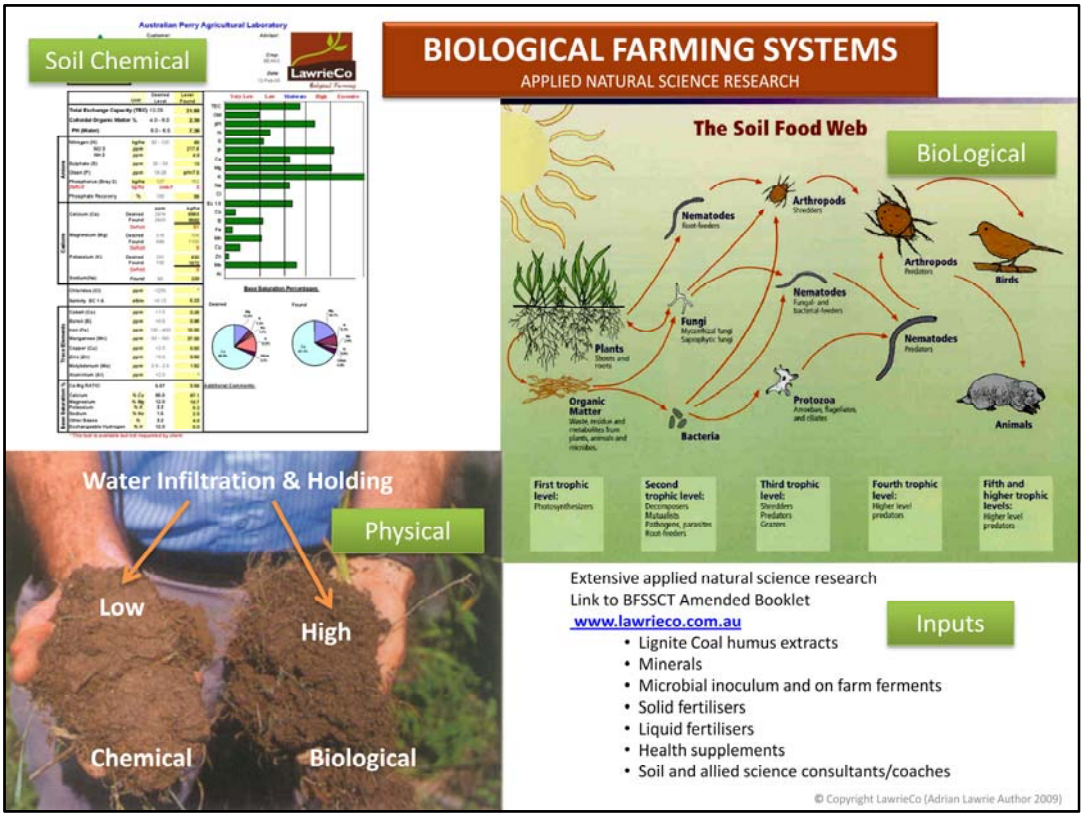

**Smelling Soil is a simple indicator of soil health.** A moist healthy soil typically has an inspiring sweet scent. If you cannot detect a distinctly pleasant odour, the probability is high that the soils health has room for improvement. Our nose can be a cheap, valuable guide. In this slide an Innovative Dairy Farmer, past Federal Politician and a Agribusiness Leader learn some new basic observations!



