

The BHU Future Farming Centre

Permanent Agriculture and Horticulture Science and Extension

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Te Ara Paerangi - Future Pathways

Ministry of Business, Innovation and Employment (MBIE)

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Re: The importance of bringing all agricultural RSI into Te Ara Paerangi - Future Pathways and the fundamentally different nature of agricultural science

I cannot over state my excitement and relief at MBIE undertaking the Te Ara Paerangi - Future Pathways (TAP-FP) process, and having attended the webinar on the 3rd November I am equally pleased that this is going to be a truly open and deep review. I wholeheartedly congratulate MBIE and all others involved in undertaking this process.

However, as an scientist working in agriculture & horticulture, I am also concerned that a significant part of the agricultural and horticultural RSI system may be outside of TAP-FP's scope. I am concerned because I, and many others, share the view that agricultural science in Aotearoa-New Zealand is at best, not fit for purpose, and worse fundamentally broken, and also needs a clean slate review, as is being undertaken by TAP-FP.

Agricultural and horticultural (from now on I will refer just to agriculture, but, horticulture is included) science and research has some unique features which I believe mean how it is done and its relationship with the people that implement it, i.e., farmers, requires special consideration in the TAP-FP process.

I am therefore writing to you at this early stage of TAP-FP with the aim of bringing attention to these issues and to hopefully inform and stimulate discussion on them within TAP-FP.

Agriculture is different and is at the heart of the global planetary crises

This is the context within which I am viewing agricultural science and the need for a clean slate review.

As was rapidly realised at the start of the COVID19 pandemic, agriculture is not "a sunset industry" as David Lange infamously said but an essential industry. As eating, along with water, air and sleep are the most basic human needs, for without them humans rapidly die, agriculture is therefore more than essential, it is indispensable and fundamental for the future survival of humanity. It is therefore the most important industry there is.

Agriculture is also humanities largest undertaking, occupying the majority of earths land surface, and, while being indispensable for producing food, it is also at the heart of most of the global planetary crises such as biodiversity loss, excess reactive nitrogen and phosphorous in the environment, climate change, etc. Fixing agriculture is therefore key in achieving outcomes such as addressing the Nine Planetary Boundaries, providing ecosystem services and addressing the Millenium Development Goals.

To state the obvious, agriculture is a vital industry to NZ, even more so with the large reduction in the tourism industry, and it is also at the heart of most of NZ's environmental challenges. It should go without saying therefore that fixing NZ agriculture is utterly critical to NZ's future.

If these challenges are to be effectively addressed, rapid and major changes are required as to how agriculture is practiced. Many reports, from the Millenium Ecosystem Assessment and The International Assessment of Agricultural Science and Technology for Development (IAASTD) in the early 2000s and numerous reports from UN bodies and independent scientific bodies since, have clearly stated that the solutions needed to fix farming are agroecological. The transformation from the current intensive agriculture model to agroecology is a truly massive undertaking and one NZ is currently desperately short of expertise and practical experience in.

This context is why I believe all parts of the agricultural RSI system needs to be included in TAP-FP.

I would also like to provide some additional perspective on what I view is the unique nature of agricultural science, and a little agricultural science history which I hope will be valuable in informing TAP-FP, and, also the processes of change and re-design that will flow on from the outcomes of TAP-FP.

Agriculture is different due to the social structures it is embedded in

Compared with other industries, e.g., manufacturing, the financial sector, government, etc. agriculture is unique because a farmer's family and their family home, are often embedded in their business. In addition farmers and their families are also embedded in strong social / peer networks consisting mostly of other farmers and their families. It would be considered quite bizarre for the owners and workers of say, a car factory, to also have their family homes in the car plant and to only socialise with their co-workers, but, this is the situation in much of agriculture globally, including in NZ. This means that the decisions farmers make about their business is also strongly tied up with their domestic life and peer pressure from their social networks. For contrast, it is highly unlikely the owner of a car plant would take into consideration their domestic life and the views of their peers when making changes to how their production system operates, but, this is day-to-day reality for farmers. If the unique situation in agriculture where a farm is not just a business but also incorporates farmers domestic lives and social networks, is not taken into account when trying to introduce new technologies, or change ways of farming, decades of research evidence and on-the-ground experience unambiguously demonstrates that such attempts will fail, often totally. Therefore, to create change in agriculture requires a quite different approach to agricultural science than the other sciences.

