

TECHNOLOGY AND INNOVATION TO MEET THE CHALLENGES AHEAD

'FOR THE SAKE OF OUR SOIL'



INTRODUCTION

Commentators and recognised agricultural experts agree that the trends in the global agricultural industry for the coming two or three decades are quite clear.

Both mainstream and agricultural news bulletins and editorial commentary has recently highlighted the urgent need for change to farming practice and thinking. The use of more efficient and innovative fertiliser strategies, together with the use of technology in order that farmers and growers become smarter, more productive and sustainable is indicated. Calls by peak industry bodies within the varying agricultural sectors have all called for a

rethinking of management plans, the use of advanced equipment such as drones for crop and land inspections, and computerised calculation tools to ensure wastage is kept to a minimum so that the soil is not being overburdened by fertiliser and chemicals.



Whilst this move is recognised as a global issue, it is especially relevant for densely populated countries where food supply and security is under serious pressure. Australian farmers are not immune. Some grave warnings have been sounded from across all agricultural sectors – and all with the same underlying message. The agricultural industry must change many of its entrenched routines and practices in order to survive, and for Australia's primary food production sector it must make these changes to remain competitive within the global marketplace. One commentator was recently heard to align Australia's status in this global issue as to being 'the delicatessen of the region, rather than the supermarket' in terms of supply potential.



Some of the trending issues are defined as being :

- the undeniable and expected massive growth in the demand for food
- the imperative of protecting the areas of arable land currently under cultivation across the globe through the use of modern farming technologies and practice that preserves the integrity of the soil and restores goodness to it
- the need for continual improvement as efficiencies are sought in supply chain practices, crop yield and quality, and in-farm practices and management
- the importance of science and technology to the sector
- how innovation and innovative crops and products will define success
- the generational transformation brought about by a greater ease and comfort of accessing and using information technology
- the reliance on 'partnership' as a means of achieving successful outcomes

RLF is at the forefront

RLF products and systems all work in support of these developing trends and represent the modern future of farm practice.

RLF is at the forefront of the modern farmer practice revolution and firmly believes it is part of the solution to implementing the changes so urgently sought. And especially so in relation to fertiliser practice for ecologically sustainable soils.



This **Special Report** will 'touch lightly' upon some of the future need issues, and discuss the innovative solutions and practical help mechanisms that RLF 'brings to the table' for farmers and growers across the world. The following is included :

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RECOGNITION THAT CHANGE IS REQUIRED

The following two articles appeared recently in Australian media.

Parliamentary Enquiry into the use of Technology

- This media release prefaces a parliamentary enquiry into the use of technology for agriculture. It specifically lists exploring the use of remote observation techniques such as drones, and for enquiry into the use of more sustainable farm chemicals. It drives to the very heart of many of the issues that RLF has been striving to achieve.



Are farmers held back by impediments to emerging technology

Farmers are being asked if they are getting maximum benefit from technology and if not, why not.

<http://www.abc.net.au/news/2015-08-14/parly-innovation-hearing-agriculture-technology/6697874>



The Revolution of Efficiency

- This media release talks about the revolution of 'efficiency' needed to find a sustainable future for Australia's primary producers. Through the use of technology for more efficient watering systems and changed fertiliser practices, efficiencies are being introduced.



Sustainable farming will be next 'revolution in agriculture'

It reduces costs and improves the environment, and one acclaimed CSIRO agronomist says sustainable farming practices are the next "revolution in agriculture".

<http://www.abc.net.au/news/2015-05-29/state-of-tomorrow-sustainable-farming/6504842>



THE REALITIES OF FUTURE NEED

The future of agriculture depends on finding efficiencies and applying change and improvement to the ways of growing and farming.

In the strictest sense of this challenge it all begins with the soil – as the cycle of life in the soil is harnessed in such a way as to underpin the most important part of the new approach to modern farming practice – the sustainability of soil – so it can strengthen and ensure the ongoing requirement to produce more with each growing year. Whilst it is acknowledged that this forms only a part of the cycle of growth and development for each plant within the crop, it is a vital one and ultimately the benefits to farmers and growers will be significant. If, through better care and understanding of our soils and by introducing changed fertilising practice, increased organic matter and stronger soil structure can be delivered, this is a fundamental positive result for the 'building blocks' of efficiency.