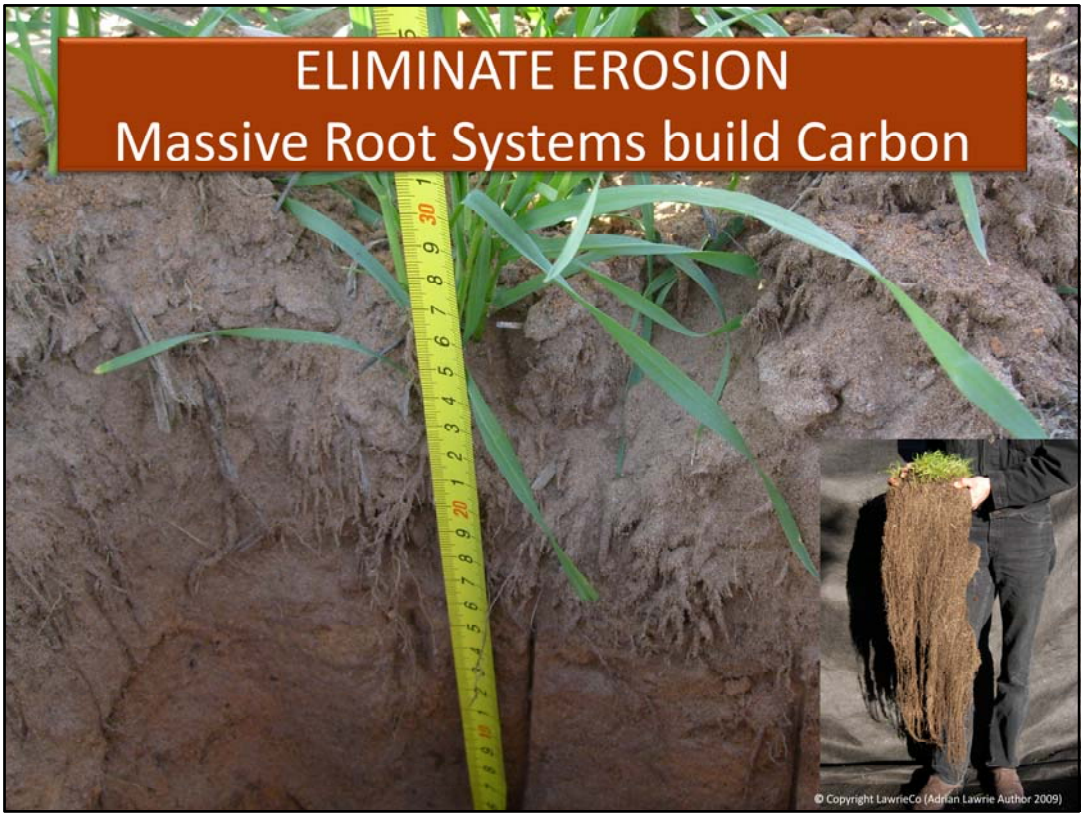

**Water Infiltration and Holding Capacity** are higher in biologically managed soils. Farming towards mineral and microbial balance in the soil builds soil Humus, and Carbon. Crops and pastures will always finish stronger to their genetic, and environmental potential in a healthy, friable, biologically active soil. Resistance to drought, frost, disease, and insect attack is higher in plants grown in healthy soil. Resulting less financial risk to producers is a significant benefit. Soil scientists trained in applied natural science research, assist in selection and application of minerals, microbial innoculum, on farm ferments, with lignite coal and extracts, and work on farm with farmers. This combination is providing rapid and lasting improvements in soil fertility.


**A century of overgrazing, excessive cultivation, burning residues, excessive chemical fertilisers, fungicides, insecticides, herbicides etc,** has destroyed much of the life in the soil. Specifically the beneficial soil fungi species appear to be most affected. We have reduced cultivation with minimum and no-till technology, typically we overgraze less in recent years. Many do not burn. We all must now rebuild that which is the biggest limiting factor in agriculture, the life in the soils. Soil degradation, salinity, erosion, declining carbon levels, higher inputs, yields declining, low resistance to environmental stress are contributing to low viability for many Australian producers. Soil biology will be negatively impacted for as long as we continue to presume that we can bombard our soils with increasing rates and frequency of toxic inputs to soil life, without cost to our sustenance and farming viability.


**Evolving over 15 years, LawrieCo, Biological Farming Systems** have accessed Australian and Global Natural Science Research of plant physiology and soil health science. Testing on company experimental farm with natural product combinations, with less Industrial Agriculture chemical inputs has been the process. Innovative farmers , with soil, personal, or family health concerns are typical amongst the early adopters. Now a team of soil and allied scientists, trained in natural sciences and coaching skills assist a fast growing sector of Australian Farmers, adopting as normal, biological methods. A further network of scientists are working behind the scene to develop and refine Biologic farming fertiliser and allied products.