Agricultural science is different: end-users (farmers) need to be part of the science system

Agricultural science and research also is different to other sciences because the end-users who implement the science are not other scientists, for example as in physics and chemistry, or other highly trained professionals, e.g., engineers, or medical doctors: the end users and implementers of agricultural science are farmers. While many farmers in NZ are well educated, often at degree level, even the well educated are unable to directly utilise, or even access, science outputs i.e., research papers, scientific conferences etc. Agricultural science outputs therefore have to be 'translated' into forms that farmers can access, understand and implement. This process of science translation and technology transfer, is referred to as 'Extension' or 'Advisory Services'. Agricultural Extension is a profession in its own right, just as important as research and farming within agriculture, and it is often viewed as the third leg of the agricultural science stool, the other two being the farmers themselves and the scientists. Without the third leg of Extension, the stool of agricultural science falls over. This is the situation we have in NZ.

Starting with the advent of intensive agriculture in the 1950s through to the late 1980s, most of the developed world, including NZ, had large, mostly government funded, free at the point of use, Extension systems. However, many of these were abolished by the advance of neoliberalism in the 1980s, including in NZ where MPI's predecessor MAF had a large Extension and Advisory service that was privatised in the 1980s and rapidly failed. At the same time the DSIR was transformed into the CRIs, with a change in objectives from serving farmers to profit and corporate objectives, breaking the connection between individual farmers and the research systems. Changes to universities, especially funding and promotion structures, also broke the direct linkages between farmers and academics. In my opinion, and many others, these changes fundamentally broke agricultural science in NZ.

As knowledge exchange is one of the 17 key questions within TAP-FP, I suggest the unique nature of knowledge exchange in agriculture, and its history in NZ, is particularly pertinent to TAP-FP, and subsequent processes.

Farm business ownership and management structures also have a large impact on effective communication in agriculture. Typically each farm is an individual business, meaning agricultural businesses are highly distributed, i.e., instead of a few large companies, with large workforces, directed by small management teams, for most farms, the farmer is the owner, manager and worker, with only larger and more intensive farms employing a few workers. This highly distributed ownership and management structure has many strengths when dealing with the highly variable environment of agriculture, but, it is a significant challenge when organisations such as government and research centres need to communicate with farm business owners and managers. This is another key role for Extension services - to provide the personal connections to each farmers that allows effective communication to the individual farm level.

Why the levy payer organisations recreated the three legged stool model of agricultural science.

The 1990s saw the establishment of the levy payer organisations such as the Foundation for Arable Research (FAR) DairyNZ, Beef+Lamb etc. One of the key tasks of these organisations is to undertake practical agricultural science and provide free at the point of use Extension services. This is exactly the work that used to be undertaken by DSIR, the agricultural universities, and MAF, but which was terminated in the 1980s political changes. I consider it highly instructional that when the agricultural science institutions exited practical agricultural science and Extension, the farmers recreated what had been lost for themselves, i.e., the classic three legged stool of agricultural science. Farmers are the main funders of the levy payer organisations, they are also the majority of the board of directors and they are also the customers, i.e., farmers are in total control. That these organisations, controlled by farmers, paid for by farmers with farmers as the customer, have recreated the three legged stool model of agricultural science by themselves, for themselves, to me is an unambiguous statement that the three legged model is what they need and that works for them.

Agricultural science is different: the end-users (farmers) must be part of the science system

Due to the unique nature of agriculture described above, for agricultural science to be effectively implemented, agricultural science must have the end user, i.e., the farmer, embedded within the science system itself.

First agriculture has existed for some 12,000 years while agricultural science is only some 200 years old. Farmers, going right back to the neolithic (i.e., the 'stone age') created agriculture without any scientific assistance, including the domestication of all crops and livestock. Even with the considerable amount of agricultural science undertaken globally today, a considerable amount, if not the bulk of agricultural innovation is created by farmers, not scientists. Often the farmer innovation is then studied by scientists, who then often refine and improve it through a deeper understanding. Clearly for this to happen farmers and scientists need to be tightly woven together to ensure communication and synergy between them can occur. This, is another vital job of the Extension system: i.e., Extension is not just a one directional translation of science into forms that farmers can understand and effectively implement, it is the thread that weaves the farming community and the science community together and facilitates effective two way communication between them.

