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National Food Security Strategy
Department of Agriculture, Fisheries and Forestry
GPO Box 858
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FOOD SECURITY SUBMISSION

This submission is a response to the Department's ***National Food Security Strategy: discussion paper*** and is submitted on behalf of all organic and biodynamic operators in Australia, who are concerned that Australia should move towards more sustainable and healthy methods of food production.

To meet the challenge of sustainably producing nutritious food distributed equitably to an expanding population will require a seismic shift in thinking about how we grow food and what resources are needed as inputs. Rather continuing past practice of destroying our ecosystems to expand food production, serious research is needed to determine how to improve our food production systems sustainably. To this end, the OECD (2020) notes that:

> *Land use is central to many of the environmental and socio-economic issues facing society. Globally, greenhouse gas emissions from the agricultural and land-use sectors account for 23% of anthropogenic emissions, and the loss and degradation of terrestrial ecosystems threatens 25% of animal and plant species with extinction. With global population projected to grow to nearly 10 billion people by 2050, food production will need to increase significantly. Additionally, global action on climate change will likely include substantial increases in energy production from biomass – further increasing the pressures on global landuse systems. Given the inter-connected nature of these biodiversity, climate, land and food-related challenges, co-ordination and coherence between different government policies affecting the land-use nexus is crucial.*

Thankfully, we are witnessing a profound global shift towards more sustainable food systems, driven by trends in both consumption and production. The organic movement has already resolved the balance between environmental protection with commercial agriculture through a principles-based approach to achieving sustainability. But we can do much better in Australia.

The experiences gained from our industry will be invaluable to informing Australia's future food security. We offer to collaborate with the Department in developing the future food strategy.

Yours faithfully,

Peter Hislop Speers
Chair, Organic Industries of Australia Ltd

Global agriculture and sustainability in context

The challenge

By 2050, agriculture will need to produce almost 50% more food, fibre and biofuel than in 2012 (FAO 2021).

- Agricultural production in South Asia and sub-Saharan Africa will need to increase by 112% to meet estimated calorific requirements.
- The rest of the world will need to produce at least 30% more.

Achieving this will mean increasing crop yields and cropping intensities as well as diversifying crop varieties. There will be trade-offs among nutritional value, crop productivity and climate resilience because there are limited options for expanding the cultivated area.

While human use of land and water for agriculture has not yet peaked, all the evidence points to slowing growth in agricultural productivity, rapid exhaustion of productive capacity and generation of environmental harm.

The interconnected systems of land, soil and water are stretched to the limit.

- Convergence of evidence points to agricultural systems breaking down, with impacts felt across the global food system. Current patterns of agricultural intensification are not proving sustainable.
- High levels of pollution and greenhouse gas emissions are stretching the productive capacity to the limit and severely degrading land and environmental services.
- Pressures on land and water resources have built to the point where productivity of key agricultural systems is compromised, and livelihoods are threatened.
- Water pollution is a rising global crisis that directly affects health, economic development and food security.
    - Although other anthropogenic activities such as human settlement (urbanisation) and industry are major contributors, agriculture has become the dominant source of pollution in many countries. Degrading water quality is a significant threat to food safety and food security.
    - Of particular concern is pollution caused by emerging chemical contaminants, including pesticides, livestock pharmaceuticals and plastics, and potential antimicrobial resistance for which there is currently little regulation or monitoring.

Taking to scale production that is more environmentally responsible and climate smart can reverse trends in the deterioration of land and water resources and promote inclusive growth.

Small holdings

Most of the world's 608 million farms (around 84% of the total) are small, run by an individual or family, rely primarily on family labour, and do not use industrial farming methods—in fact, they mostly use methods more like organic farming. These small farms produce up to 80% of the food supply in Asian and sub-Saharan Africa. Small farms are the workhorse of world food production.

Despite widespread perceptions, sustainable smallholders can be really productive.

- A large study examining smallholder agriculture covering 286 projects, over 37 million hectares in 57 developing countries, found that when sustainable agriculture was adopted, average crop yields increased by 79%.
- Also, sustainable systems were more diversified, with yields often composed of more than a dozen crops and various animal products, generating higher yields per hectare.
- Higher yields mean increased household food security and higher household income, especially when money was saved through less fertiliser and pesticide use.
- An analysis of 15 case studies in Africa demonstrated that organic agriculture brings multiple benefits to the community, including more nutritious diet and health, reduced occupational hazards through decreased exposure to pesticides, and job creation.