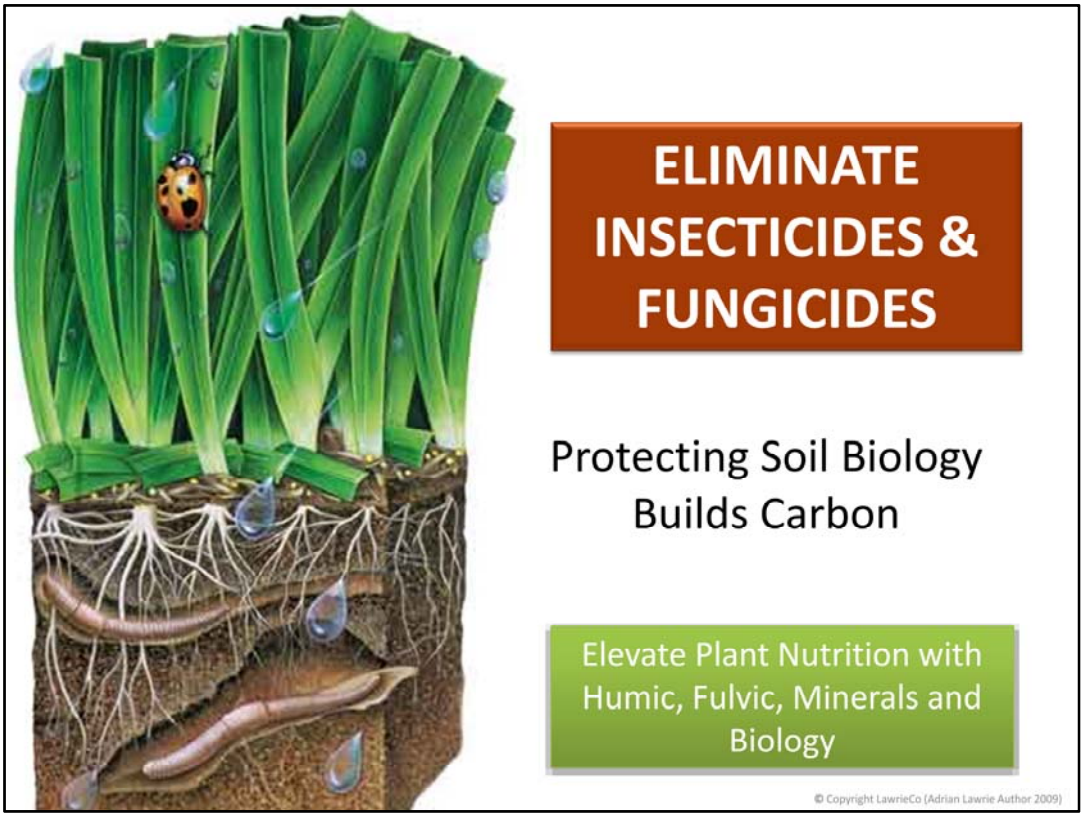

**Transforming low fertility white sand to highly productive rich black soil is an outcome** of 12 years of balancing mineral ratios to desirable levels, microbial ferments of specific beneficial bacteria and fungi, other natural fertiliser such as kelp, fish extracts, lignite brown coal and extracted humic and fulvic acids. No or little Chemical Fertiliser is needed now . Premium grade animal and human food, together with premium profit per hectare from this property are rewards for sequestering a massive deep carbon bank from years of growing plants that produce more sugars, carbohydrates , and deposit more carbonic acids and similar into the soil . They convert atmospheric Carbon Dioxide into Soil Carbon. “Stewardship Of The Soil” begins with applied biological science, as core farming activity, also viability in agriculture.


**Achieving a reasonable crop** in severe drought conditions is an outcome of humic acid use with low fertiliser use and seed dressing with Microbe inoculums and natural nutrients that stimulate large root growth and mycorrhizal filaments reaching deeper and wider than roots can grow. Seven years of this provide cumulative benefit of building soils capacity to receive rainfall and improved water storage capacity. Water evaporation is less and crops finish better in spring drought condition. Two paddocks surrounding the green paddock, in the aerial picture were chemically fallowed, however most surrounding paddocks had stock put on crop in mid spring to recoup some production, as the crops were not going to mature with any worthwhile yield. Tim and Marianne crops in 2007 averaged 1.2 t/ha, sold at close to $400 /tonne, they made a good return amid very poor district results. Water use efficiency was exceptionally high.




**Massive roots, with high microbial exudates from roots is rapid Soil Carbon building technique.** Wind and water erosion are reduced / eliminated. The foundation is set for high yield, without needing fungicide and insecticide. Soil 'glued' to roots is indication of high microbe activity in root rhizosphere. High rates of chemical fertilisers and chemicals without the natural humic and microbe inputs comparatively, do not achieve high carbon building in soils. Typically root mass and microbial colonization in root zone, will be 50% less with chemical fertiliser alone. Many chemicals damage soil beneficial fungi . Mycorrhizal fungi and numerous other beneficial fungi access nutrients and moisture from a much greater volume of soil than roots alone, and very efficiently recycle plant residues. Spraying digestion fungi is another component of BFS to reestablish the missing fungi to our soils.


**Burning stubble and residues, is akin to tearing up $100 notes and future generations heritage!** BFS utilises this massive resource of stubble and dry unpalatable pasture, as a substrate to rebuild over time high populations of microbes, that build soil fertility. The digestion program has emerged as an important component in BFS, by which Nitrogen applications are being reduced from 25% to 100% less without yield loss. It is a key tool in the BFS chest for rapidly building soil carbon. Consistently where BFS digestion program is applied, stock managers report significant improvement in weight and animal wellbeing.




**Nutrition density and balance in plants is a precursor to eliminating insecticides and fungicides out of crops and pastures.** Achieving optimum nutrition status starts with a good healthy soil. Plant nutrition status is assessed by many tools including: Refractometer-gives guide to photosynthesis producing sugars in plant 'carbohydrate factory'. This is an excellent guide to mineral balance and density in plants. Tissue analysis, provides guide to chemical nutrition status of plants. Sap analysis, provides guide to mineral composition of sap in plants. Together with visual assessments, crops are monitored, measured and managed in BFS. Foliar applications are used to fine tune plant nutrition status. Appropriate nutrient, humic, fulvic, minerals are selected and are foliar applied with on farm fermented biology to displace need for chemical repair work in crop and pasture. A combination of improving soil health, humic, specific microbe inoculums and low fertiliser starts young plants with higher disease and insect resistance. Foliar nutrition 'fine tunes' high plant nutrition status. Using 'cides' in agriculture reduces humic and fulvic production in root/microbe interactions. BFS is specific in including these natural occurring biological acids. ['cide' from Latin cida, killer].

