SUMMARY

The land catchments of the North East Coast Drainage Division which is adjacent to the Great Barrier Reef, occupy about 42 million hectares, about 20% larger than the continental shelf which supports the reef.

Land use practices in these catchments depend on landform, climate, availability of irrigation, soil types and the economics of adapting natural conditions to produce various horticultural and agricultural crops.

Most of the soils of the region, the exception being some recent alluvia, are naturally deficient in the major elements, nitrogen, phosphorus and potassium. Addition of these has been necessary for large-scale crop production, particularly sugarcane and fruit and vegetable crops.

Concern has been expressed that the movement of nutrients and eroded sediments from the adjacent land presents a serious threat to the complex ecosystem of the reef. Estimates indicate that the current movement of some nutrients from the terrestrial to the marine environment may be up to four times that which occurred pre-development. There is a need to quantify nutrient transfers at the catchment level, so that management practices can be modified where necessary, to prevent degradation of the reef environment.

The research program of the Great Barrier Reef Marine Park Authority includes investigations on the effects of water quality on the reef ecosystem. As part of the overall studies, it was considered worthwhile to obtain historical data on nutrient applications, particularly nitrogen and phosphorus in fertilizers and stock feed supplements, for each of the river catchments adjacent to the reef. This report covers 28 catchments, for the period from 1910, when the first fertilizer applications were made in north Queensland, to 1990.

The information provided relies heavily on fertilizer industry sources for details of the products supplied at various times to agricultural areas. Data available from the Agricultural Census were used as points of reference, as information at the local authority area level was not published prior to the 1970-71 season. Australian Bureau of Statistics data needed to be modified to allow for changing nutrient content of fertilizer products with time, and for differences in the groups of products for which statistics were obtained. Prior to 1961-62, there was no distinction between various fertilizer types; in that year, superphosphate was first separated from other fertilizers.

Allocation of nutrient applications to catchments presented difficulties, as local authority areas in Queensland rarely relate to boundaries of river catchments. As sugarcane production constitutes the bulk of fertilizer usage (70% of the total nitrogen and 55% of the phosphorus in 1990), and since changes in nutrient use in that crop tend to reflect changes in fertilizer products supplied, a detailed study of changes in the areas and production of sugarcane at the catchment level was essential.

The report provides, for each catchment, a summary of major land uses and some details of fertilizer use practices. The area, mean annual run-off and rainfall data are tabulated for each catchment, as are historical usages of phosphorus and nitrogen. For 1990, tables are provided to show the total quantities of the nutrients applied to the main groupings of crops and pastures, the averages rates for the catchment and ratios of nutrient applications to mean annual run-off volume.

The more significant statistics contained in the report include:

- The total area of the 28 catchments from the Daintree to the Mary River, is 38 million hectares.

- Almost 83 000 tonnes of nitrogen were applied to crops and pastures and in stock feed supplements in 1990. This was about the same as had been applied, cumulatively, up to 1945.

- Cumulative nitrogen applications in the period up to 1990 were about two million tonnes, equivalent to 53 kg N/ha for the whole area adjacent to the reef.

- The intensity of nitrogen use varies considerably between catchments, with higher rates where sugarcane production is the dominant land use, e.g. the Pioneer River catchment averaged 37 kg N/ha in 1990.

- Sugarcane accounted for 71% of nitrogen use in 1990; this share had declined over the survey period as the areas of other crops and improved pastures increased.

- Eleven basins with rain-grown sugarcane production as the major agricultural land use accounted for 57% of the total nitrogen use in 1990 and 7.6% of the total land area.

- The six catchments in north Queensland where average annual run-off exceeds 50% of rainfall occupy 2.6% of the total area and accounted for 20% of 1990 nitrogen use.

- Phosphorus applications to crops and pastures and for livestock supplementation were about 13 500 tonnes of phosphorus in 1990; about the same amount as had been applied, cumulatively up to 1940.

- Cumulative phosphorus applications in the period to 1990 were about 400 000 tonnes of phosphorus, equivalent to about 10 kg P/ha for the whole area.

- The area to which phosphorus fertilizer has been applied represents 1.6% of the total land area adjacent to the reef.

- The intensity of phosphorus use varies considerably between catchments, with the Johnstone, Mossman and Pioneer receiving above 4 kg P/ha in 1990.

- Sugarcane accounted for 55% of phosphorus use in 1990; this share was much larger in earlier years.

- Twelve of the basins, occupying 86% of the total area had average phosphorus application rates of less than 1 kg/ha in 1990.

- The six north Queensland catchments where average annual run-off exceeds 50% of average rainfall, occupying 2.6% of the total area, accounted for 25% of the total phosphorus applied in 1990.