The reality is, that over coming years farmers will have no option but to increase outputs and reduce input costs. This forced transformation through a period of change from existing commonly held farmer practices, to experimenting and experiencing new innovative product technologies and concepts is inevitable.

Increase Outputs and Reduce Input Costs

RLF has a vision for this future challenge and how it can be achieved. And RLF is delivering these innovative solutions right now.



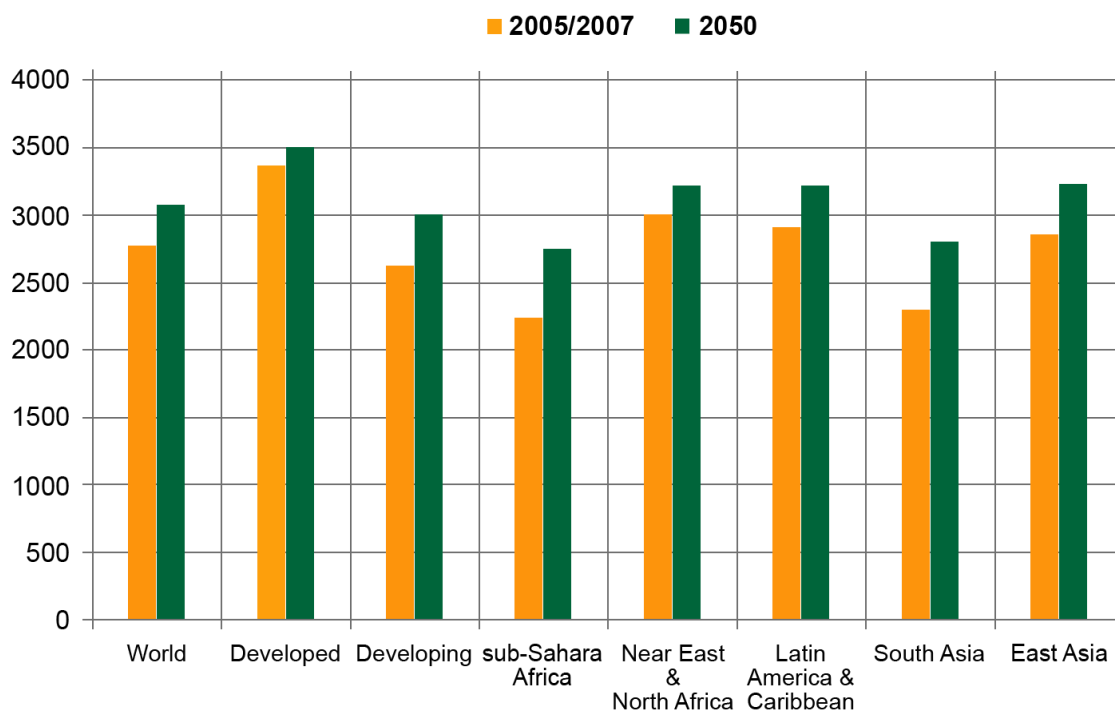
A GLOBAL SNAPSHOT OF FUTURE FOOD NEED

The following chart makes a simple and obvious statement. It shows the per capita food consumption as calculated in 2007, with a projection made for the world's per capita food requirement by 2050. It is a powerful reminder of the challenge ahead for the world and its agricultural industries.

In all regions, and population groupings, the need going forward is expressed as significantly higher.



Per capita food consumption (kcal/person/day)



This is a compelling and complicated issue with many food consumption issues involved.

Some of these consumption issues will see food types and consumption levels change across countries, with a move by some towards producing and consuming more livestock products and experimenting with different types of meat and higher dairy produce consumption. It may be that some developing countries will be slow to transition. This is an evolving and complex matter that ranges a variety of reasons across land availability, climate, soil structure and condition, access to water, and cultural and religious factors and taboos involving cattle and pig meats in particular in large developing populations. The need for cereal crops, and especially for rice as a staple food commodity will continue to be great.

The World needs more food

A 2011 report released by the Associated Press captures the spirit and importance of agricultural change. It demonstrates too that this is not a new problem needing a solution. It has been on the agricultural radar for quite some time.

