Rainfall simulation

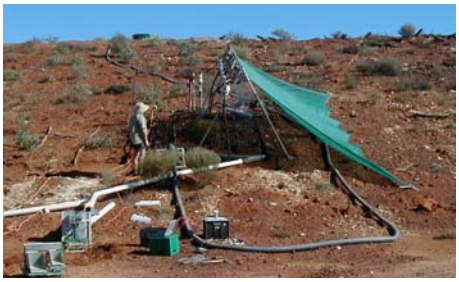
Rainfall simulation is not a new technique. In various forms, and with differing degrees of refinement, it has been used for close to a hundred years. The development of rainfall simulators has reflected advances in both technology, and in our knowledge of rainfall and its interaction with the soil. There are, currently, many designs for rainfall simulators.

Simulated rain is used to study the properties of a particular material; the impacts of a particular management practice, or can be used to increase understanding of a particular process of infiltration, runoff, or erosion.

It is also possible to use parameters derived from rainfall simulation as a basis for modelling the behaviour of landscapes, sometimes under quite long periods of natural rain. Provided the parameters derived are appropriate, this has been shown to be quite successful.

Landloch has made extensive use of rainfall simulators. Important attributes of the simulator used by Landloch are:

- High spatial uniformity (C.V. 8-9%)
- Rainfall kinetic energy » 29 J/m^2/mm, similar to natural rain at intensities >40 mm/h
- Accurate control of rainfall intensity
- Modular design, enabling a range of plot sizes, though generally Landloch uses plots 5 m long and 1.5 m wide
- Light weight and good portability.



The equipment was described in a paper by Loch et al. (2001). Upgraded simulator control and drive systems meet high safety standards, Electromagnetic requirements, and have enhanced reliability.

Landloch has used rainfall simulation extensively for:

- Field and laboratory characterization of infiltration and erosion characteristics of a range of mine spoils and topsoils, for locations in Western Australia, Queensland, and the Northern Territory, as well as South Africa and New Caledonia, emphasizing the high mobility of the equipment.

- Studies of sediment, nutrient, and pollutant movement
- Studies of impacts of tillage management on compaction and infiltration in agriculture
- Assessing development of compaction in macadamia plantations
- Measuring impacts of revegetation, consolidation, and armouring on soil physical properties and erodibility.
- Testing the effectiveness of a range of hydromulch materials.

Landloch regularly plans, executes, interprets, and reports studies using rainfall simulation.

Alternatively, Landloch can provide research groups or organizations with access to rainfall simulator equipment and expertise in its use. This enables research groups to access the technology and associated expertise at a relatively small cost, and can involve considerable interaction with Landloch to achieve optimal data interpretation and, where necessary, modeling.

Relevant references

Loch, R. J., Robotham, B. G., Zeller. L., Masterman, N., Orange, D. N., Bridge, B. J., Sheridan, G., and Bourke, J. J. (2001). A multi-purpose rainfall simulator for field infiltration and erosion studies. *Australian Journal of Soil Research* 39: 599-610.

Loch, R.J. (2000). Using rainfall simulation to guide planning and management of rehabilitated areas: I. Experimental methods and results from a study at the NorthParkes mine. *Land Degradation and Development* 11: 221-240.

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