

BACK TO THE FUTURE: POSSIBLE MECHANISMS FOR THE MANAGEMENT OF PLANT VARIETIES IN AUSTRALIA

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Once farmers were convinced of the benefits that could accrue to them by rewarding breeders for their efforts, work could be started towards reducing the scope of the [farm saved seed] provision.

-- Dr Mick Lloyd¹

I INTRODUCTION

The plant breeder's rights scheme has existed in Australia for 20 years.² In this time there have been a number of concerns, controversies and challenges to granting intellectual property privileges over plants. While some of these concerns have been resolved, a recurring problem for plant variety owners has been their ability, or lack thereof, to effectively manage proprietary rights over their plant-related innovations.³ In this context, intellectual property owners have been especially concerned about the problems that they face in generating an 'adequate' return for their labour and investment.⁴ Notably, controlling the sale, use and reuse of plants through intellectual property regimes (such as plant breeder's rights) has not come easily. There are a number of reasons for this lack of success.

First, the natural copying mechanism inherent in plants poses a major protective risk for those involved with developing plant related innovations.

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1 Australian Plant Breeder's Registrar, 1991-95; *Records of the Diplomatic Conference for the Revision of the International Convention for the Protection of New Varieties of Plants*, UPOV, Geneva, Publication No 346(E) (1992) 367.

2 In some jurisdictions these rights are referred to as plant variety rights. Throughout the paper the phrase plant breeder's rights will be used, unless specific reference is made to the *Plant Variety Rights Act 1987* (Cth), which was in force from 1 May 1987 until 10 November 1994.

3 Generally speaking, a greater sense of proprietary interest over plants began with advances in science and technology where pure-line selections, mutations, hybridisation and transgenics revolutionised plant breeding. This created the potential to develop new plant varieties more quickly and effectively: see Jack Ralph Kloppenburg Jr, *First the Seed: The Political Economy of Plant Biotechnology* (1988).

4 For an examination of the historical complications of granting property rights to intangibles, see Brad Sherman and Lionel Bently, *The Making of Modern Intellectual Property Law* (1999). For a discussion of the justifications of intellectual property see Peter Drahos, *Philosophy of Intellectual Property* (1996).

Once released, a new plant variety can be easily reproduced by others who harvest the seeds and then duplicate the plant innovation. Consequently, this makes it difficult, if not impossible, for the breeder of a new plant variety to prevent leakage through the unauthorised exchange, sale and use of a plant variety once that variety is publicly available. In this way, after only one planting cycle,⁵ the farmer's own harvest can reduce the intellectual property owner's capacity to generate a return on their investment.⁶

Secondly, a persistent issue for intellectual property owners of plants is farm saved seed,⁷ a practice that dates back to the earliest days of agriculture and involves farmers retaining seed from one harvest for the purpose of replanting, trading or exchanging with neighbours.⁸ Here, innovators see farm saved seed as the unauthorised duplication and use of protected plant material; they argue that leakage through seed saving adversely affects their own ability to generate economic reward for their efforts.

A third problem for those wanting to manage property rights over plants is that farmers have historically been unrestrained by formal intellectual property rights. In the late nineteenth and early twentieth centuries, disseminating seeds and other propagating material was largely a government funded endeavour, as propagating material was regularly sent through the post by government agencies.⁹ While this approach encouraged variety adoption and adaptation (and was seen to assist the development of stable agriculture) it also meant that farmers were not restricted in their use of plants and plant propagating material. For this reason, amongst some Australian farmers there is a culture of resistance or a 'lack of respect' towards intellectual property schemes.¹⁰

5 This is particularly the case for annual plants such as grain, barley and corn which have an annual (normally a few months) seed-to-seed lifecycle.

6 If a plant breeds true to seed after harvest, the result is a greatly multiplied crop of the same seed. For instance, if a farmer sows one tonne of seed over 20 hectares (at 50 kilograms per hectare) it is possible, depending on seasonal and environmental conditions, that the farmer will produce 45 tonnes of seed. Because of this reproductive characteristic, commercial seed companies will contract certain farmers to 'bulk-up' their seed supplies in order to have quantities sufficient for the market.

7 While referred to as farm saved seed, the phrase has wider application, as individuals may save seed and any other structure, eg. bulbs and cuttings, used in the propagation of a plant variety. Section 3 of the *Plant Breeder's Rights Act 1994* (Cth) defines 'propagating material' as 'any part or product from which, whether alone or in combination with other parts or products of that plant, another plant with the same essential characteristics can be produced'.