UN : Farmers must produce 70% more food by 2050 to feed population

A quarter of farmland is highly degraded, according to the first report into the state of the world's land resources



Farm workers in Yinchuan, China. Most of the world's available land is already being farmed, the UN report said. Photograph: Feng Li/Getty Images

The United Nations has completed the first global assessment of the state of the planet's land resources, finding in a report that a quarter of all farmland is highly degraded and warning the trend must be reversed if the world's growing population is to be fed.

The UN Food and Agriculture Organisation (FAO) estimates that farmers will have to produce 70% more food by 2050 to meet the needs of the world's expected 9-billion-strong population. That amounts to 1bn tonnes more wheat, rice and other cereals and 200m more tonnes of beef and other livestock.

But as it is, most available farmland is already being farmed, and in ways that decrease its productivity through practices that lead to soil erosion and wasting of water.

This means that to meet the world's future food needs, a major "sustainable intensification" of agricultural productivity on existing farmland will be necessary, the FAO said in its report, State of the World's Land and Water Resources for Food and Agriculture.

The report was released on Monday, as delegates from around the world meet in Durban, South Africa, for a two-week UN climate change conference aimed at breaking the deadlock on how to curb emissions of carbon dioxide and other pollutants.

The report found that climate change coupled with poor farming practices had contributed to a decrease in productivity of the world's farmland following the boom years of the "green revolution", when crop yields soared thanks to new technologies, pesticides and the introduction of high-yield crops.

Thanks to the green revolution, the world's cropland grew by just 12% but food productivity increased by 150% between 1961 and 2009.

But the UN report found that rates of growth had been slowing down in many areas and today were only half of what they were at the peak of the green revolution.

It found that 25% of the world's farmland was now "highly degraded" with soil erosion, water degradation and biodiversity loss. Another 8% was moderately degraded, while 36% was stable or slightly degraded and 10% was ranked as "improving".

The rest of the Earth's surface is either bare or covered by inland water bodies.

In western Europe, highly intensive agriculture has led to pollution of soil and aquifers and a resulting loss of biodiversity. In the highlands of the Himalayas, the Andes, the Ethiopian plateau and southern Africa, soil erosion has been coupled with an increased intensity of floods. In rice-based food systems of south-east and eastern Asia, land has been abandoned thanks in part to its loss of cultural value.

The report found that water around the world was becoming ever more scarce and salinated, while groundwater was becoming more polluted by agricultural runoff and other toxins.

In order to meet the world's water needs in 2050, irrigation must become more efficient because most systems perform well below their capacity, the FAO said.

The agency called for new farming practices such as integrated irrigation and fish-farm systems, as well as overall investment in agricultural development.

The investment deemed necessary until 2050 is \$1tn (£642bn) for irrigation water management for developing countries alone, with another \$160bn for soil conservation and flood control.

<http://www.theguardian.com/environment/2011/nov/28/un-farmers-produce-food-population>



INNOVATION AND CHANGE

Chemical

By utilising concepts such as :



- fertilising the seed,



- applying high-analysis broad-spectrum Ultra Foliar fertilisers (via the leaf)



- supporting soil-based granular fertilisers at a more effective rates of application



as with RLF's Integrated Fertiliser Management (IFM) strategy, will the change to modern farming practice become more widely accepted in an effort to meet the goals generated by the trends and challenges for the future.

RLF's IFM strategy has been widely reported on and can be viewed and listened to [here](#).



RLF understands that this is a global issue, not just an Australian issue.

Accordingly, RLF has built its product range, marketing programs and infrastructure supports for farmers and growers in all marketplaces across the world. These are important and transformative fertiliser routines for the future.

**Practices must Innovate
and Change**

The statements that follow are the outcomes consistently achieved by a modern IFM fertiliser strategy :

- **Plant**

IFM provides the plant with biological results of strength, increased root size and development, shoot and tiller size and number, and overall general physiological well-being. It is these results that give the plant the real-life advantages that result in potentially bigger, better and greater crop results.



- **Yield**

IFM can improve yield performances that can be both measured and quantified. As a result, higher yields provide greater financial return to the farmer.