# ANIMAL HEALTH & REPRODUCTION

IMPROVE with SOIL APPLIED MINERALS and LIGNITE COAL
COMPARED with CHEMICAL FERTILISER

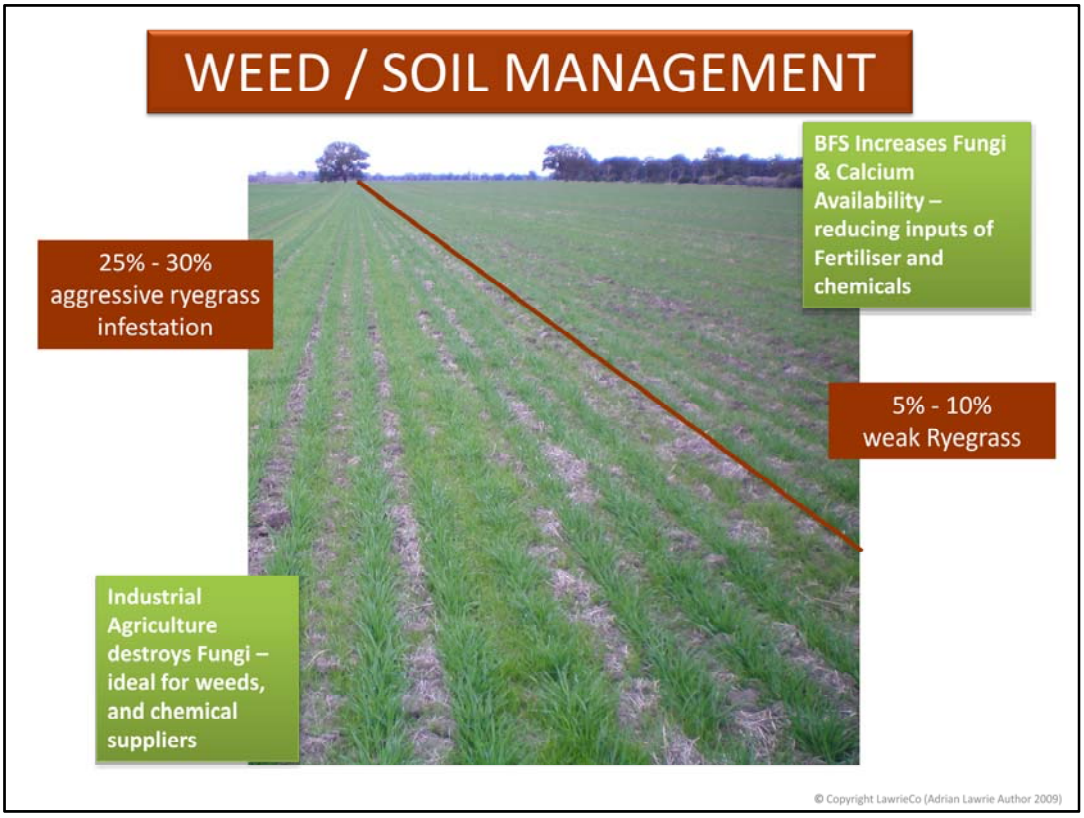
2 Year 60Ha Pasture Comparison – Triple P Program – DPI Facilitated Farm Group, Craig, Norman & Sandra Joppich, Lang Koop – Mid West VIC

| | Super Phosphate Phosphorus, Sulfur Acid | Calcium, Magnesium Soft Rock Phosphate Humates, Trace Elements |
|---|---|---|
| Kg Live Weights per Ha produced | 200 | 277 |
| Weaning Percentage | 95% | 121% |
| Gross Margin/Ha (Returns – Costs/Ha) | $308 | $393 |

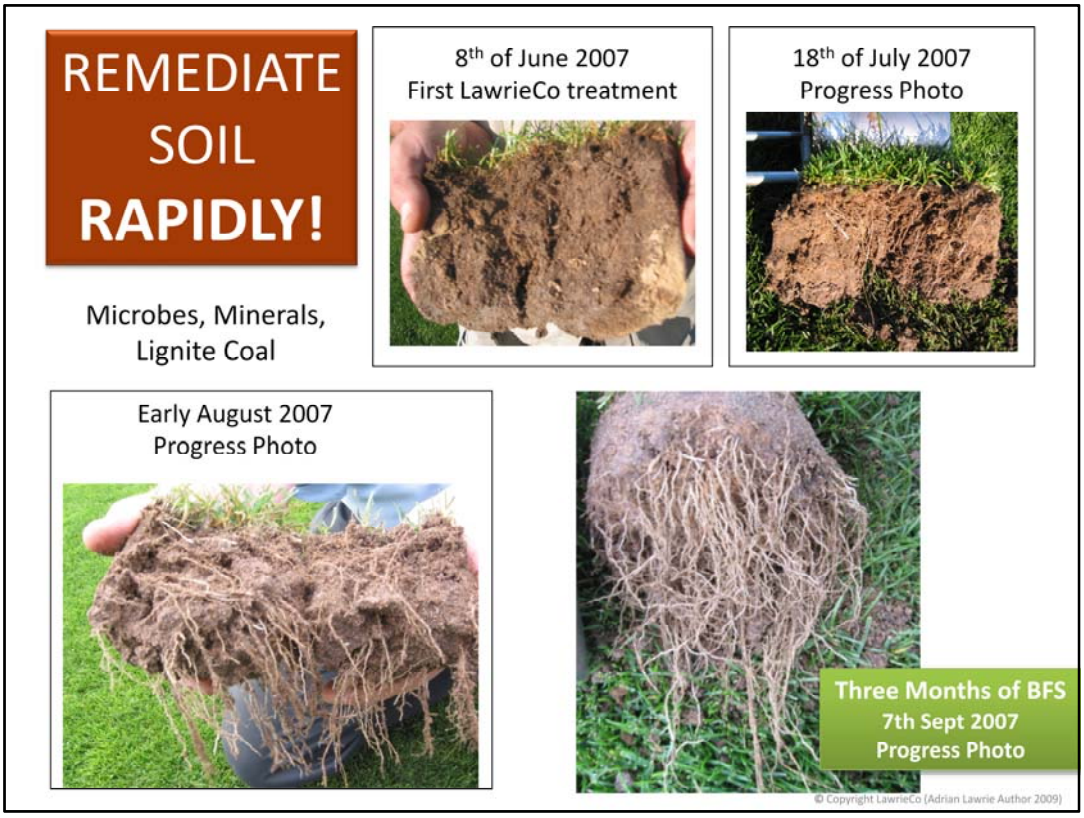
38% Increase in Live Weights per/ Ha
27% Increase in Weaning Percentage
28% Increased Profit, return per /Ha


