

# **Plant Variety Protection and Technology Transfer in New Zealand: the Benefits of Public-Private Partnerships**

## ***Use of Plant Variety Protection by National Research Centres as it pertains to Grasslanz Technology Limited in New Zealand***

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### **Role of government owned research and development organisations in New Zealand**

Prior to the establishment of Crown Research Institutes (CRI's) in 1992, all Government Departments in New Zealand, including those with scientific research capability (e.g. Department of Scientific Research (DSIR), Ministry of Agriculture and Fisheries/Forestry) (MAF)) were largely publicly (tax payer) funded to perform and deliver outputs for public good. In the case of plant breeding and development this meant new plant varieties were released into the public domain for any party to use – essentially they were commodity products.

In this situation plant breeders would often develop new varieties which proved of little commercial interest or value due to their unrecognized potential by end users or due to unproven performance in specific or general environments that were the focus at that time.

The Government Act which created CRIs in 1992 stated that the purpose of a CRI is to carry out research for the benefit of New Zealand, pursuing excellence in all that it does, abiding by ethical standards and recognising social responsibility; and operating as a good employer. A CRI must do these things whilst remaining financially viable.

CRIs must transfer and disseminate their research, science and technology. They have the role of "making a difference" with the research they produce. This is achieved through strategic, long-term relationships with sectors and industry. This provides the mandate for companies such as Grasslanz Technology to be established and to function.

### **Grasslanz Technology Ltd**

Grasslanz Technology Limited is a plant technology provider - its products are primarily proprietary plant varieties and other technologies delivered through seed to the end user - farmers. Grasslanz invests in applied research and development (R&D), the outputs from which are licensed to production and marketing companies

for sale. It neither employs science nor marketing capability. It establishes alliances with seed companies to co-invest and then most often exclusively licenses the resulting products for production and sale.

Grasslanz is a wholly owned subsidiary of AgResearch Ltd, one of 8 government owned Crown Research Institutes. Grasslanz is arguably one of New Zealand's most influential pastoral companies resulting from its ability to bridge between science innovation and commercialisation.

Grasslanz specialises in developing proprietary forage varieties and other forage technologies, such as novel fungal endophytes. It is the owner of more than 80% of the proprietary endophyte technologies and white clover varieties, and a large proportion of ryegrasses and other forage varieties sold in New Zealand. Grasslanz's product portfolio is based around traditional temperate plant species, namely perennial, Italian and hybrid ryegrasses, tall fescues and white and red clovers, but also bents, bromes, herbs and many others.

Grasslanz, while owned by AgResearch, has the freedom to invest in both public and private research. Investment can be made wherever it expects to obtain the best return in terms of an innovative technology or product that is fit for purpose. The majority of Grasslanz plant varieties have been bred out of AgResearch – a valuable and reputable resource. AgResearch is the preferred research and development (R&D) provider and receives more than 70% of total R&D investment made by Grasslanz Technology.

Grasslanz develops strong commercial alliances to maintain a channel to market for its plant technologies. Delivery to the ultimate customer, the farmer, is achieved through sale of seed by head licensee companies. These companies are based primarily in New Zealand but do include businesses in Australia, USA and Europe. Ironically some companies that are our greatest competitive threat in some technologies are our valued customers in other innovations. Grasslanz also manages funding in joint R&D investment programmes on behalf of other R&D investment agencies and commercial companies.

The Grasslanz Technology business model is a six step process leading from the identification of a product concept to the product's commercial launch by a seed company partner:

1. Identify market opportunities, through either market 'pull' or research 'push'
2. Determine the market entry strategy and engage investors/alliances
3. Contract and manage R&D
4. Protect intellectual property and brand
5. Deliver technology through nucleus seed to commercial partner
6. Administer license and steward product in the marketplace