- **Economics**

IFM gives the ability to achieve a positive economic benefit as a direct result of using this process. RLF products and systems ensure that the farmer can confidently and reliably invest in products that are capable of delivering a significant return on investment.

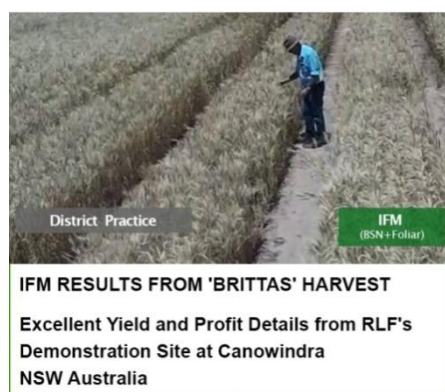
- **Produce**

IFM has been shown to grow healthier (with higher nutritional values) and better quality produce.

- **Sustainability**

IFM produces more high-value biomass for the future of the soil. RLF products have been demonstrated to substantially increase the nutrient value and biomass of the root systems as well as the above-ground plant matter. Following harvest the plant matter returns its nutrition to the root biomass, which in turn directs its nutritional value back to the soil, ready for future use.

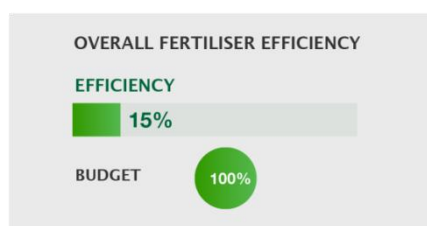
These additional links to three relevant publications will also help you understand the power of this innovative fertiliser strategy and give an insight into the results made possible.



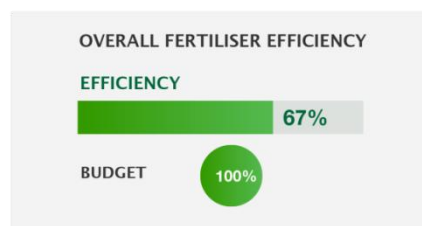
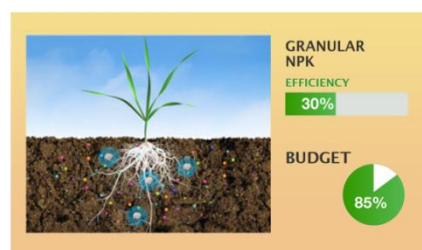
Practices

NEW PRACTICE

BASIC FARMER PRACTICE



INTEGRATED FERTILISER MANAGEMENT



SEED

SOIL

LEAF

What this chart so graphically demonstrates is :

- 'OLD' practice will generally see 100% of the fertiliser budget used as NPK
- 'OLD' practice typically sees no foliar applications, unless remediation of any known nutrient deficiency is required
- supporting the success of IFM actually relies on the reduction of granular NPK use
- the success of IFM through the combined (or integrated) use of BSN Seed Priming fertiliser, granular NPK and Ultra Foliar fertilisers shows better results and greater overall efficiencies
- seed fertilised with BSN Seed Priming fertiliser – utilising a very small percentage of the overall fertiliser budget can result in optimal yield potential as opposed to that of seed not fertilised, which risks below optimum yield potential
- application of Ultra Foliar fertiliser provides plant available P, NK + trace elements during vital growth and development stages
- the protection of the soil through the return of greater organic matter after each crop is both an investment for future returns and for the ongoing cropping-potential of the land

Technology

Innovative, interactive resources that support our customers has also been recognised by RLF as an informative and helpful means of engaging with modern practice.

Several accessible tools, just a click or two away on any computerised device – whether desktop or hand-held – can give a much greater degree of confidence to any farmer as decisions are made with respect to their particular cropping or grazing environment.

RLF knows that every field, property and environment can all experience different problems.

