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tiar
TASMANIAN INSTITUTE OF AGRICULTURAL RESEARCH

Submission by.

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On behalf of The Tasmanian Institute of Agricultural Research[1].

To:

Senate food production inquiry

Food production in Australia and the question of how to produce food that is:

(a) affordable to consumers;

(b) viable for production by farmers; and

(c) of sustainable impact on the environment.

The Tasmanian Institute of Agricultural Research (TIAR) is a joint venture between the State Government (Department of Primary Industries and Water, DPIW) and the University of Tasmania within the School of Agricultural Sciences (SAS). It is funded by these two institutes as well as federal (ACIAR, education, science and other sources), private, industry body (levy) and direct industry funds either in fully external funded or joint investment projects. Food & fibre are particularly important for Tasmania because of the high proportion they make of the total state financial product. TIAR is 12 years old and has grown considerably since its inception. TIAR has 3 research farms, as well as 2 University and 4 state Government locations around all agricultural regions in the State.

TIAR in conjunction with the SAS is a holistic organisation in its core composition. TIAR conducts research, development, education, training and extension (RDE & E) from "blue skies" to highly market driven practical on ground training. It works across all of Tasmania's agricultural industries. The joint state/university model is increasingly being copied in various forms across Australia (N Qld, WA, Vic, NSW, SA, NT as well as NZ[2]). TIAR has had substantial involvement in creating new Tasmanian Industries around poppies, pyrethrum, viticulture, new low rainfall pastures and other agricultural products. It has also improved other elements of the value chain for example creating products to improve beer fermentation. Critical to the success of TIAR (which is not necessarily realised in the copied models) is the total approach to agriculture being undertaken. TIAR has RD&E groups organised by commodity groups but also has cross themes of value chains, rural social science, climate change, food safety, education and natural resource management. Increasingly it is the ability to efficiently integrate all of these components that is becoming the limiting factor allowing industries to achieve the 3 goals specified above. TIAR recognises this in it's structural organisation. TIAR through benchmarking and other methods strives to achieve the necessary efficiency and effectiveness in its processes, its projects and through them in the industries, government and other clients it serves. Full integration of all these areas into the holistic system can be

more difficult where, for example in food safety, there is no separate national research initiative to drive their inclusion in agricultural innovation and trade. Where evaluations have been carried out for TIAR programs (predictive microbiology in food safety[3], dairy research) they indicate returns on investment of 5 – 11+ fold. This is consistent with international norms. A challenge in the future is to continue and increase these returns via the integrated, holistic model increasingly being developed within TIAR.

TIAR does recognise that the greatest source of new information is external to itself. Thus while having a role in generating new knowledge to enable it to interact globally TIAR must also take a major role in seeking, understanding, modifying and applying that global knowledge to Tasmania. All the purposes specified above are incorporated into the existing TIAR 5-year strategic plan. (available if desired).

My first assertions then are;

1. **That there is considerable national need for integrated, co-ordinated, collaborative RDE and Education in the form exemplified by TIAR that looks at all the dimensions of agricultural systems to achieve the 3 goals indicated. Research cannot be separated from the other elements in the system; all are valuable and involve partnerships. When applied in this way there are considerable financial and environmental benefits that accrue.**
2. **Substantial international input and collaboration followed by local modification is needed to get the global benefits to Australia.**
3. **Together these indicate considerable public good, best funded by a range of partnerships composition (inputs) which is dependant on desired outcomes.**

(a) affordable to consumers;

It must be recognised that affordable to consumers does not necessarily equate with cheap, nor necessarily with low prices to farmers. Rather it is about good value for money in diverse consumer eyes (from billionaires to pensioners, from gourmets to the disinterested). This means diverse products and the need to differentiate and identify and maintain differentiation where value may be added. For instance value can be added by specification of provenance (eg Tasmanian or organic), creating and demonstrating improved quality (eg longer lasting, better tasting), indicating lower footprints (embedded carbon, or water), achieving improved safety, quality or nutraceutical benefits (eg lower bacterial counts) & other mechanisms. Provided the consumer willingly pays for these services food has become more affordable. In a historical sense (despite a recent blip[4]) food is extremely affordable in Australia and more affordable than previously in most developing countries. Many of the issues that surround affordability now encompass other parts of the value chain. The grower costs and returns have little bearing on the final product cost in spite of fluctuating widely with changing input costs and supply levels. For example I have worked on crops (eg Plantago ovata) where only 5% of the value of the consumer product was paid to the grower as a gross return. Discrepancies approaching this magnitude are now the norm rather than unusual in food value chains.