Ecological intensification of agriculture

Ecological intensification (EI) is one pathway proposed to sustain yields while reducing threats posed to agriculture by the environment (MacLaren 2022).

EI is defined as the enhancement of ecosystem services to complement or substitute for the role of anthropogenic inputs in maintaining or increasing yields. Anthropogenic inputs have underpinned necessary gains in productivity and food security since the onset of industrial agriculture, but their widespread over-use has incurred substantial environmental costs.

EI seeks to retain productivity while mitigating environmental impacts and is a strategy that could be implemented under various sustainable agriculture paradigms, such as agroecology, sustainable intensification, and climate-smart agriculture. Managing farmland to provide ecosystem services that support productivity can also encourage farmers to avoid environmentally degrading practices.

EI could help return agriculture into a 'safe operating space' for humanity. Using a novel application of meta-analysis to data from 30 long-term experiments from Europe and Africa (comprising 25,565 yield records), a notable recent study (MacLaren et al) investigated how field-scale EI practices interact with each other, and with N fertiliser and tillage, in their effects on long-term crop yields.

The report confirmed that EI practices (specifically, increasing crop diversity and adding fertility crops and organic matter) have positive effects on the yield of staple crops. The report demonstrated that EI practices have a largely substitutive interaction with N fertiliser—so that EI practices substantially increase yield at low N fertiliser doses, yet have minimal or no effect on yield at high N fertiliser doses. EI practices had comparable effects across different tillage intensities, and reducing tillage did not strongly affect yields.

Labels for agricultural production systems

There is significant confusion in the Australian community about the plethora of labels that are applied to different agricultural production systems. This confusion largely results from the absence of coherent action from governments to define or regulate these labels. The producers who use these labels to signal product virtues to the market can also intend different meanings for similar labels.

The different methods of agricultural production can also have a significant effect on biodiversity.

- Since the advent of **industrial farming** (or conventional farming) in the first half of the 20th century, most farming methods have degraded biodiversity through extensive clearing of natural landscapes, farming methods that degraded the soil, and excessive use of industrially produced fertilisers, pesticides and herbicides that can pollute the environment and contaminate the food supply. In its extreme form, industrial farming treats soil as merely a growing medium, with all nutrient enrichment and pest & weed management occurring using synthetic compounds.
- **Organic and biodynamic farming** methods arose in the early 20th century in reaction to the industrialisation of agriculture. It sought to only use natural agricultural production methods. In the late 20th century, this evolved resulting in the codification of these natural production methods into organic standards, and the auditing of individual producers against those standards to provide assurance to the market about the production claims being made. Organic and biodynamic standards mostly preclude the use of GMOs and allow only natural fertilisers, pesticides & herbicides.
- While organic production principles encompass environmental sustainability, this linkage may not be explicit in the standards. Consequently, in most countries, regenerative organic agriculture complements the organic standards by educating organic farmers in best practices for improving the biodiversity outcomes and the productive capacity of the farm. In Australia, the confusion around organic standards that arises from no government regulation, has seen **regenerative agriculture** emerge as, largely, something separate from organic agriculture. And because there is no audited standard for what constitutes "regenerative" agriculture, the claims faced by consumers are also confused.

Organic agriculture and regenerative agriculture are environmentally sustainable because both aim to maintain or improve the ecosystem services. In contrast, industrial agriculture doesn't necessarily invest to maintain the ecosystem services that underpin the agricultural production. Instead, land is often managed through the application of synthetic fertilisers, pesticides and herbicides to provide an 'optimal' growing medium. Over time, the ecosystem services can be degraded, so that the growing medium increasingly requires more synthetic inputs to maintain production. The farming methods and chemicals can also cause 'external' detriment to the off-farm environment or other farmers.

The degradation to ecosystem services that is inherent in industrial farming is a form of market failure. The economic problem is that, initially, the marginal cost is often small and ecosystem services can be very resilient; however, as industrial farming grows in scale and over time, the marginal costs increase, and the environment struggles to recover naturally. The market failure is that the 'market price' for the industrial farm produce does not include the cost of degrading the ecosystem services that were essential in its production.

