



Australian Government

Chief Scientist

DR ALAN FINKEL AO

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Opening keynote

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BRISBANE

It's a great pleasure to be the opening act of the Ag and Food Tech Symposium, in AusBiotech's 30th anniversary year.

And I say that notwithstanding a paragraph I came across in this year's Industry Position Survey:

"Over 80 per cent of leaders say they are concerned about the current review of the R&D Tax Incentive led by Mr Bill Ferris, Dr Alan Finkel and Mr John Fraser."

But I won't take it personally – or I might worry about coming into the room with just one in five of you onside.

To the four in five, let me just say that the aims of the review were laudable – to improve the integrity, efficiency and additionality of the system. And we kept those aims firmly in mind throughout.

But I'm all in favour of frank and fearless comment. In that spirit, I can admit that I've got worries of my own when it comes to the topic of biotechnology.

It's a fascinating and important field. But my wife Dr Elizabeth Finkel, the editor-in-chief of Cosmos magazine, knows far more about it than I do. When we're on joint panels, we play it like the ultimate mixed doubles champions in tennis: I get the baseline shots on gravitational waves; she takes the volleys on CRISPR gene editing.

And that game-plan worked perfectly well... until AusBiotech asked both of us, in our *individual* capacities, to write a piece for the 30th birthday publication.

A double page spread – Dr Alan and Dr Elizabeth! Finkels at fifty paces! What's a humble Chief Scientist to do?

Squib, of course – which I'm proud to say is exactly what I did. I focused my article on just that segment of the biotechnology horizon that I know best, all things pertaining to the human brain.

There'll be no squibbing today.

The view is simply too good through the wide-angle lens.

A big harvest on the horizon...

I look out across the horizon for biotechnology in agriculture, and I am staggered by the possibilities that a technology like CRISPR represents.

This is not genetic modification as people have imagined it since the 1980s.

This is something fundamentally different: a pair of scissors that we can wield with nuance, efficiency and control.

We are barely two years into the CRISPR age – and who can keep count of all the extraordinary applications?

- Mushrooms that don't brown in storage
- Barley that makes its own ammonium fertiliser from nitrogen in the soil
- Beetroot that makes the Parkinson's drug L-dopa
- Tomatoes that conquer anaemia
- Pigs immune to swine fever
- Chickens that produce only female offspring, for eggs
- And cattle that produce only males, for meat.

Add to this the phrase 'gene drive'... and the urgency of this conversation is clear.

As far as I know, nobody complained when scientists made it possible to bring about the eradication of a virus, like smallpox.

But we might have different views on 'xenocide' – the extinction of a species we decide we don't like, such as the *Anopheles* mosquitos that spread malaria.

And gene drive technologies may well put that power in our hands. We could bring about a xenocide before more than a handful of people even *know* the term!

But that is a much bigger topic, for another day.

Shorn of all speculation, the facts are compelling. We have the makings of a global revolution in what we farm and the way we farm it.

And that's an opportunity too big to ignore.

Today, the world spends about \$5 trillion US on food every year.

Come 2015, there won't just be a billion more mouths to feed – there will be double the number of mouths with middle-class tastes.

Friends, it's true: there's a dining boom up ahead.

The smart investors know it.

In 2014, the global venture capital investment in agricultural technologies topped 2.3 billion dollars US. In 2015, it doubled – to 4.6 billion dollars.

And we want the return on the dining boom to be more of those dollars flowing into Australian Agricultural Tech.

Think of the *mining* boom and all it left behind.

- The world's biggest network of autonomous trucks, at Rio Tinto's mines in the Pilbara.
- A remote operations control room in Perth that puts NASA to shame.
- And an Australian Mining Equipment and Technology Services sector, known as METS, with the quality brand to be globally competitive today.

The METS sector is worth tens of billions of dollars, with billions of dollars of exports.

If we get it right, the dining boom can leave us a FETS sector to match – that's 'F' for farming.

And we're raring to show the world how twenty-first century farming ought to be done!

But who's paying attention?

But what of the journalists? What of the politicians? What of the public? How far has their understanding progressed?

Just out of interest, I went to the Parliamentary records – all fully searchable online.

The phrase “genetically modified” has been kicked around many times – often, with the word ‘moratorium’ attached.

But here is a list of words and phrases that have yet to be uttered or recorded even once:

- CRISPR
- Gene editing
- Gene drive

That suggests to me that the vocabulary of the Parliament is well behind the frontier of the science. I don’t know what conversations the politicians might be having in other quarters – but I *do* know that history won’t wait.

A Petri dish for fear...

Of course, we might say that the silence thus far is a good thing – if no-one’s talking about gene editing, at least no-one’s insisting that we ban it. But we know from past experience that progress in the absence of policy is just not sustainable!

Let’s face it, you don’t need to *persuade* politicians to ban something outright in order to frustrate its progress.

A situation of legal uncertainty or public confusion is more than enough to convince them.

It makes consumers nervous. It makes investors wary.

And that means that good science – important science – goes undone. It also sets the public conversation by default, to the starting position of fear.

We focus on the risks of the new – we forget the demonstrated harms of carrying on as we are today.

- Like the toxic run-off of pesticide and fertiliser to the Great Barrier Reef.
- Like the 2 billion people who suffer from malnutrition.
- Like the fact that agriculture accounts for about a quarter of global greenhouse gas emissions.

And, of course, you don't need to talk to a scientist, read the literature or grasp the facts to form an opinion. Just as you don't need the *evidence* on your side to win a Twitter debate.

We have replayed those conversations many times.

But I genuinely believe that we have an opportunity today to re-set them – just as advocates for new technologies have done before.

