



## Commercial application of rainfall simulation

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Landloch Pty Ltd is a commercial consulting firm, providing advice on a range of land management issues to the mining and construction industries in Australia. As part of the company's day-to-day operations, rainfall simulation is used to assess material erodibility and to investigate a range of site attributes. (Landloch does carry out research projects, though such are not its core business.)

When treated as an everyday working tool, several aspects of rainfall simulation practice are distinctively modified.

Firstly, the equipment used is regularly maintained, and regularly upgraded with a primary focus on ease, safety, and efficiency of use and on reliability of function. As well, trained and experienced technical support is considered essential. Landloch's chief technician has over 10 years experience in running rainfall simulators at locations across Australia and in Africa and the Pacific.

Secondly, the specific experimental conditions established for each set of rainfall simulator runs are carefully considered to ensure that they accurately represent the field conditions to which the data will be subsequently applied. Considerations here include:

- wetting and drying cycles to ensure material consolidation and/or cementation if appropriate;
- careful attention to water quality if dealing with clay soils or with amendments such as gypsum;
- strong focus on ensuring that the erosion processes considered are those of greatest importance to the field situation of concern; and
- detailed description of both material and plot properties, to increase the potential for data to be applicable to a wider range of projects and investigations.

Other important company procedures include:

- For each project, the scientist or engineer responsible for analysing and reporting rainfall simulator data is present during the running of all field plots, as it is essential that they be aware of any specific conditions that may have developed when the plots were subjected to rain; and
- Regular calibration of all equipment.

In general, typical errors when rainfall simulation is carried out by inexperienced researchers include:

- Failure to accurately measure rainfall rates (the most common error);
- Inappropriate initial conditions, including wetting treatments;
- Use of inappropriately small plots - relating to our concern at the erosion processes considered be those of genuine field relevance;
- Inappropriate rainfall kinetic energies; and
- Failure to observe critical processes operating on the study plots, such as saturation excess or the presence of impeding layers at shallow depths.

Landloch regularly uses erodibility data to design stable batter profiles for minesite waste dumps. Subsequent monitoring of designed dumps has confirmed that modelled erosion rates are consistent with those

subsequently measured under field conditions.