Research organisations such as ours can still create value by working with input costs as these are rising and expected to continue to do so as they become scarcer. Wheat yields in Australia have increased at 2% pa for over 100 years without evidence of decline. Total factor productivity increase has been as great in Agriculture as in the communications industry (>5% pa ABARE data[5]). There are scientific solutions to many of the problems associated with increasing productivity and reducing need for inputs. For example Phosphate can be unlocked from soils rather than applied externally. GPS controlled applications can increase application efficiency of inputs,

better forecasting can reduce risk & these can all be tied together in detailed farm decision models. We can, & are, also creating more efficient production via new science areas (eg GMO's, biological nitrogen fixation, traditional breeding, and novel solutions such as raised bed cropping). However, we are also creating value by quality and safety improvements (eg cool season Tasmanian wines, better understanding of pathogen needs in foods) and better providing for consumer needs (product package size etc.). A critical issue here is the ability to embody this value in the product and thus create consumer awareness of the value. For example via provenance labelling, "buy Australian", "buy local", "buy Low input production", "buy ethical production". These require regulation at point of sale and accurate labelling. As many impose imposts on retailers and the value chain and create educated consumers, they are often unpopular in concentrated marketing systems (such as the food retail system in Australia) or in global systems where buyers want undifferentiated products to allow substitution. Potentially they also require recognition by the elements of the chain of the value proposition and creation of methods to retain the value. Much of our research (RDE & E) value can then be added by improvements in the value chain where most of the value is created not at the production end alone. As indicated above the Australian food retail distribution is highly concentrated. This is out of alignment with other systems that are shifting greatly to direct marketing (eg books via Amazon.com and others) due to the new web-based technologies and our extraordinary abilities to handle data which is now possible. TIAR can add value by creating improvements in value chains. (An example is the Refrigeration Index model used by beef exporters to predict the shelf-life and safety of products that are in-transit.) At an international level Australian food sales are often minor in a global sense and thus considerable effort needs to be expended to differentiate the product and provide value to the international consumer that likewise will provide greater returns to Australian growers. This also requires RDE & E effort to identify, encapsulate and promote the value within the global value chain.

Several assertions result from the above:

1. **Science can solve or alleviate many of the challenges for food production systems. There is no evidence that the rate of advance has slowed. However, increased systems thinking as displayed by TIAR is needed.**
2. **We need to make use of new technologies (eg GMOs) within systems to enhance productivity when they become available.**
3. **Value chain improvements are needed to allow growers to better capture additional value they create (eg provenance labelling, alternative chain types integrating the newest technologies). This requires appropriate regulatory frameworks.**

(b) viable for production by farmers; and

Increasingly it is this area that is failing in our production systems. The age of farmers is rising to the point where in other industries most would be retired. The entry of newcomers is restricted by costs of entry due to the need for large scale farms to be efficient in the existing systems and to the small proportion of the total food value that returns to growers. Increases in grower efficiencies increase supply and allow other parts of the chain to capture the value (often by becoming less efficient themselves due to less than perfect markets). The impost of additional costs and increased skill burdens around other demands on growers (Textbox A) is also restricting entry by newcomers to the industry at all parts of the chain (producers, RDE & E staff and agribusiness). Lack of RDE & E staff and agribusiness staff makes it more difficult for growers to get the information needed to compete. Other areas of the economy are more appealing to those capable of the multitude of tasks needed for a modern producer. This is indicated by reducing enrolments in agricultural training degrees. Recently the deans of agriculture group surveyed the market to

find Australia is only supplying 40% of the agricultural graduates needed by industry. The situation in food science & technology is worse with declining student numbers and no dedicated source of funding. They also indicated low returns to researchers were limiting interest in agricultural science as a career. For TIAR (via SAS) this has resulted in numerous well funded scholarships not being taken up or being returned, a situation not uncommon globally. A coordinated national approach is needed to delivering education and training. Industry and universities need to identify the skills needed in the marketplace and then define knowledge that can be transferred by universities/TAFE through COE that reduce duplication and build on strengths. Additionally there needs to be a mechanism to make student participation in this delivery seen as an exciting pathway for their future.)

Often a range of viable production levels can exist within farms. For example a low input, low cost, low profit system may be more appealing to an older farmer than a high risk, high investment, new, high production option. The latter has greater value for Australia (& consumers) but lesser value for a farmer who wishes to remain where he/she has lived for their lives doing what they understand well already. Systems need to be developed that give maximum value to all participants and therefore encourage shifts to more productive alternatives. Increasingly these systems involve holistic social engagement and system changes such as in land ownership and management. TIAR through its holistic fully engaged delivery model is involved in these areas and can add value through integrated RDE & E efforts in defining and implementing these new systems. Production needs to respond better to signals to ensure optimum value is captured by the integrated system. This requires RDE & E efforts around understanding the signals and developing viable responses to them. For example with Tasmania's mild climate, extensive available water and skilled workforce high value, high quality production systems need promotion, differentiation, development of viable options and education of all involved. This requires investment in infrastructure as well as RDE & E.

