises to be more specific and reliable mapping of land resources.

In conjunction with this work, Mr Bruce Cook of the Division of Land Use Research and Dr John Smith and Mr Hugh Mackenzie, of the Division of Computing Research, have devised computerized methods to store and handle the data. These involve separate storage of two lots of information in the computer. One comprises map data—lines and points representing, for example, region boundaries and towns. The other is the information gathered during a survey about the vegetation, soil, and so on.

The computer can put information from the two stores together and produce maps providing the details asked for by a user. One can, for example, ask it to show all regions in a survey area that have the combination of properties known to be needed for growing a particular crop.

The computer system has not yet been tested with data from the Chimbu survey, but it is being used to handle information gathered during a survey (now going ahead) of 6000 sq km on the New South Wales south coast.

This survey, in cooperation with the New South Wales Government, is being conducted along more traditional lines than those developed by Mr Speight. But it is taking in some types of information, on things such as type of land tenure and state of development, that are usually outside the scope of resources surveys. For this survey, the area has been divided into regions averaging about 2 sq km. The output is designed to assist the people who make decisions about land use there.

The research shows that computer techniques can be used successfully in storing and making available land resources data. It doesn't, however, usher in the era of a national data bank able to provide information about the potential uses of any part of the country. That may come later. The immediate gain is a significant improvement in the usefulness of particular surveys.

A computer data bank for regional planning. B. G. Cook and B. V. Johnson. *Proceedings of the First Australian Conference on Urban and Regional Planning Information Systems, Hunter Valley Research Foundation, Newcastle*, 1973, 5.01–5.10.