This also shows that if a top down, e.g., Government → RSI system → farmer, approach is implemented, then most of the potential innovation in agriculture coming from farmers will not be captured, and, there will likely be considerable resistance among farmers to implementing imposed solutions, as recently demonstrated in NZ with the Groundswell protests. In a similar vein to the partnership between the Crown and Māori, farmers need to be true partners with the government and the public in the RSI system, if change is to happen on farm.

While it is vital to have farmers embedded in the agricultural science and extension system, it is also important that they do not drive the whole research agenda, as tends to occur in the levy payer organisations (see below). While it is important that some parts of the agricultural science system are responsive to the needs and wants of farmers and that it helps them to achieve their business and social objectives, it is also important that the agricultural science system also responds to the desires of the public / government around what occurs in agriculture, while also being able to 'lead itself' through scientists undertaking research they personally consider to be of importance. I also consider it to be vital that all parts of the agricultural science systems undertake the critic and conscience role currently only legislated for within the universities.

I therefore consider this has significant implications for the design of the research priority setting systems that TAP-FP is aiming to create, and indicates the likely need for a different approach in agriculture than other industries.

To summarise: to create effective change, and especially agroecological transformation in agriculture, it is utterly imperative that farmers are an integral part of the agricultural science system through an effective Extension service, a system unique to agriculture. These are further reasons why I believe agricultural science needs special consideration within the TAP-FP process.

All of agricultural science needs to come within the scope of Te Ara Paerangi - Future Pathways

Based on the above arguments, I therefore consider it vital that the whole of the agricultural science system in NZ needs to come within the scope of TAP-FP. I am also clear from the webinar on the challenges of expanding TAP-FP's scope. All agricultural science providers, the CRIs, the universities, the levy payer organisations, and others need to co-ordinate and collaborate. The global planetary crises cannot be solved by the current siloed and competitive system, as noted in the Green Paper. It is also no use each of the science providers having their own extension systems. There needs to be a single

unified, free at the point of use, extension system for all of NZ that is embedded across all the agricultural science providers that interacts with all farmers at the farm level.

Clearly much of this is not within MBEs remit: much of it lies with MPI, as well as other government ministries and departments, i.e., it is a whole of government issue, especially as fixing agriculture is such a major issue for NZ as a country. There are also likely to be significant political challenges, especially regarding the levy payer organisations which are owned and controlled by farmers. One significant problem with the levy payer organisations is they are sector specific, often highly tribal, often fail to cooperate, and the sector model fails to recognise that many farmers belong to multiple sectors. As Prof. Allison Stewart the CEO of FAR said at the recent New Zealand Institute of Agricultural & Horticultural Science Inc., Canterbury Forum “The problem that we have is that if you lead a levy body sector group you have an unenviable task of trying to do what your growers want vs. what they need, while trying to look after your sector vs. what's best for New Zealand”. This very succinctly sums up the fundamental structural problem with the levy payer organisations. Another issue with the sector specific levy payer organisations is they are not good at supporting cross sector actors, such as Māori farmers and organic agriculture, which can provide many valuable perspectives and practical approaches exactly because they are cross-sector. The solutions required to fix agriculture are also cross sector, so there are multiple reasons to include the research component of the levy payer organisations within TAP-FP.

To conclude, I believe it is imperative for the future economic, social and environmental wellbeing of Aotearoa-New Zealand, as well as to address the global planetary crises, that, agricultural science in NZ needs a fundamental review. As Te Ara Paerangi - Future Pathways is undertaking a fundamental review of the RSI system under MBEs jurisdiction, which includes part of the agricultural RSI system (principally the CRIs Plant & Food, AgResearch and Manaaki Whenua) it would be logical to extend TAP-FP to include all of the agricultural science system. Clearly this requires a whole of government approach and has political dimensions as well, so it will likely be challenging. However, failure is not an option, considering agriculture is at the core of the massive challenges that humanity faces and the future wellbeing of Aotearoa-New Zealand.

I hope these thoughts and perspectives are helpful in valuable as you proceed with the Green Paper consultation, I wish you the best progress possible, and I look forward to continuing to engage with the process. If you have any questions or comments please do not hesitate to contact me.

Yours sincerely

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