8 Farm saved seed is more commonly discussed in relation to 'farmers' rights' and developing countries where subsistence farming remains a way of life and intellectual systems are considered 'weak' and inefficient: see, eg. Bongo Adi, 'Intellectual Property Rights in Biotechnology and the Fate of Poor Farmers' Agriculture' (2006) 9(1) *The Journal of World Intellectual Property* 91; Michael Blakeney, 'Protection of Plant Varieties and Farmers' Rights' (2002) 24(1) *European Intellectual Property Review* 9; Bryan Endres and Peter Goldsmith, 'Alternative Business Strategies in Weak Intellectual Property Environments: A Law and Economics Analysis of the Agro-Biotechnology Firm's Strategic Dilemma' (2007) 14(2) *Journal of Intellectual Property Law* 237.

9 For a general discussion, see Geoffrey Raby, *Making Rural Australia: An Economic History of Technical and Institutional Creativity 1788-1860* (1996) 34; Robin Bromby, *The Farming of Australia* (1986) 15; David Godden, 'Growing Plants, Evolving Rights: Plant Variety Rights in Australia' (1998) 6 *Agribusiness Review* <<http://www.agrifood.info/review/1998/Godden.html>> at 20 May 2007.

10 This 'lack of respect' is often discussed in relation to developing countries: see Endres and Goldsmith, above n 8.

This resistance has been exacerbated more recently by a change in the way that plant breeding is funded.¹¹ This shift has seen more overt opposition to the practice of saving seeds based upon the belief of the seed industry that the practice impedes private investment of future plant breeding programs.¹² These changes have resulted in a major transformation for growers and farmers, particularly in the way that they are able to deal with plants, so much so that farmers are now encouraged to be ‘seed buyers’ and not ‘seed savers’.¹³

Fourthly, there is doubt whether the substantive law protecting plant innovations (particularly plant breeder’s rights) can be enforced effectively in countries such as Australia.¹⁴ In Australia, the onus is on the intellectual property owner to provide evidence of the unauthorised uses of protected material – a process that is fraught with difficulty.¹⁵ Moreover, deterring the unauthorised use of plants requires not only the detection and identification of the wrongdoers, but also successful enforcement. Of particular concern for plant breeders is that farmers (and others in local rural communities) are reluctant to provide the necessary evidence to successfully prosecute those suspected of infringement.¹⁶ There may be a number of reasons for this reluctance including the relatively small size of farming communities, the close-knit relationships formed in those communities and the fear that prosecutions may have a negative impact on current and prospective customers.

The ramifications of these evidentiary difficulties are illustrated by the ill-fated enforcement initiative of the Australian Seed Federation;¹⁷ known as ‘Operation Plant Breeder’s Rights’. The ‘Operation’ was announced with much enthusiasm and publicity, and was an attempt to catch ‘pirates’ who were systematically infringing plant breeder’s rights and, it was estimated, were costing the

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- 11 This should not be confused with the idea that public breeding is no longer taking place, as government agencies and universities are still involved in plant breeding. Instead, those institutions are increasingly being asked to generate income from their plant breeding activities: Bob Lindner, ‘Privatised Provision of Essential Plant Breeding Infrastructure’ (2004) 48(3) *The Australian Journal of Agricultural and Resource Economics* 301; Ross Kingwell, ‘Institutional Change and Plant Variety Provision in Australia’ (2005) 13 *Australasian Agribusiness Review* <<http://www.agrifood.info/review/2005/Kingwell.html>> at 10 May 2007.
 - 12 Although, to date there is no empirical evidence to support the proposition that farm saved seed impedes plant innovation in Australia. In fact, the Advisory Council on Intellectual Property has called for empirical support for such claims: Advisory Council on Intellectual Property, *A Review of Enforcement of Plant Breeder’s Rights: Issues Paper* (March 2007) 17 <http://www.acip.gov.au/library/ISSUES_PAPER_v28%20print%20version.pdf> at 20 May 2007.
 - 13 For a discussion of the United States position, see Carly Fowler, *Unnatural Selection: Technology, Politics and Plant Evolution* (1994) 31-69.
 - 14 Some of the larger farms in Western Australia require in excess of 2,000 tonnes of seed per year for planting which is seen as a major impediment to farmers purchasing all of their seed from plant breeders and the seed industry from year-to-year.
 - 15 Gert Würtenberger, ‘Questions on the Law of Evidence in Plant Variety Infringement Proceedings’ (2006) (7) *Journal of Intellectual Property Law and Practice* 458.
 - 16 Advisory Council on Intellectual Property, above n 12, 20-21, 29-30.
 - 17 The Australian Seed Federation is the peak seed industry association in Australia and ‘represents the interests of its members involved in the breeding, production and marketing of sowing seed - at state, national and international level’; see *Australian Seed Federation* (2007) <<http://www.asf.asn.au>> at 10 May 2007.