**Mineral density in pasture is profitable in Animal Husbandry.** In this example, the health and mothering capacity of the sheep was more capable and provided a significant increase in profit margin for the farmer. Doctor Linus Carl Pauling, Nobel prize winner in 1954, stated “All disease and illness has its root cause in lack of minerals in our diet.” BFS take this knowledge seriously, and farmer programs are formulated to address mineral and microbe balance relative to each soil type and rebuild Soil Carbon. Raising microbe balance and activity in soil ‘transports’ more minerals into plants.

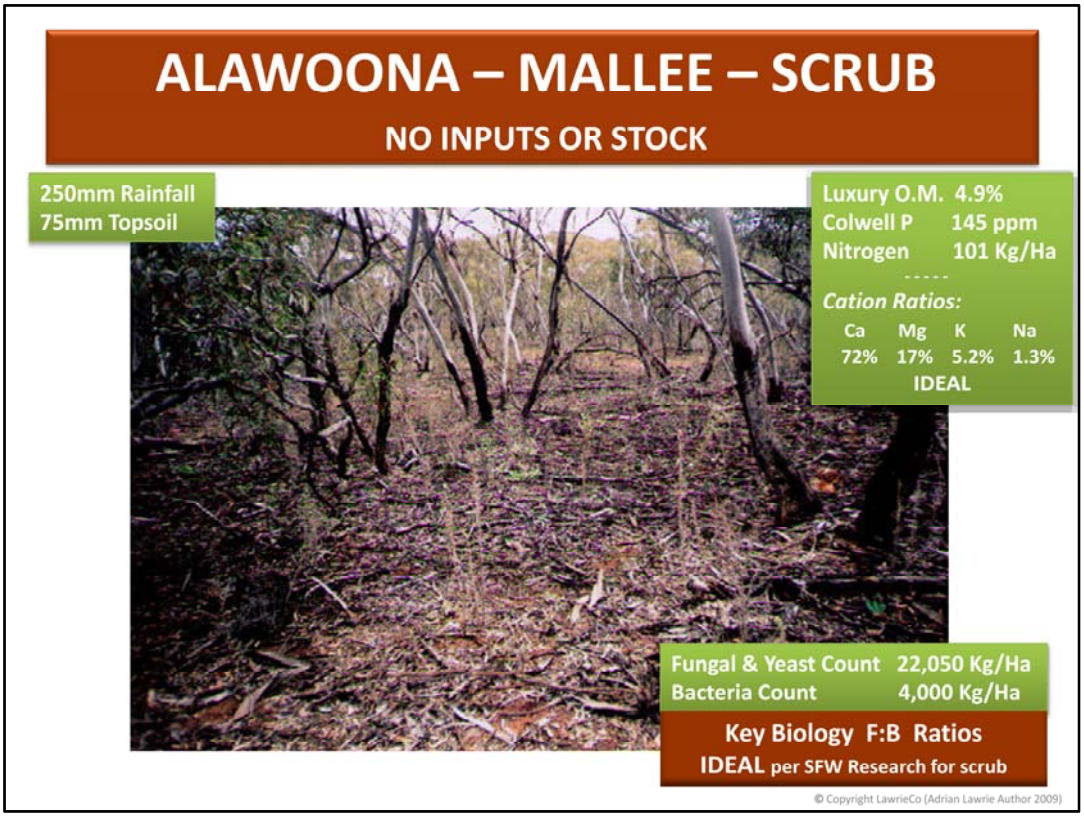

**Many common weeds are far less invasive in healthy soils.** This Lucerne carried twice as many lambs, with half the irrigation water 15 months after starting BFS program. Couch grass [a seriously persistent weed] was outcompeted by 23 year old Lucerne with a new vigor . No herbicides were applied in this transition. Natural science research informs us that nature selects for higher order of plants if soil mineral, biological, humus, and physical conditions permit. In this case study Lucerne is deemed to be a "higher order' plant than couch grass. With twice the profit the farmer acknowledges this science!