Some of the easy access links now available for our customers as they partner with RLF and implement our modern crop protection strategies are :

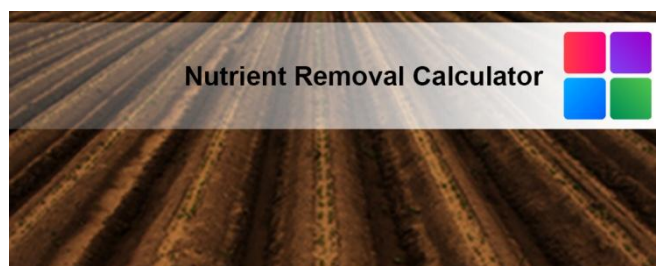
Maxiyield

The easy to use step-by-step calculator that allows you to determine your fertiliser requirements as a fully integrated approach to fertiliser regimes. Get the information you need, to make all of the decisions necessary to take control of your own fertiliser routines with the utmost confidence.



Nutrient Removal Calculator

Every time a crop is grown, nutrients are taken from the soil. Understanding how the science of nutrient removal works and how all elements work together to bring about successful outcomes for plant growth and yield is important knowledge. This calculation tool is designed exactly for this purpose.



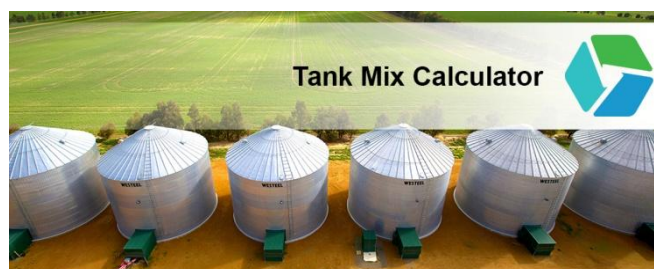
Crop Nutrient

If you need to know more about the twelve essential plant nutrients and their roles in plant health then this interactive tool gives you the answers. Access to understanding the key nutrients needed to make your crop thrive has never been easier.



Tank Mix Calculator

This RLF developed calculation tool allows you to quickly formulate the cost effectiveness of a wide range of foliar fertiliser solutions for different crops and cropping situations. Define and input your own specific parameters.



RLF Chem Test

RLF recognises the importance of understanding compatibility facts and has developed this unique resource dedicated to understanding the compatibility of the RLF product range with industry chemicals and other agricultural products such as fungicides, pesticides and herbicides. This information is invaluable.



Crop Fix

Experiencing crop or plant problems ? This interactive tool gives you easy access to technical expertise when you most need it. Upload your pictures or video of any crop or plant problem you may having difficulties with and see what RLF's Technical Group recommend to help find a solution.



There is also direct email access given for information and advice from RLF's top scientific, technical and chemical team members. Our professional staff are always at the disposal of our customers.



Ask the Doctor

Dr Hooshang Nassery, Head of Technical, can answer any technical or plant problem or question that you have.

Simply ask.



Ask the Chemist

Steve Wornes, Senior Process Chemist, can answer any chemical or compatibility question that you have.

Simply ask.



CONCLUSION

There are several known facts about the challenges and changes that lie ahead.

They are :

- the undeniable and expected massive growth in the demand for food
- the imperative of protecting the areas of arable land currently under cultivation
- the need for continual improvement and efficiencies
- the importance of science and technology
- the requirement for innovative crop protection solutions
- the reliance on 'partnership' as a means of achieving successful outcomes
- the willingness of farmers and growers to embrace these factors for change
- the acceptance of the importance of the soil



The beginning of every cropping cycle, begins with the soil.

If the soil has been restored because of the quality of the organic matter ploughed back into it, it will be invigorated and imbued with greater natural nutrient.

This is the basis of IFM. This is an exciting and innovative farm management strategy.



A partnership with RLF can be relied upon. It is a company with world-leading technologies and products and it leads the industry with its innovative liquid fertiliser products, systems and crop protection solutions.

RLF is committed to modern farming practice.

RLF is dedicated to building a vibrant and successful global network that places the interests of our customers first and foremost as they strive to bring food security to their part of the globe.

RLF shares this sense of purpose with all its team members who are able to provide advice as they work within their local communities.

RLF believes it can do much to contribute to the global effort of feeding a hungry world, and by doing so support the economic development of countries everywhere – whether large or small.

RLF understands the importance of sustainable farming and to this end ensures that its premium products return more high-value biomass for the future of the soil.

RLF delivers both technology and innovation – **FOR THE SAKE OF OUR SOIL.**

Partner with us as we face the challenges ahead.

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Date : 9th September 2015