Australian seed industry A\$300 million per year.¹⁸ The seed industry believes that ‘Operation Plant Breeder’s Rights’ was largely unsuccessful due to the difficulties of obtaining sufficient evidence,¹⁹ highlighting the complexity of obtaining evidence in law and, more specifically, in the management and control of plant varieties.²⁰

At this stage, it is important to point out that, despite the forceful argument put forward about lack of enforcement and high rates of saved seed, a major problem for intellectual property owners is that there is little empirical data to substantiate their claims. Moreover, the work that has been done is not necessarily based on quality data that is either transparent or openly available. Instead, estimates of the rate of saved seed have been characterised more by conjecture than concrete data.²¹ That said, Rabobank International recently estimated that the total annual value of the Australian seed industry, including farm saved seed, protected varieties and non-protected varieties, was in excess of A\$1 billion.²² Of this, it was calculated that approximately A\$200-300 million worth of seed is estimated to be saved every year.²³

While the exact rates of farm saved seed and enforcement remain unclear, there is no denying that this is a real problem for intellectual property owners,

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- 18 Australian Seed Federation, ‘Peak Seed Body Set to Crack Down on PBR Cheats’ (Press Release, 16 November 2004) <<http://www.asf.asn.au/news/ASF%20PR%20Operation%20PBR%2016Nov04.pdf>> at 10 May 2007; Asa Wahlquist, ‘Dirty Work by Pirates as Breeding Gets Seedy’, *The Australian* (Sydney), 17 February 2005, 34.
- 19 Anecdotal evidence suggests that a number of seed companies were attempting collectively to initiate legal actions against Australian farmers. However, it appears that this was not pursued because of a failure to obtain sufficient substantiating evidence. The evidentiary problem is also specifically raised by the Advisory Council on Intellectual Property: Advisory Council on Intellectual Property, above n 12, 21.
- 20 This is not a problem specific to plant innovations and evidentiary issues can be difficult for all areas of the law. For example, Stein argues that the purpose of evidence is to apportion the risk of error: Alex Stein, *Foundations of Evidence Law* (2005).
- 21 For example, the Australian Seed Federation estimates that ‘seed piracy’ cost the Australian seed industry A\$300 million per annum and that rates of saved seed are: wheat, 95 per cent; barley, 90 per cent; oats, 80 per cent. There is no mention of how these figures were obtained: Australian Seed Federation, *Submission into the Review of Enforcement of Plant Breeder’s Rights* (May 2007) Australian Council on Intellectual Property <http://www.acip.gov.au/pbrsubs/Australian%20Seed%20Federation%20_ASF_.pdf> at 18 September 2007. Similarly, in 1990, it was estimated that for small grain crops like wheat and barley seed saving was 89 per cent (Australia), 85 per cent (Spain) and 70 per cent (Canada and the United States). Yet there was no mention of methodology, sample sizes or response rates: see Noel Byrne, *Commentary on the Substantive Law of the 1991 UPOV Convention for the Protection of Plant Varieties* (1996) 61.
- 22 Rabobank International, *The Seed Sector in Oceania* (July 2005). Another report produced by Context, who provide a global seed market database on 48 crops from multiple countries, commented that the ‘total global proprietary seed market sector value approached USD\$20 billion in 2006’: see Context, *Thinking in Context* (2007) Context Net <<http://www.contextnet.com/uploads/File/Context%20Newsletter%20May%2007.pdf>> at 22 June 2007.
- 23 Rabobank International, above n 22. See also Noel Byrne, above n 21, 61.

who doubt their ability to generate income from plant related innovations.²⁴ Faced with these problems, intellectual property owners have used a number of strategies to manage plant varieties. Part II of this article examines these strategies by discussing and identifying the limits of the current approaches under plant breeder's rights and end point royalties. Part III examines alternative strategies for generating revenue on plant varieties, namely patent law and technological protection measures, for which Part IV puts forward various other possible approaches to counter leakage and generate remuneration, namely closed loop contracts and seed point royalties. Finally, Part V concludes that the agricultural, horticultural and garden industries are heterogeneous and argues that a 'one size fits all' approach to managing plant varieties will not succeed.