Textbox A: Increasingly the costs being borne by farmers are not around food production costs but rather are covering externalities (eg costs of pollution downstream) or other values desired by Australians in general (eg biodiversity). While these are valuable outcomes they are often not encased in imported food prices (eg Chinese products) nor borne by other elements of the Australian value chain (eg Carbon pollution by factories) or biodiversity maintenance in cities. Consequently growers are losing share of the value of their production and control of their resources. This makes financial and social sustainability more difficult.

Several additional assertions result from the above:

1. **Without greater returns to growers it will be difficult to attract and retain new entrants into production systems. Rejuvenation requires the development and implementation of mechanisms that make changes to more productive value-adding agriculture an attractive alternative, bearing in mind levels of risk, change and skill needed. New systems are needed to reduce the level of risk (eg financial products), change (eg new ownership models for farms) and skill (eg improved training and information availability) required.**
2. **Imposts need to be borne by beneficiaries and where other producers do not meet similar imposts (particularly in safety scrutiny) these need to be incorporated into the trade system.**

(c) of sustainable impact on the environment.

Growers in Australia have made enormous strides in increasing sustainability in their production environments. The best example is the low tillage systems developed for W Victoria with enormous effects on productivity and reduced erosion. These enormous gains have been underpinned by RDE & E efforts from organisations across Australia. The expectation that these gains will continue seems reasonable, particularly with the increased efforts by organisations such as TIAR to embed environmental sustainability in the mainstream of their development efforts (eg NRM and climate change adaptation are now cross themes across all of TIAR's research). Growers generally are highly concerned about the environmental as well as social and financial sustainability of their farms. However, this can become unbalanced where financial imposts are too high, where the social system changes (eg invasion of weed species into the peri-urban areas where farms are split up). Social breakdown by amalgamation and loss of youth from rural areas also creates a severe stress on other forms of sustainability. The same is true for environmental or financial failure affecting social sustainability. All three areas of sustainability (financial, social & environmental) can create severe issues for the other forms where they come under stress. Considerable effort is needed to develop sustainable systems in these modified environments. Real, practical, integrated system solutions are needed. Work by TIAR on "controlled traffic" vegetable farming offers tremendous opportunities for reducing soil degradation and erosion while improving productivity. However, financial (new or modified machinery) and social (farm ownership restructuring) impediments make uptake difficult. Thus research and RDE & E are needed to create viable solutions to allow practice change. Environmental sustainability also needs clear development of systems that actually achieve this outcome. For example "organics" is touted as a more environmentally viable system. However, in many situations where scientific evaluation of "organic" and other systems are performed the greater need for cultivation and lower yields at poorer quality in "organic" systems means sustainability is greatly reduced. The real nature of sustainability needs to be followed over the long term across whole systems. Unless the total environmental effect is understood excessive environmental imposts not costed to the correct beneficiaries in Australian systems means they are often disadvantaged to others where social and environmental costs are either not met (eg much of Asia) or are met via separately funded programs (eg Europe). It is conducting this RDE & E that an integrated agency like TIAR linked to local, national and international collaborators can produce outcomes of value.

Several additional assertions result from the above:

1. **Without greater returns to growers it will be difficult to fund environmental management. Real beneficiaries and balanced systems need identification, development and extension across integrated systems.**
2. **Environmental imposts need to be clearly documented across the whole system & costs borne by beneficiaries. Where other producers do not meet similar imposts (particularly in environmental and social areas) these need to be incorporated into the trade system.**

1 Details on website at http://www.tiar.tas.edu.au/
2 Lincoln University and Agrisearch have recently announced an intention to amalgamate.
3 www.mla.com.au/NR/rdonlyres/59FA0667-567B-42B8-904F-5DF1374481FD/0/MLA_Food_Safety220807.pdf
4 Projections from the University of Missouri's Food & Agricultural Policy Research Institute (FAPRI) indicate near zero food price inflation for the USA in2009 with similar values suggested for Australia
5 http://signposts4ag.com/signposts-grains/contributions-of-the-industry-to-economic-systems/contributions-to-economic-systems-extending-beyond-the-industry/productivityfollowing record rates in 2007 and 2008.