



Photo: N.Z. Forest Service (J. H. G. Johns, A.R.P.S.)
In the Blowhard area, west of Napier. Wind has eroded the surface pumice soil and the run-off of water has caused gulying to follow.

Although individual works are necessary to deal with small urgent problems, catchment authorities are expected to promote comprehensive schemes to control long lengths of rivers or, for soil conservation, to organise farm-conservation plans over groups of farms covering whole catchments. In this manner the various techniques can be made mutually supporting and results are achieved much more cheaply. Schemes originate from a local demand for improved conditions. Proposals are prepared by the local body, discussed with the prospective ratepayers and submitted to the Soil Conservation and Rivers Control Council for approval and the granting of a subsidy. The Act requires that the local share of the cost be assessed on the basis of benefit received and rates are graduated accordingly.

An essential part of each proposal is an

economic report on the benefits that will result. In the case of river-control schemes, these consist of prevention of losses and of increases in production following the land improvement that better control of water makes possible. With soil-conservation works much of the benefit may be "off site", that is, on other lands or river channels that will no longer suffer from the deposit of detritus carried down from above. Nevertheless, it is usual, after the initial development costs have been met, for a farm-conservation plan to result in considerably better returns to the farmer as well as ensuring that the land is managed in accordance with its capabilities to give a sustained yield.

There is no such thing as absolute control of erosion and flooding. Rivers are "biotic" entities whose character is determined by the climate, geology, vegetation, and fauna of their catchments. They are for ever changing, and all that man can do is to guide that change into directions favourable to his own ends. Engineering works are required in the lower and middle reaches to contain floods and to train the river to a stable alignment. Soil-conservation techniques are necessary over the whole catchment to prevent the overwhelming of the river works by detritus as well as to prevent land deterioration. Soil conservation is primarily achieved by maintaining and improving the vegetative cover. There is no end to such operations. Periods of high activity will be followed by longer periods of quiescence, when only works of a maintenance nature are needed; but geological change and economic progress will sooner or later make further major work necessary.

Hydrology

Hydrology is the scientific study of the water of the earth. It was stated earlier that the council is required to provide a hydrological service. This is effected partly through the hydrological work of catchment authorities and partly by the delegation of the main responsibility to the Ministry of Works. The civil-engineering division of that department has a hydrology section in its head office and a hydrological survey that operates in the field throughout New Zealand. The hydrological work of the Ministry of Works embraces the collection of data, the analysis of information, and the publication of results for the national hydrological records; it also involves co-ordinating the hydrological work of other