I think of IVF: at first controversial, and now so common that we tend to forget how violently we once disagreed.

Yes, it took long and patient explanation of the science... but in the end, it wasn't the scientific data that turned the debate.

It was the undeniable evidence living in our midst: happy families and healthy children.

Tangible benefits sell technologies – it's as simple as that.

To date, in contrast, most of the benefits of genetic modification have been hidden away from consumers.

I think of:

- The CSIRO cotton that cuts insecticide use on farms by up to 85 per cent.
- Or the tomato with a longer shelf-life.

It's the farmer and the distributor who see the gain. Of course, the consumer might benefit indirectly, if the retail prices fall – but they won't link that saving to the sticker that says 'GM'.

The next wave of products can be different. To follow the success of IVF, I recommend that you bend over backwards to ensure that the next wave of products present to the consumer as not just cheaper... but:

- Lower calorie
- Allergen free
- Or vitamin enhanced.

And not just healthier – but *kinder* as well.

Imagine... if chickens produced only female offspring, and industry no longer needed to cull healthy males!

We know that consumers care about such things. Most of us already pay a premium for free-range eggs. Surely we can be persuaded to eliminate the killing of male chicks one day after they are hatched.

Consumers simply need to see the benefits, in a tangible way; and feel confident that the science and the regulatory framework are sound.

Consumer benefits should be as much in your minds as is ensuring a well-run industry.

You already show excellent leadership in the latter. As I read AusBiotech's consistent message to Government, this organisation, and the sector it represents, are not asking Australians to take it on trust.

You are calling for good regulation – because you recognise that it is the socially responsible *and* the commercially prudent path.

And you have made that call in the knowledge that very few, if any, governments around the world have thus far confronted the issue proactively – or responded particularly well.

We have the opportunity to lead the way.

Building seedbed Australia

After all, look at the stunning success we have achieved in clinical trials, with the active support of the community:

Every year, around 1000 new clinical trials commence in Australia, capturing a \$1 billion dollar investment.

We do it on the strength of our science and the integrity of our regulatory institutions.

Together, they add up to a quality brand. And quality counts.

You could say that we have yet to achieve the same success with respect to medical devices. I agree.

I find it remarkable that our current regime hands a competitive advantage to imported technologies, whilst hamstringing the local developers.

But until we achieve a better balance, let's not lose sight of the contrast between medical devices and clinical trials.

That's the difference we can make by our choices in regulation.

Can we reach from our present position in agricultural technology regulation to a global best-practice regime?

There is much to suggest that we can.

First, we build from a strong foundation in research, with great breadth and depth of expertise.

And you'll have to forgive me for waxing lyrical on that topic today. I have just embarked on a two month tour of the country's big ticket research facilities.

And it's a working holiday – part of the consultation process for the National Research Infrastructure Roadmap.

That Roadmap will help to guide the next big wave of investments in the great science equipment we want to see.

And it's amazing – everywhere I go, people have ideas for spending money!

Who would have thought?

But Vice-Chancellors and research agency heads know the formula as well as we do: science converts money into knowledge; and innovation converts knowledge back into money.

The foundations are well in place today:

- from the National Imaging Facility
- to the Australian Plant Phenomics Facility
- to the supercomputing infrastructure on which biotechnology relies.

The Issues Paper flags what we can do next. And I would be very surprised if the strong biotechnology thumbprint on that document is not carried through to the Roadmap that ends up on the Prime Minister's desk.

We have, and we will continue to make, a very strong case for Australian research.

Second, we have a sterling global reputation for farming smart, clean and green.

We have harnessed that reputation to good effect: building markets and persuading consumers to pay a premium price.

So we begin from a platform of trust. And how many nations can say they stand with us on that platform today?

Third, we have regulatory agencies of unquestioned ability and integrity.

This, too, is acknowledged around the world; just as it is acknowledged by AusBiotech members.

And the Productivity Commission has cited you as an authority on that point, in its latest report on the regulation of Australian agriculture.

Our institutions are advantages we need to harness as well as defend.

And fourth, we have this organisation – a coherent voice for the sector and a clear point of access for government.

Biotechnology was barely a blip on the national radar when AusBiotech first convened in the 1980s.

Since that time you have achieved extraordinary visibility for biotechnology, particularly in the biomedical field.

Over the last 11 years your success has been led by your CEO, Dr Anna Lavelle.

Anna understands the importance of advocacy not just for the members, but for the consumers. She understands the importance of new technology not just for cost reduction but for broader benefits.

Anna leaves this organization in excellent condition. If any organisation has the vision and stamina to make the case for agricultural technology, it is this one.

Seizing the momentum

I look at those four strengths: research, reputation, regulation and representatives.

And I say we can be forgiven for big ambition!

It is big ambition that will ensure a strong showing for agricultural technology in the public policy discussions underway today.

Look across the National Innovation and Science Agenda, and the opportunities add up.

- The Research Infrastructure Roadmap
- The CSIRO Innovation Fund.
- The development of an impact measure for research
- The new industry-focused PhDs
- The Biomedical Translation Fund.

Take the last one I mentioned, the Biomedical Translation Fund. I am a strong advocate for that Fund, as I have said many times before.

But if we have a Biomedical Translation Fund... why not an Agricultural Technology Translation Fund as well?

I'll leave that one with you to think about its merits, and who might be its advocates.

Conclusion and challenge

For today, let me wish you all the best for this important conference.

Let me encourage you to focus on the tangible benefits that Australian consumers will see.

And let me lend my support to a regulatory framework that puts this country ahead of the pack: for scientific advancement, and consumer trust.

Friends, the future is ours to farm. Let's show the world how it's done.

THANK YOU.