

From Waste to Water Quality
Using Lime-amended BioClay (LaBC®) for Landcare on the Sandy Soils of the Swan Coastal Plain



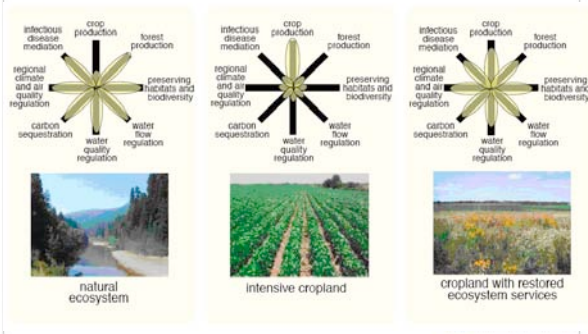
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¹Water Corporation of Western Australia
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³MBS Environmental

The Challenge – Sustainability of Ellen Brook Catchment, Climate Change, Resource Efficiency

- We are not changing poor land management practices quickly enough – environmental harm continues.
- Farmers are wasting money and harming the environment by using technically inefficient soluble fertilisers.
- Climate change is here - farming systems must change to adapt.
- Resource constraints are real – we need to 'close the loop' and harvest valuable water, nutrients and energy from our waste streams.
- We need to 'redesign for sustainability'.



The Ellen Brook Sustainability Project: Restoring Ecosystem Services



From www.epa.gov.au/information/2009/2009_star_ecosystem_services.html

Ellen Brook Sustainability Project Approach

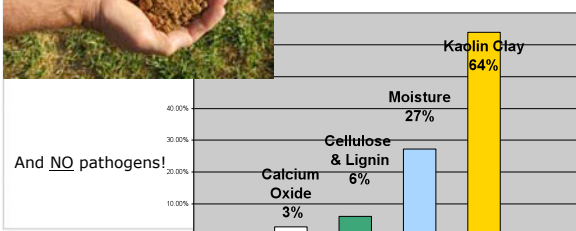
- Develop a cheap, safe slow nutrient release fertiliser & soil improver based on lime-amended biosolids
- Create sustainable solutions:
 - Reduced nutrient losses, increased carbon fixation
 - Reduced biosolids transport costs
 - Improved environmental outcomes
 - Improved farmer incomes; reduced input costs & nutrient 'wastage'.
 - Reduced vulnerability to drying climate, "re-balance" hydrology
- Create accessible, transparent data management system
 - Shared Land Information Platform (SLIP)
 - Land use, carbon sequestration, nutrient leaching
- Individually designed farm improvement plans (incl. nutrient reduction)
 - With landowner and land manager
 - Based on field data and land owner's plans
 - Secured by simple, common law contract



Lime-amended BioClay® or LaBC®



What is in LaBC®?
30% Lime-amended Biosolids (LAB) & 70% clay



The Making of Lime-amended BioClay® (LaBC®)



< 1. Clay stockpile (1.5 million tonnes!)

2. Lime-amended Biosolids (LAB) delivery>



< 3. Trommel to blend LAB with clay to make LaBC®



4. Stockpiled LaBC® for curing >

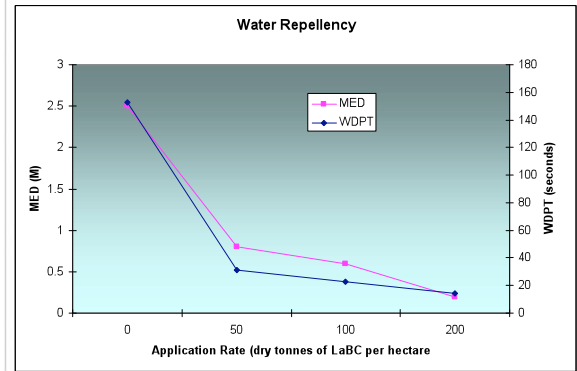


LaBC® applied at a rate of 50 wet tonnes per hectare provides:

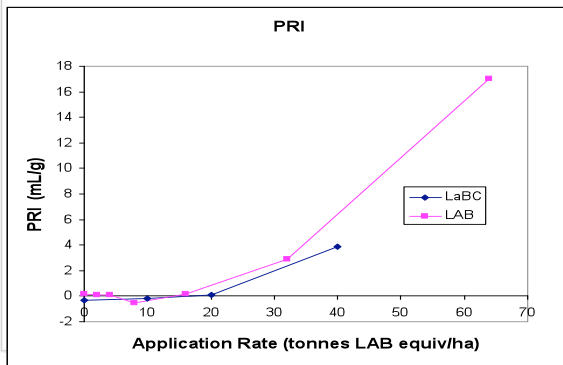
- Effective amelioration of existing soil acidity, countering soil acidity for several years, and removing the need to apply agricultural lime.
- Adequate phosphorus for at least 4 - 7 years.
- Sufficient copper and zinc for at 10-15 years.
- A improvement in the wettability of severely hydrophobic soils.
- An improvement in soil water holding capacity and nutrient retention.
- Probably inadequate potassium for more than one year.
- Sufficient nitrogen, sulphur and manganese for one to five years.
- Excellent growth of oats, perennial grasses and farm trees.



LaBC® Significantly Reduces Soil Water Repellence



Phosphorus Retention Index (PRI) of LaBC® and LAB



Growth Response Trials 2009 West Road Bullsbrook

200 tonnes/ha LaBC®
300 kg/ha Super 3:1
50 kg/ha Urea
No LaBC®



West Road Bullsbrook Field Trial 2009 Super 3:1 vs. LaBC® First Year Oats



Ovens, R (2009). Report on LaBC® field trial to Water Corporation. Department of Agriculture and Food, December 2009.



Professor Stephen R. Smith of Imperial College London, writes...

"Improving the acceptability of biosolids in the way described here, by defining a careful product specification supported by a thorough quality assurance system and that provides clearly defined economic and environmental benefits to support long-term sustainability is an approach that should be encouraged to underpin the development and expansion of recycling initiatives for biosolids in the future. **This may be regarded as 'best practice' in the biosolids industry** and, in the UK, LABC would probably be a candidate for assessment for its suitability at meeting 'end-of-waste' criteria for full recovery as a product under the revised European Waste Framework Directive."



How broad scale nutrient reduction will be achieved

- Strategic nutrient interception by trees, shrubs and grass with commercial and environmental value
- Fencing to improve grazing control near surface water
- Shelter belts and fodder shrubs to draw production toward higher ground
- Encourage:
 - Slow release fertiliser production and use
 - Soil amendments to improve P adsorption
 - Accurate fertiliser application
- Create long term relationships to help:
 - Manage newly established vegetation
 - Drive responsible fertiliser decisions
 - "Climate harden" agriculture to reduce future risks

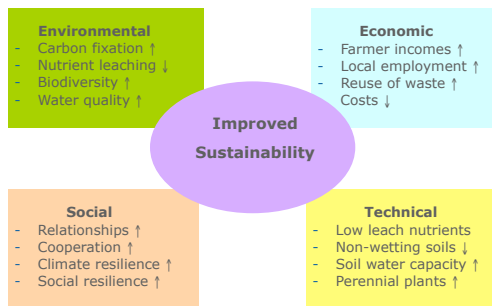


Advantages for farmers and society

- Improved farm gate production
- Less reliance on imported feed
- More diverse income base
- More local employment
- Reduced erosion and nutrient loss to groundwater and streams
- Reduced fire risk
- Reduced dust
- Reduced weed spread
- Enhanced biodiversity
- Enhanced carbon fixation
- Learning opportunities
 - Soil carbon sequestration by perennials
 - Relationship between reforestation and water table



In Summary, More Sustainable Outcomes



Our Partners

- Department of Defence – access to land for field at Bullsbrook; future reforestation projects
- ChemCentre WA – leaching column and field lysimeter studies
- Department of Agriculture and Food – Shared Land Information Platform (SLIP); agronomic advice;
- Forest Products Commission – farm forestry
- Swan River Trust – Ellen Brook WQIP; nutrient offsets scheme?
- Perth Region NRM – catchment community liaison
- Commonwealth Government *Caring for Our Country* funding.
- Faculty of Earth and Environment, University of Western Australia - soil carbon research & monitoring
- CSBP – fertiliser advice.
- Biosolids regulators - Department of Environment & Conservation, Department of Health.