Over the last few decades, we have seen increasing market pressures for environmentally sustainable food production. But these pressures are rather disparate and tend to be focussed

on individual issues, rather than systemic production of environmentally sustainable food. For example:

- increasing numbers of **consumers** have been worried about the chemical contamination of food, and so respond to virtue signalling—through labels such as organic, spray free, free range, sustainable—even though the labelling of food products in this way is often devoid of any definition or assurance
- **investors** are demanding greater attention to sustainability and ethical imperatives—these demands include pressure for the agriculture sector to reduce its carbon emissions, increase carbon sequestration, and provide greater transparency on animal welfare and environmental impacts

Organic food

Organic and biodynamic agriculture is among the broad spectrum of food production methods which are focussed on sustainable use of natural resources and minimising production effects on the environment.

Organic farming adopts a holistic production management system which promotes and enhances agri-ecosystem health, including biodiversity, biological cycles, and soil biological activity. This is accomplished by using, where possible, cultural, biological, and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system.

It is established that the production system affects the chemical composition of plants and animal products, and that scientific reviews find that organically produced food has a different chemical composition to conventional food. Notwithstanding the compositional differences arising from organic farming, the consequential public health implication of the various compositional differences is under active scientific debate. Comparisons are complicated by organic food consumption being strongly correlated with several indicators of a healthy lifestyle and by conventional agriculture "best practices" often being quite close to those of organic.

The Australian community needs to understand better, and be educated better, in:

- the effects of improved chemical composition of food on health outcomes

compared with:

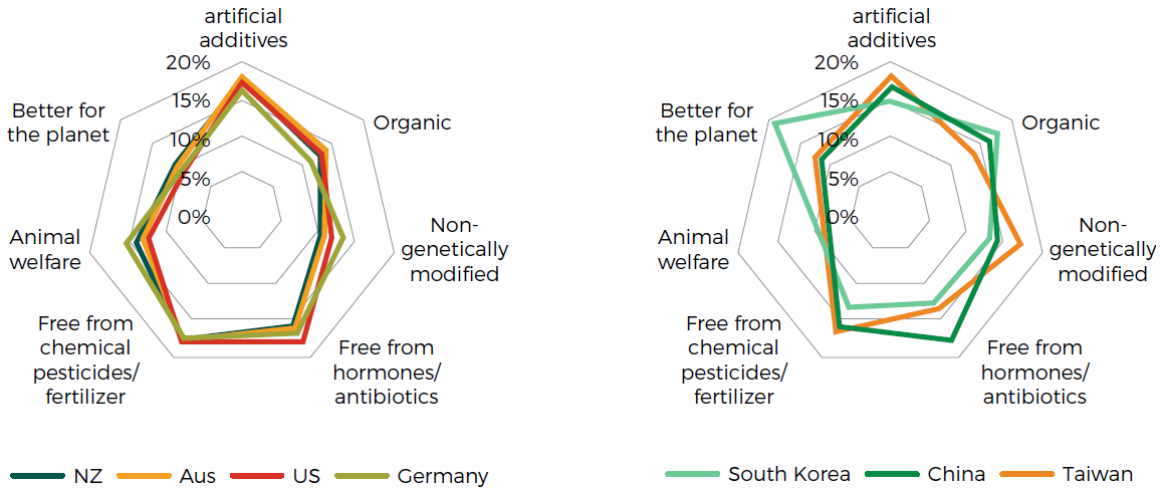
- the long term consequences for health outcomes of sustained application of chemical fertilisers, pesticides and herbicides

"Organic" is also a labelling term that denotes products that have been produced in accordance with organic production standards and certified by a duly constituted certification body or authority. Most nations have specific regulations in place to protect consumers and producers of organic food, so that food that is labelled as organic must be certified to standard. Australia is the only advanced nation not to have such a system for its domestic market.

The motivation for producing organic food is predominantly based on human and environmental health, healthy food and ethical foundations. Our research indicates that an average 41% of consumers purchase organic products at least once per month, but over 60% of Millennials are purchasing organic products.

An organic claim by itself does not necessarily rank highly in consumers' minds. However, three key attributes of organics (free from artificial additives, free from pesticides, and free from hormones and antibiotics) do rank highly for consumers (Chart 1).

CHART 1: CLAIMS CONSIDERED BY CONSUMERS WHEN PURCHASING FOOD AND DRINK



(Organics Aoteraroa New Zealand, 2021)

A lack of trust in organic labelling emphasises the need for regulated systems—23% of Australian consumers identified that full trust in certification labelling may induce them to buy more (Organics Aoteraroa New Zealand, 2021).