II CURRENT APPROACHES FOR THE CONTROL OF PLANT VARIETIES

A Plant Breeder's Rights and Farm Saved Seed

While the practice of saving seed has existed for centuries, as a legal doctrine it has a relatively recent beginning.²⁵ Despite (or because of) its youth, the legal concept of farm saved seed has generated heated debate with policy makers and intellectual property owners. Many owners view the practice as an unauthorised duplication of innovation that has an adverse impact on their ability to gain remuneration. As a consequence, there has been consistent pressure to impede or displace the saved seed exception.

This tension was evident even before the farm saved seed exception was accepted into the *International Convention for the Protection of New Varieties of Plants* ('UPOV').²⁶ For example, the International Trade Seed Federation²⁷

24 This is reflected by an ongoing review into the enforcement of the *Plant Breeder's Rights Act 1994* (Cth): see Advisory Council on Intellectual Property, above n 12. Also, the International Seed Federation has stated that farm saved seed is 'the most complex and worrying issue for the seed industry of self-pollinated crops, but increasingly also for hybrids of vegetables and field crops': International Seed Federation, 'Enforcement of Plant Breeders' Rights: Opinion of the International Seed Federation' (Presentation at the UPOV Meeting on Enforcement of Plant Breeders' Rights, Geneva, 25 October 2005) 3.

25 The *International Convention for the Protection of New Varieties of Plants* ('UPOV'), adopted on 2 December 1961 (entered into force 10 August 1968, revised on 10 November 1972, 23 October 1978 and 19 March 1991). There are only two variations on the farm saved seed exception: UPOV 1961/1972 and UPOV 1991, as the 1961/1972 and 1978 UPOV Acts deal with farm saved seed using the same language. There are also other international agreements that refer, either directly or indirectly, to farm saved seed. For example, Article 9 of the *International Treaty on Plant Genetic Resources for Food and Agriculture*, opened for signature 3 November 2001 (entered into force 29 June 2004) ('FAO') creates obligations on national governments to protect certain farmers' rights. In addition, art 27(3)(b) of the *Agreement on Trade Related Aspects of Intellectual Property*, 1869 UNTS 299 (1994) ('TRIPS') states that all countries must either protect plant varieties using patents or an 'effective *sui generis*' system, or both, and the issue of farm saved seed may be an important consideration in assessing those schemes that are 'effective' and those that are not.

26 See UPOV, above n 25. As can be seen from the quote above, taken from the 'Records of the Diplomatic Conference for the Revision of the International Convention for the Protection of New Varieties of Plants', Geneva, 1991, these attempts were foreshadowed at the same time as the farm saved seed exception was being debated, and ultimately, accepted into UPOV.

argued that the exception was tantamount to a subsidy;²⁸ the Dutch delegation sought to limit the farm saved seed exception to the areas of agriculture in which the practice was already established (eg, in cereals, peas and potatoes);²⁹ and France wanted the provision deleted altogether so that plant breeder's rights had the same strength as patents.³⁰ The Australian approach to this issue can only be categorised as one of reluctant acceptance. In supporting the farm saved seed provision, the Australian delegation made it clear that its support was based upon 'political necessity' and was motivated, at least partly, by fear of a backlash from farmer groups if Australia did agree to such an exception.³¹

Australia opted to include the farm saved seed exception in section 17 of the *Plant Breeder's Rights Act 1994* (Cth) ('*PBR Act*').³² Therefore, the interpretation of section 17 provides some insight into the scope of a farm saved seed exception as well as the difficulties in articulating such an exception.³³ Section 17(1) provides that if:

- (a) a person engaged in farming activities legitimately obtains propagating material of a plant variety covered by [plant breeder's rights] either by purchase or by previous operation of this section, for use in such activities; and
- (b) the plant variety is not included within a taxon declared under subsection (2) to be a taxon to which this subsection does not apply; and
- (c) the person subsequently harvests further propagating material from plants grown from that first-mentioned propagating material;

the [plant breeder's right] is not infringed by:

- (d) the conditioning of so much of that further propagating material as is required for the person's use for reproductive purposes; or
- (e) the reproduction of that further propagating material.³⁴

27 The International Seed Federation has over 70 members and is the major representative of the interests of seed traders and plant breeders globally at various forums including UPOV and the Convention on Biological Diversity ('CBD'). In 1992, the International Federation of the Seed Trade ('FIS') and the International Association of Plant Breeders for the Protection of Plant Varieties ('ASSINSEL') merged to form the International Seed Federation. ASSINSEL was established in 1938 and in 1956 called for an international conference to 'consider the question of protecting new plant varieties officially, and if possible to lay down principles that govern protection': UPOV, *The First Twenty-Five Years of the International Convention for the Protection of New Varieties of Plants* (1987) 82.

28 UPOV, above n 1, 357.

29 UPOV, above n 1, 353.

30 UPOV, above n 1, 351-52.

31 UPOV, above n 1, 357. See also, note the opening quote by Dr Mick Lloyd, the Australian Plant Breeder's Rights Registrar from 1991 to 1995, above n 1.

32 The *PBR Act* was introduced so that Australia could comply with UPOV. It replaced the *Plant Variety Rights Act 1987* (Cth). Under s 38(1)(a) of the *Plant Variety Rights Act 1987* (Cth) a farmer could 'propagate, grow and use plants of that variety for purposes other than commercial purposes'.

33 The UPOV Administrative and Legal Committee is currently developing a set of explanatory notes in relation to arts 15(1)(i) and (2) of UPOV 1991: UPOV, *Progress of the Work of the Administrative and Legal Committee* (2005), C/39/9.

34 Regulations may declare a particular taxon to be a taxon to which ss (1) does not apply: *PBR Act* s 17(2). A taxon denotes any taxonomic category, eg, species or genus, in the system of classifying plants.

In *Cultivaust Pty Ltd v Grain Pool Pty Ltd*,³⁵ the Federal Court of Australia considered the farm saved seed exception in section 17. The decision appears to limit the application of the exception under the *PBR Act*, although the exact scope of section 17 remains unclear.³⁶ In this context, the decision may stand for a number of propositions including: that the original sale of the propagating material to a farmer does not exhaust the plant breeder's right;³⁷ that a farmer can save seed indefinitely;³⁸ and that there are limits placed on what a farmer can do with the seed that they have saved.³⁹ Before I consider the interpretation of section 17 in more detail, the facts of the case should be summarised.

In 1992, Cultivaust was appointed the exclusive licensee of a barley variety known as Franklin Barley by the Tasmanian Government, which owns the plant breeder's right in Franklin Barley.⁴⁰ Cultivaust supplied Franklin barley to growers in Western Australia for growing trials in 1991 and 1992. As a result, Franklin barley was grown in Western Australia, harvested by farmers, and then delivered to the Grain Pool of Western Australia ('Grain Pool') which was to market and supply the barley to various global markets. During this time, Cultivaust sought to establish a royalty scheme with the Grain Pool and the Western Australian Farmers Federation. However, royalty negotiations between Cultivaust, the Grain Pool and the Western Australian Farmers Federation failed, and in 1996, Cultivaust and the Tasmanian Government commenced proceedings against the Grain Pool and the State of Western Australia alleging infringement of their plant breeder's right.⁴¹

In relation to the various exception provisions of the *PBR Act*,⁴² Mansfield J observed that the common feature was the balance between commercial interests and public access.⁴³ With this overarching objective in mind, Mansfield J discussed the application of the farm saved seed exception and concluded that section 17(1) of the *PBR Act* authorises the retention of farm saved seed and the use of that seed in 'producing a further crop and the harvest of further propagating material from plants grown from that seed'.⁴⁴ However, the Grain Pool went further than this in its dealings with Franklin Barley and argued that section 17 also allowed them to carry out acts which were not done to produce plants or propagating material, which would be sold for a commercial profit to a

35 *Cultivaust Pty Ltd v Grain Pool Pty Ltd* (2004) 62 IPR 11 ('*Cultivaust*').

36 See Advisory Council on Intellectual Property, above n 12. The written submissions can be accessed online <<http://www.acip.gov.au/pbrsubs.html>> at 18 September 2007.

37 *Cultivaust* (2004) 62 IPR 11, 53-54.