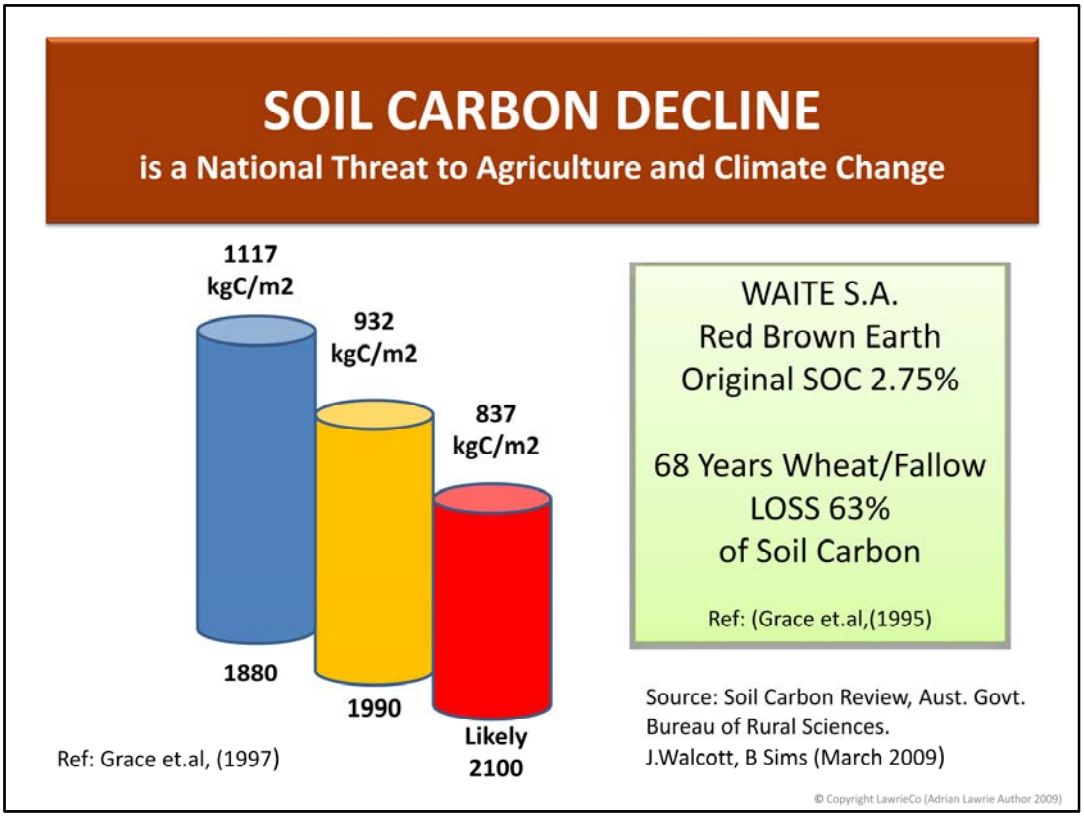

**Ryegrass, the bane of modern cropping, checked by changing soil mineral availability.** Billions of dollars and litres of toxic herbicide chemicals are applied annually in attempt to control this now often herbicide resistant weed. BFS soil management [3 forms of calcium, humic acids, minerals, microbes and reduced fertiliser] resulted in far less colonization of ryegrass that was far less aggressive [RH side of picture] than non BFS management on left side of comparison paddock. Notwithstanding drought induced cash flow reduction, all of this farm will in the future be treated with BFS. Weed management without chemicals has in BFS acquired sufficient example to warrant Serious further independent research.