Consumers have some understanding of the benefits of organic food and products. However, a deeper understanding remains limited to a small proportion of consumers. Education around the broader benefits of organics is critical for continued industry growth—28% of Australian consumers indicate that a better understanding may induce them to buy more organic products (Organics Aoteraroa New Zealand, 2021). Notwithstanding this, growth in the consumption of organic products remains substantially higher than for overall growth in consumption.

Sustainability

Sustainability is concerned with ensuring that the wellbeing of future generations is at least as high as that of the current generation. The wellbeing of a generation depends in large part on the overall 'stock' of resources that is inherited from previous generations. One of these resource stocks is the environment, which supports the consumption of market products as an input to production.

There are ever increasing global drivers of sustainable agriculture—including international obligations, investor and consumer preferences, and environmental-social-governance commitments—that are placing pressure on Australian agriculture to demonstrate sustainability in the market value chain and to society more broadly.

The OECD (2021) has identified that food systems face a triple challenge:

- ensure food security and nutrition for a growing population
- support the livelihoods of millions of farmers and others in the food chain
- do so in an environmentally sustainable way

However, global land use is currently unsustainable. As global populations rise and economies develop, the demands placed on land-use systems will further increase. Consequently, providing sufficient food, mitigating greenhouse gas emissions, storing carbon in ecosystems, and addressing biodiversity loss, is challenging. Historic land-use change globally, predominantly from the expansion and intensification of agriculture, has resulted in widespread declines in biodiversity, with around 25% of animal and plant species now threatened with extinction, the degradation of 74% of the world's terrestrial surface, and significant greenhouse gas emissions. As the pressures on land-use systems increase, the need for transformative change to address unsustainable land-use practices is growing (OECD 2020).

The United Nations has adopted 17 Sustainable Development Goals to deliver sustainability outcomes, including in respect of food security. There are risks and opportunities for Australian agriculture within the current sustainability policy vacuum, as the expanding awareness of the Sustainable Development Goals globally is reflected through growing demands within value chains and the finance sector.

The Australian Government should play more of a role in promoting the Sustainable Development Goals. In the first instance, it should develop a comprehensive reporting framework and performance indicators for progress on sustainable agriculture. The framework should be harmonised with the national reporting platform for the Sustainable Development Goals.

There is also a role for the Australian Government in harmonising reporting systems that are being implemented in the private sector. It is imperative that a farm-scale natural capital monitoring system that aligns with agreed international and national metrics is developed, tested and implemented to assist land managers respond to the market, government and society expectations of sustainable agriculture value chains.

Assistance provided by Australian Governments to support the shift to sustainable farming is largely non-existent. It's also likely that existing agricultural structures and policies are impeding this shift. The Australian Government could do more to support the growth of sustainable farming, as exemplified by organic and biodynamic growers, regenerative agriculture, and even many best-practice conventional farmers.

The Australian Government should consider the case for imposing taxes on the use of herbicides, pesticides and fertilisers. Such a tax should approximate the costs imposed by chemical use on ecosystems, consumers and workers, and could take account of the inherent risks in residues damaging perceptions of the quality of agricultural produce. Such a tax would also reduce some of the cost disadvantage faced by chemical free farming. An alternative that would achieve the same objective, would be for the government to subsidise chemical free farming.

The Australian Government should also consider the case for payments for ecosystem services. This is starting to be implemented in a limited way in respect of carbon sequestration, but a much more holistic approach—as is being implemented in the UK—could be adopted in respect of the full range of ecosystem services supported by sustainable farming, including enhancing biodiversity.

Organic agriculture

In most countries, organic agriculture is a clearly defined method of production, typically based on government-regulated standards which are audited on a regular basis by private sector certifiers (Food and Agriculture Organization and World Health Organization, 2007).