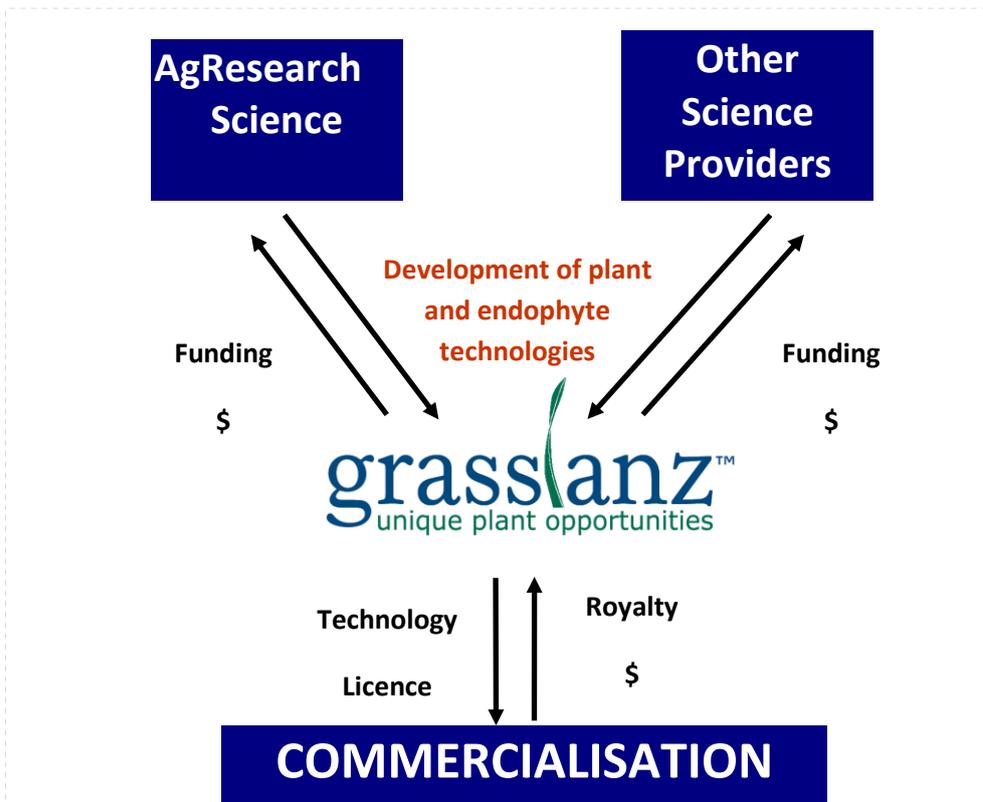


Figure1.0 Grasslanz Technology Limited business model

Grasslanz Technology also has a significant 30:70 joint venture with PGG Wrightson Seeds Limited – Grasslands Innovation Ltd. Established in the 2006/07 season the objective of this long term strategic joint venture is to discover, develop and market forage innovations nationally and internationally exclusively for PGG Wrightson Seeds Limited.

### Impact of Plant Variety Rights

Prior to New Zealand becoming a member of UPOV in 1981 and signing up to the 1978 UPOV Act Government departments that bred plant varieties held no intellectual property rights over its new varieties or innovations. Consequently commercial traders in these new plants and seeds were reluctant to spend money promoting them without some exclusivity. The breeding effort and costs associated with these government funded researchers were also of benefit to potential commercial competitors and other plant breeders overseas.

The introduction of Plant Variety Rights (PVR) in New Zealand in 1987 gave confidence and security to both government and commercial breeders providing a renewed impetus to breed further quality varieties. PVR also enhanced the confidence of providers of overseas germplasm for use in New Zealand for seed production and marketing with the knowledge that the IP could be controlled and

managed effectively. In New Zealand, fungal endophytes are considered a species eligible for protection under Plant Variety Rights. Fungal endophytes are naturally occurring fungi whose complete life cycle occurs within grasses such as perennial ryegrass and tall fescue in a symbiotic relationship. Most New Zealand ryegrass pastures are infected with endophyte. The endophyte fungus grows between the cells of the host plant, drawing nutrients from it but in return conferring resistance to insect pests, drought tolerance, and protection from overgrazing.

Grasslanz is a world leader in the use of plant variety rights to protect fungal endophytes. Along with its licensee companies Grasslanz is committed to effective information transfer and promotion of novel endophytes. It participates in technical workshops, to improve the understanding of these endophyte technologies and works closely with the New Zealand Plant Variety Office in developing effective methods for the IP protection.

### **Change in drivers of publicly funded research**

CRI's are Government-owned businesses with a scientific purpose. They receive some public money but are increasingly expected to make profits and if required pay dividends to their shareholder, the New Zealand government. A portion of funding is available for 'blue sky' research (no immediate commercial value) where private investment is unlikely. To achieve the targets expected of these research institutes it is essential that partnerships and collaborations are formed with relevant private companies and other research groups. These collaborations not only share the costs but also the benefits of commercialisation and give investing stakeholders some exclusivity over the resulting products. License agreements between the parties detail conditions and any restrictions of use, ownership of product and IP, marketing, increases through seed production, quality standards to be met, and conditions of use for any licensed trademark.

The transition of these government research departments into CRI's saw a more efficient and targeted research environment and with PVR available an increased confidence and security of its intellectual property. Partnerships and collaborations with various plant based industries had a solid foundation which proved the importance of Intellectual Property (IP) Rights in maintaining the research momentum.