38 *Ibid* 48.

39 *Ibid* 49.

40 Application number 1989/018, accepted 6 April 1989 as Certificate No 29 <http://pbr.ipaustralia.plantbreeders.gov.au/plant_detail.cfm?AID=1837573> at 11 October 2007.

41 In total, there were four causes of action: (1) infringement under the *Plant Variety Rights Act 1987* (Cth) and the *PBR Act*; (2) breach of fiduciary duty; (3) breach of contract; and (4) unlawful interference. There was also an alternative claim made against the Grain Pool in that the Grain Pool was estopped by its conduct.

42 Exceptions include private, experimental or breeding purposes: s 16; and farm saved seed: s 17.

43 *Cultivaust* (2004) 62 IPR 11, 48-49.

44 *Ibid* 48.

person, who then intended to grow further plants or propagating material from the material sold.⁴⁵

Significantly, Mansfield J held that section 17 did not stipulate, beyond its use as farm saved seed, what the grower could do with any propagating material generated from farm saved seed.⁴⁶ This left a number of questions unanswered. In particular, what could farmers do with the harvested crops that they had grown from the saved seed?

Unfortunately though, this is where the language of the *PBR Act* and the *Cultivaust* decision become difficult to follow. Justice Mansfield interpreted and applied section 17 of the *PBR Act* subject to the ‘cascading’ principle found in section 14. Section 14, which deals with plant breeder’s rights in relation to harvested material, provides:

(1) If:

- (a) propagating material of a plant variety covered by PBR is produced or reproduced without authorisation of the grantee; and
- (b) the grantee does not have a reasonable opportunity to exercise the grantee’s right in relation to the propagating material; and
- (c) material is harvested from the propagating material;

section 11 operates as if the harvested material were propagating material.

- (2) Subsection (1) applies to so much of the material harvested by a farmer from propagating material conditioned and reproduced in the circumstances set out in subsection 17(1) as is not itself required by the farmer, for the farmer’s own use, for reproductive purposes.

According to section 11 of the *PBR Act*, protection relates to the propagating material, eg, the seed or cutting.⁴⁷ If the grantee cannot enforce their plant breeder’s right over the propagating material, then section 14 says that, in certain circumstances, the grantee can exercise their right over the harvested material, eg, the barley grain or tree. The result of this ‘cascading’ doctrine was the strengthening of the plant breeder’s rights by giving section 17 a limited application. In Justice Mansfield’s opinion, the only conclusion available was that farm saved seed from second and subsequent generations was to be treated as if the harvested material (in this case barley grain) was propagating material. Therefore, the harvested material was covered by the exclusive rights granted pursuant to section 11:⁴⁸

45 Ibid 22, in relation to *Plant Variety Rights Act 1987* (Cth) s 38; *ibid* 25, in relation to *PBR Act* s 17.

46 *Cultivaust Pty Ltd v Grain Pool Pty Ltd* (2004) 62 IPR 11, 48-49.

47 A farmer who legitimately obtains propagating material may ‘condition’ or ‘reproduce’ that propagating material for use as propagating material: see *PBR Act*, s 3 for the definitions of ‘condition’ and ‘reproduce’. In limited circumstances, the plant breeder’s right is extended to essentially derived varieties: s 12; dependent varieties: s 13; harvested material: s 14; and products obtained from the harvested material: s 15.

48 *Cultivaust Pty Ltd v Grain Pool Pty Ltd* (2004) 62 IPR 11, 49.

In my view, s 14(2) describes the status of second and subsequent generations of crop (other than that retained for farm saved seed), so that the second and subsequent generations of crop are also to be treated as if the harvested material were propagating material covered by s 11 ... the harvest from farm saved seed, except for further farm saved seed, is to be treated as if it were propagating material ... the subject of PBR.⁴⁹

Furthermore, Mansfield J examined the conditions under which section 14 would operate in relation to farm saved seed, stating that saved seed would be categorised as ‘harvested material’ if two factual conditions were satisfied.⁵⁰ First, section 14(1)(a) requires that the second (or subsequent) generation crop not be authorised by the grantee of the *PBR Act*. That is, plant breeders holding a plant breeder’s right can give permission to farmers to harvest (and sell) crops grown from farm saved seed. Secondly, section 14(1)(b) requires that the grantee does not have a reasonable opportunity to exercise a plant breeder’s rights in relation to the propagating material.⁵¹