> *Organic and biodynamic agriculture is among the broad spectrum of food production methods which are focussed on sustainable use of the environment. Organic production systems are based on specific and precise standards of production which aim at achieving optimal agroecosystems which are socially, ecologically and economically sustainable. Terms such as "biological" and "ecological" are also used in an effort to describe the organic system more clearly. Requirements for organically produced foods differ from those for other agricultural products in that production procedures are an intrinsic part of the identification and labelling of, and claim for, such products.*
>
> *Soil fertility is maintained and enhanced by a system which optimises soil biological activity and the physical and mineral nature of the soil as the means to provide a balanced nutrient supply for plant and animal life as well as to conserve soil resources. Production should be sustainable, with the recycling of plant nutrients being an essential part of the fertilising strategy. Pest and disease management is attained by means of the encouragement of a balanced host/predator relationship, augmentation of beneficial insect populations, biological and cultural control and mechanical removal of pests and affected plant parts.*

Organic farming is poised to be part of the climate change solution—organic farmers do not rely on fossil-fuel intensive synthetic inputs to manage pests or increase soil fertility and use farming techniques that sequester carbon in the soil. However, more work is needed to understand specific strategies organic growers can adopt to mitigate climate change, while managing the negative effects climate change is having on their farms through drought, flooding, invasive pests and extreme weather events.

A recent study of a four-decade farming system trial, comparing organic and conventional grain-cropping approaches in North America, found impressive results for organic grain farming (Rodale Institute, 2022). The trial established that organic management matches or outperforms conventional agriculture in ways that benefit farmers and lays a strong foundation for designing and refining agricultural systems that can improve the health of people and the planet.

- Organic systems achieve 3–6 times the **profit** of conventional production.
- Organic systems produce **yields** of cash crops equal to conventional systems after a five-year transition period. However, in extreme weather conditions, such as drought, the organic plots sustained their yields while the conventional plots declined. Overall, organic corn yields have been 31 percent higher than conventional production in drought years.
- Healthy soils **capture carbon** and keeps it out of the atmosphere. Organic systems usually have much more diverse carbon inputs going into the soil so microbial biomass is significantly higher than in the conventional system, leading to higher soil organic matter over time.
- **Water** infiltration is significantly faster under long-term organic management compared with conventional practices.

- **Soil health** in the organic systems has continued to increase over time while the soil in the conventional systems has remained essentially unchanged.

Overall, organic systems leach no toxic compounds into nearby waterways (unlike pesticide-intensive conventional farming), use 45% less energy than conventional, and emit 40% less carbon into the atmosphere.

The policy context

Australian agricultural policy highlights our tremendous efficiency and our production of 'clean and green' food for export to the world, and yet:

- Australia is only a small agricultural producer at the global scale
    - we are a price-taker, with ordinary productivity and no market power
    - we focus on low-value bulk commodity exporting, when the smart choice would be to focus more on value-adding
- our production methods are dependent on the unsustainable use of our environment, and propped up by excessive reliance on herbicides, pesticides, synthetic fertilisers, and genetic modifications
    - in practice, 'sustainability' in the Australian farming lexicon has only ever meant sustaining farm profitability and sustaining growth in exports
- the rest of the world is increasingly turning their back on food produced the Australian mode of production
- climate change is changing the productivity and suitability of our traditional farming regions, and our reliance on industrial-style farming means we are struggling to adapt

and so:

- Australian agriculture risks being left behind—our products risk being frozen out of traditional markets if we fail to adapt to their needs and desires

We urgently need to place the sustainable production of food at the centre of Australia's agricultural policy—in line with the United Nation's Sustainable Development Goals—or we risk losing our export customers.

Organic and biodynamic farming methods, with its systems-focussed attention to sustainable agricultural production, should be at the centre of this shift to sustainability for Australia.

But our organic and biodynamic industry is:

- under-developed compared with other advanced nations
- struggling due to absent enabling regulation
- marginalised in agricultural policy
- lacking for government support and strategy

Australia urgently needs to fix this problem in its agricultural policies.

Policy and regulation

The Australian Government could re-orient **policy advising functions** so that sustainable farming and value-adding to agricultural products are the over-riding policy objectives.

The Australian Government should provide the necessary **regulations to underpin sustainable farming**:

- adopt best practices from overseas to implement robust regulation for producing and marketing sustainable food products, centred initially on organic and biodynamic farming
- work with State Governments to harmonise regulations for domestic organic production and organic exports
    - because Australia is a federation of sovereign States, it's possible for policy initiatives in areas of State responsibility (such as organic regulation) to be implemented in different ways (competitive federalism), either to suit local requirements or by way of experimentation, or in a consistent way (collaborative federalism)
    - either way, for national reforms in areas of State responsibility, it is normal for one State to take the lead on implementing the reform, and the other States then follow the same way
    - sometimes the Australian Government takes the lead on collaboration (but does not necessarily need to implement the regulatory changes)
    - for example, the National Electricity Law is contained in a Schedule to the *National Electricity (South Australia) Act 1996* and all the other States implement that schedule to ensure consistency in the law nationally

Australia could adopt a **target for sustainable farming** like the European Union's target of increasing the total of the EU's agricultural land under organic farming to least 25% by 2030.