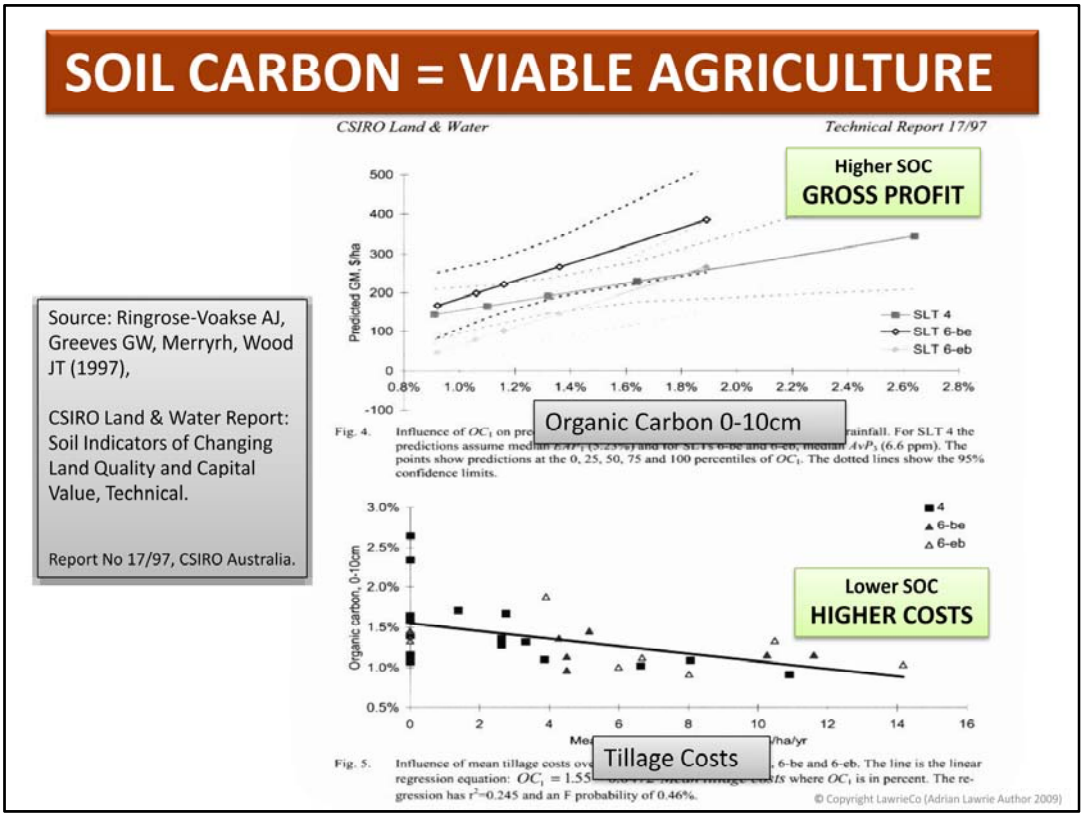

**Seriously chemically challenged , dead, and mineral imbalanced soils, can be rebuilt, insitu, quickly.** BFS technology can be utilised to recover inadvertent damage caused by over application of various chemicals. Unfortunately this can be common in public arenas. Combining humate, humic and fulvic with appropriate to soil minerals and specific biology, can rehabilitate even the most degraded soil. Mining rehabilitation, roadside, parks, and amenity areas can be rebuilt with **significantly reduced irrigation water required.**



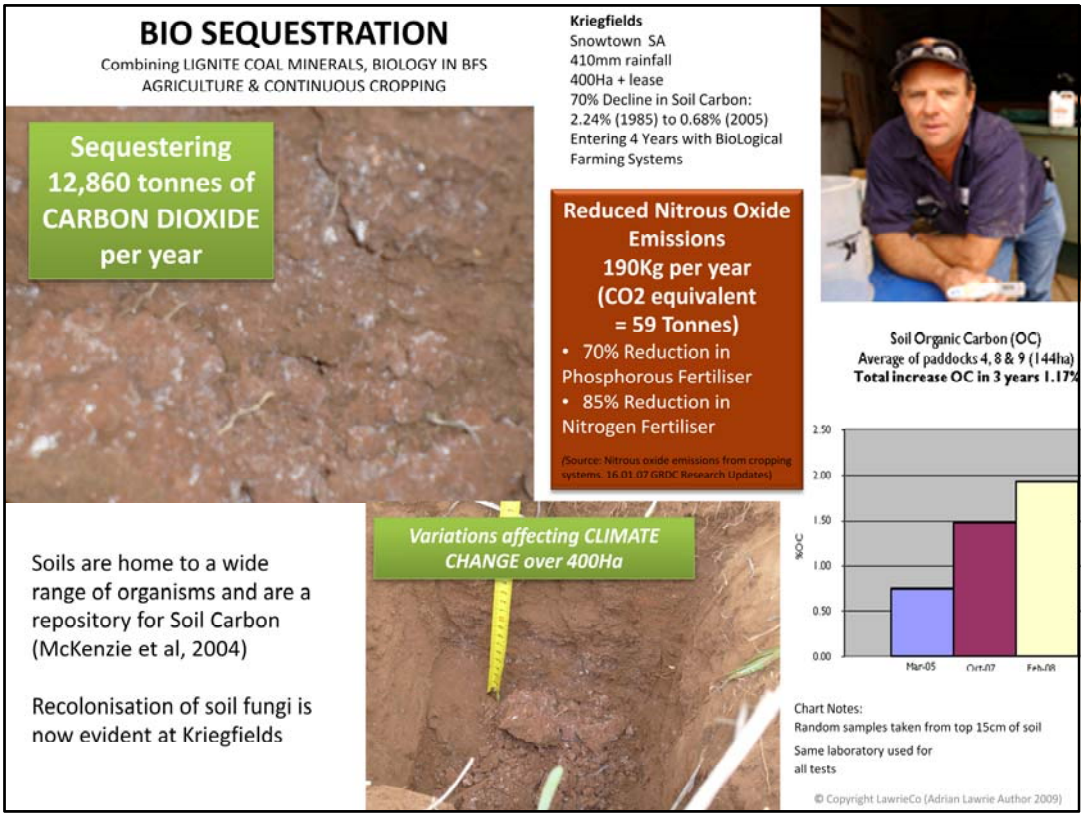

**Nature Knows Best.** The ratio of soil beneficial Fungi relative to Bacteria, F:B, is deemed important by scientists including Soil Food Web inc. It correlates with plant succession order. e.g. where only moss will grow soil biology is 100% bacterial; common agricultural weeds flourish in 1 F: 10 B; **agriculture crops & pasture flourish in 1 F : 1 B;** vines & tree crops 5-10 F : 1 B; rainforest up to 1,000 F : 1 B. In the virgin mallee pictured above soil samples tested revealed F 5.5 : B 1. **Increasingly over past 5 years BFS programs include this as part of the biological balancing objective for our clients with corresponding excellent results. We now are of firm view that equal proportions of beneficial fungi and bacteria produce best GM profit for crop & pasture enterprises.** Sadly many agricultural soils are in 1F : 10B –ideal for weeds.