Several decades ago it was accepted as part of the Government's role to support New Zealand's primary industries in agriculture and horticulture and during those times was successful in doing so. It is now no longer seen as appropriate that tax payers alone fund research for the benefit of national or multi-national privately owned companies.

It became essential therefore that partnerships and collaborations were formed to obtain funding from those who were to reap the immediate resulting benefit. Not only does this encourage investment due to the exclusivity provided (through IP and license agreements) but it focuses research into products the market wants and expects. The expertise of commercial knowledge to establish markets and promote the products in New Zealand and perhaps even more importantly, overseas, was

something government researchers generally lacked, and were in no position to undertake.

PVR and other forms of IP protection together with these exclusive arrangements allow for product control in the marketplace and deter infringement and as a result enable the owner/breeder to recoup costs in the development of the variety, which can then be used in further R&D investment.

Royalties received from proprietary seed sales assist in the funding contributions to further research projects supported by Grasslanz. This creates a funding cycle which bridges research and marketing pathways as opposed to the chasm into which many other research projects fall because of a lack of commercial linkages, experience or knowledge. This failure to progress a product of research through lack of a commercial pathway is unfortunately known to many scientists. Grasslanz Technology on the other hand acts as an agent to ensure that science discoveries with companies able to produce and market the resulting technology.

A disadvantage of this situation could be the reduction in the research and experimentation with germplasm of 'marginal' material perceived to be of insignificant commercial importance. Some of these varieties may have use in small or unique environments but due to perceived uneconomic commercial returns are not progressed. This may result in a potentially useful new plant genera or species being overlooked. Grasslanz has the resources, access to expertise and financial freedom to explore many of these niche opportunities. Often the success of other mainstream products can help fund these 'smaller' more speculative projects.

### **The importance of plant variety protection to Grasslanz Technology Limited as the commercialising agent of a National Research Centre**

Intellectual property protection is at the core of the Grasslanz business success , A full time IP manager is employed to ensure appropriate protection of its commercially important IP occurs through Plant Variety Rights (trials / registration) and where appropriate supported by patents and trademarks. This is managed through:

- Key liaisons between legal advisors and breeders/inventors in the development of new applications;
- Maintaining a review on new IP of interest from potential competitors and collaborators; and
- Interaction with plant breeding governing authorities (e.g. NZPVR office, IP Australia, EU, USA)

Grasslanz IP strategy is to:

- Establish an Intellectual Property (IP) estate that can be used to leverage alliances with other companies
- Encourage broad claims to IP rights that maximise utility in offering field-of-use licenses outside primary field of interest and helps attract alliances to share R&D costs and allows for cross licensing any improvements

- Identify IP that can be commercialised and obtain access through ownership or license
- Have a defensive IP strategy to enable Grasslanz to block others but avoid others blocking Grasslanz

To achieve this strategy Grasslanz follows 4 steps:

1. **Assess** the opportunity, potential benefits and value of the IP. Is it novel, can it be protected, will there be freedom to operate and is there an obvious path to market?
2. **Capture** the IP to prevent it unknowingly entering the public domain.
3. **Protect** the IP in a way that maximises its commercial potential. Most common types of protection include:
  - Patent
  - Trademark
  - Plant Variety Right
  - Trade Secret
4. **Exploit** the IP as quickly as possible to ensure a return on investment within the term of the protection period (e.g. 20 years for PVR for agricultural crops Determine based on market data:
  - the countries where protection needs to be been obtained
  - if licensing or selling the technology to another party a sensible option?
  - risks associated with sales into territories of technologies where there is no IP protection

AgResearch has a long and proud history of high quality plant variety research and development. Its PVR portfolio (now managed by Grasslanz) dates back to the first PVR application filed in 1985 with the New Zealand Plant Variety Rights Office and since then have applied and been granted hundreds of PVRs, many which have exploited their full 20 year protection period. This security of IP protection has enabled Grasslanz to demand an appropriate royalty on proprietary seed sold to ensure 'adequate' returns on investment and into future R & D

AgResearch/Grasslanz's successful proprietary varieties enable higher monetary return to be invested in other projects – ones which serve farmers directly and generate an effective cycle of providing funding to develop highly innovative products for the agricultural industry which in turn help fund further projects.

On the contrary, if PVR did not exist then Grasslanz would not be able to command premium prices for its products which equals less money to recoup costs and return to R & D which leads to less output and less innovation for New Zealand agriculture. In the current commercial/economic climate there would be little incentive for breeders to spend time and resources developing new varieties if their rights were not protected.