The 1980's: space technology challenges agriculture

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Energy reflected and emitted from the earth provides valuable information for agricultural scientists concerned with the classification of vegetation, its extent, composition and condition. The comparatively new technology of remote sensing (recording data remote from the target), can provide a new source of data acquisition and interpretation. The collection, processing and interpretation of this information in its various forms has several advantages, principally that it is regular, reliable and in forms which lend themselves to computer analysis.

The sensors on board the Landsat space satellite provide 18 day updates of c. 30000 sq km. They record the energy reflected from the earth in the green (500-600 nm), red (600-700 nm) and two infra-red bands (900-1100 nm) of the spectrum. Each of the bands yield particular information about the earth which assist interpretation, e.g. the green and red show chlorophyl attributes (maturity) and features of soil and geomorphology, while the infra-red, not visible to the human eye, is most expressive of plant physiology and water relations (vigour and health). Other sensors, both present and future, will also yield information in the ultra violet and thermal (heat) emission wave lengths which will aid studies of temperature and water relationships in soil and vegetation. All this data can be obtained in digital form (the "C.C.T." or computer compatible tape) and can be investigated by computer analysis. Because of the specific "signatures" of the various parameters studied by agriculturalists, discrimination, aerial extent, condition and change can all be monitored.

As this type of data has not been available to scientists studying plants and animals, agricultural research in this field in Australia has been limited (Leggett 1979). The pioneering studies in Australia, support the projected U.S.A. evaluation of the benefits to agriculture (Duggin et al. 1978). The major problems to be overcome are the development of suitable programmes to analyse the C.C.T.'s and the availability of reliable coverage in reasonable time. This latter drawback will be soon overcome as Australia commences to receive 18 day updates of the whole continent soon after the satellite passes. Australia's own tracking station and processing facility are due to provide data from mid-1980, obviating the need to obtain recorded data in retrospect from the U.S.A.

As more sophisticated sensors and operational satellite systems come on line, the challenge to agricultural scientists to utilise the data will increase. The successful analysis of satellite data promises valuable savings in cost, energy and reliability of research results.

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