- This significant expansion in organic agricultural production would support and significant expansion of organic food and beverage value-adding.

In the first instance, the Government could announce a commitment to move to more sustainable farming practices, adopt a 2030 target for organic farming, and consider ways to define and measure other forms of sustainable farming.

The Australian Government could implement **market mechanisms** which:

- reduce the incentives for unsustainable farming by:
    - removing explicit and implicit subsidies for herbicides, pesticides, fertilisers, genetically modified foods and feedstock, and carbon-based fuels
        - explicit subsidies involve direct government expenditures which support an industry sector—for example, cash payments to producers or users of the product; expenditure on research and development that expands demand for the product
        - implicit subsidies are often difficult to see—for example, it is a form of government failure to not regulate markets to ensure that the level of

production properly accounts for social marginal costs (and not merely reflect private marginal costs)

    - introducing taxes or fees on the use of these unsustainable farm inputs, so that the higher price is more reflective of the social marginal cost of its use
    - removing programs that provide incentives to unsustainable farming practices
- introduce incentives for sustainable farming
- a more holistic approach—as is being implemented in the UK—could be adopted in respect of the full range of ecosystem services supported by sustainable farming, including enhancing biodiversity

Research and development

Many agricultural production practices in Australia are not sustainable—natural resources are typically depleted through conventional production processes. To maintain or increase production, most farmers compensate for this depletion in natural resources by inappropriately applying artificial fertilisers and synthetic chemicals—but, in so doing, they exacerbate the depletion of the natural resources. The result is that the value of agriculture to the nation is less than is recorded in national accounts, and current generations of farmers will bequeath a poorer country to next generations than was inherited by them.

The achievement of sustainable farming methods should be the overriding objective of all publicly funded research, development and extension work in the agriculture sector. Sustainable farming practices would involve practices that emphasise:

- the use of renewable resources and the conservation of energy, soil and water
- recognition of livestock welfare needs and appropriate stocking practices
- environmental maintenance and enhancement, while producing optimum quantities of produce without the use of artificial fertiliser or synthetic chemicals

The organic industry has been practicing sustainable farming practices in Australia for several generations. We are by no means perfect in this regard, but we have developed practices and expertise which can be harnessed to improve practices in conventional farming. Together, organic and conventional farmers could develop best practice methods for adoption across all Australian agriculture sectors.

Our industry mostly feels left out of the mainstream activities of Australia's Research & Development Corporations (RDCs). Industry consultations reveal almost unanimous support[1] for ways to ensure that the compulsory levies for R&D are targeted to industry needs via a greater focus on influencing the work of the RDCs. This is difficult because the organic industry is organised around production systems rather than specific commodities—indeed, our industry produces commodities which are covered by every one of the RDCs. And yet, no one RDC adequately represents our collective needs.

[1] For example: https://organicoperators.au/sites/default/files/OneVoice/Final%20Report%2020180213%20version.pdf

- There is industry consensus on the need to influence and direct RDC strategy and policy, to gain better value for the levies paid.
- There is also a role for RDCs to be more focussed in assisting the industry with:
    - improving market access in export markets—our industry has more complex hurdles for market access than most other agricultural sectors, especially in respect of seeking equivalent recognition of our certification processes
    - export market development

We do have some success in attracting RDC funding when proposals are strictly commodity focussed. Both national and some state governments have also been involved—to differing extents between jurisdictions and over time—in efforts to catalyse an organic sector that is sustainable in the long term, market responsive and that makes the most of export opportunities. And the Rural Industries RDC (AgriFutures Australia) administered a research effort in the area of organic agriculture; however, this has long since been abandoned.

The predominant view across our industry is that it receives poor value from these levies.

The Australian Government should consider establishing a new RDC specifically focussed on the transition to sustainable agricultural production, and for that RDC to collaborate with other RDCs to implement programs which cut across all commodity groups. Organic R&D would naturally sit within this new RDC.

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