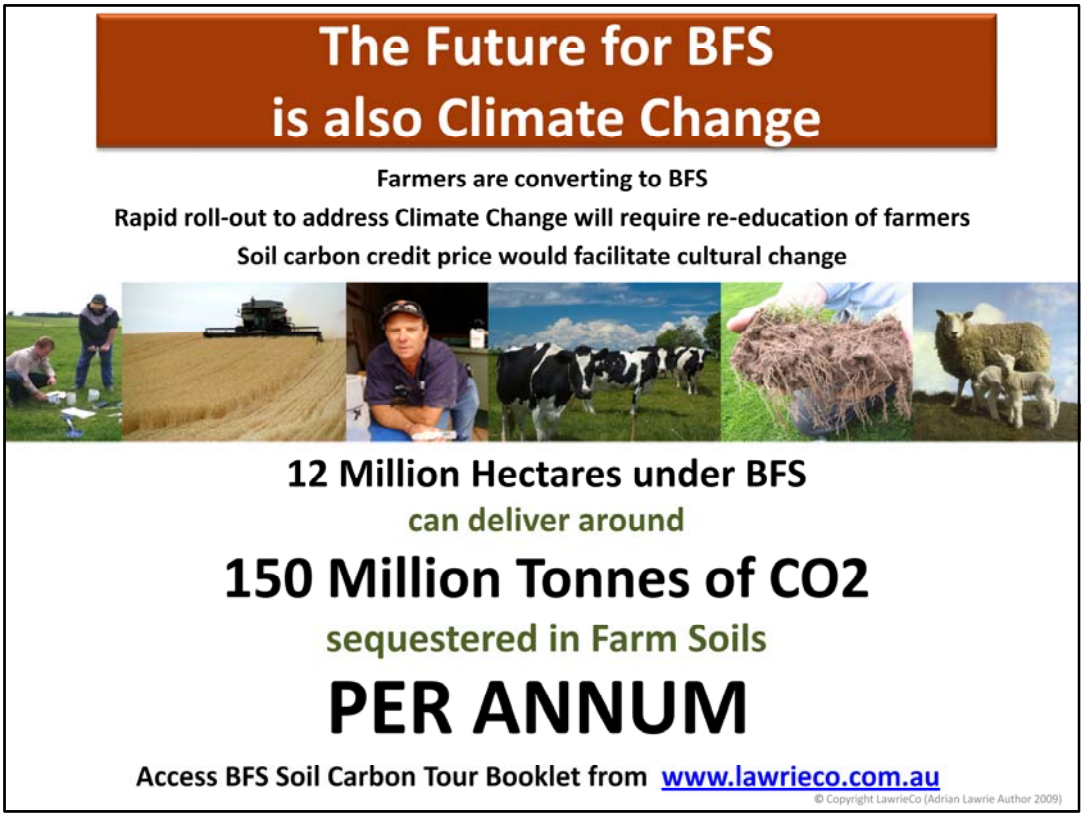

**Agriculture must address soil fertility decline. Past world leaders quote rise and fall of civilizations on health of their soils. Are we exempt?** Whether we are or not, BFS now has rapidly growing examples of soil carbon increasing rapidly [as compared with chemical farming expectation and experience] and now has capacity to sequester much of Australia's Carbon Dioxide emissions into Soil Carbon. This has massive benefit to the Australian community. Many farmers will not survive in the long term without rebuilding soil carbon. High carbon in our soils will be a key foundation of our national food security and real wealth for future generations.




**CSIRO Land & Water researchers demonstrate farms with SOC of 1% had app. $160 GM/ha profit. In same region farms with SOC of 2% had app. $380 GM/ha profit.** We need to transition Australian soils back to at least the Soil Carbon levels of a century ago. Many leading scientists emerging with Applied Biological Sciences understanding, contend that we now have the technology, products, and systems to raise our commercial agricultural soils above what they were originally. BFS believe that to be a real expectation based on examples emerging.




**Innovative farmers with sufficient unresolved /escalating problems are primary driver of change in agriculture.** Inadvertently Brian and Stephanie Krieg find themselves at forefront of **SOLUTIONS NOW !! for CLIMATE CHANGE** . Their innovation is solving national problems. The nation needs urgently to address their financial reward for this work. They, like many others in rural Australia for a variety of reasons, are challenged to make farming viable, increasingly so over past 2 decades. A primary motivator for this family is to profitably produce healthier food, with less chemicals to buy and apply, and leave the farm better than when started. The wider community of consumers, business, science, government etc need to **URGENTLY REWARD INNOVATIVE OUTCOMES WITH CARBON INCENTIVES.**




**Agriculture can provide a solution to climatic change problems. Some entrenched industrial agricultural attitudes and paradigms must change as the first and major step to build better Australian, and World soils.**

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