Importantly though, there is still confusion and uncertainty surrounding Justice Mansfield’s interpretation of section 17.⁵² Adding to the uncertainty, Cultivaust appealed to the Full Federal Court based on the proper construction of section 18 of the *PBR Act* and the use of the harvested material as food.⁵³ In October 2005, Finn, Emmett and Bennett JJ dismissed the appeal,⁵⁴ and in the process, expressed doubt about Justice Mansfield’s construction of section 14. The Full Federal Court considered that Mansfield J confused the distinction between the primary rights under section 11 of the *PBR Act* and the secondary rights that arise by way of infringement under section 53(1).⁵⁵ That is, for the Full Federal Court, the cascading principle appears to relate to infringement, not to the rights per se. In criticising the trial judge, the Full Federal Court somewhat ambiguously stated that:⁵⁶

if s 14(1) be relevant, the primary judge may have misconstrued s 14(1)(b) in failing to distinguish between the grantee’s right under s 11 and the secondary rights that arise by reason of infringement of that right, as provided for in s 53(1). In the light of the conclusion reached above, it is unnecessary to resolve that question but it should not be thought that his Honour’s view of ss 14(1)(b) and 15(b) would necessarily be endorsed if the question arises in the future.⁵⁷

49 Ibid.

50 Ibid 51.

51 On the facts presented, Mansfield J held that Cultivaust and the Tasmanian Government did have a reasonable opportunity to exercise their plant breeder’s rights in relation to the propagating material leading to each harvest, and therefore, s 14 did not apply. According to Mansfield J, the indicia of what constitutes a ‘reasonable opportunity’ were knowing that such crops were being grown and harvested, understanding that the crops were themselves subject to the *PBR Act* by reason of s 14 and, if relying on another body (eg, to obtain end point royalties), knowledge that there had been no agreement: *ibid* 50-51.

52 See above n 36.

53 Section 18 has since been repealed and replaced by the *Plant Breeder’s Rights Amendment Act 2002* (Cth) s 4. This changed the exception from food, food ingredient or fuel to acts authorised under a law of the Commonwealth or of a State or Territory.

54 *Cultivaust Pty Ltd v Grain Pool Pty Ltd* (2005) 67 IPR 162.

55 *Ibid* 174.

56 *Ibid*.

57 *Ibid*.

What does all this mean for the interpretation of the farm saved seed exception? First, section 17 of the *PBR Act* allows a farmer to save seed indefinitely. However, it appears that without the authorisation of the plant breeder's rights owner, farmers cannot do anything 'beyond its further use as farm saved seed' as the plant breeder's right is not exhausted by the sale of the protected propagating material.⁵⁸ This means that, according to Mansfield J, farmers cannot freely sell the harvested material (for example, barley or wheat grain) generated from their farm saved seed, even if it is not being sold as propagating material.

This interpretation becomes especially problematic where the harvested material is also the propagating material. In particular, Justice Mansfield's construction of sections 14 and 17 fails to adequately distinguish between selling a harvest of plant material that is not propagating material, eg, wood, and harvests which are both the harvested material and propagating material, eg, wheat and barley. This is an important distinction to make in clarifying the relationship between sections 14 and 17, and the resolution of this issue may be significant for the management of plant varieties under the *PBR Act*.⁵⁹

Ultimately though, the applicability of this 'cascading' principle may depend upon the determination of what constitutes a 'reasonable opportunity' under section 14. Such an interpretation of the farm saved seed exception is difficult to reconcile. Upon closer examination, the requirement of authorisation to sell crops grown from saved seed has the potential to drastically impact upon farming practices throughout Australia.⁶⁰ Such an interpretation may nullify the merit of the legislative farm saved seed exception by severely diluting its application. Further, this approach seems to be inconsistent with the host of pronouncements and comments about the scope of the farm saved seed exception. It also appears to contradict the underlying philosophy upon which the farm saved seed exception appears to be based: the prevention of farmer-to-farmer trading.⁶¹

If section 14 is relevant to the interpretation of farm saved seed based upon the 'alleged' prevalence of seed saving by Australian farmers and the awareness of this fact by plant breeders and seed sellers, it can be cogently argued that what is

58 Ibid.

59 Leave to appeal to the High Court was denied on 16 June 2007: Transcript of Proceedings, *Cultivaust Pty Limited v Grain Pool Pty Limited* [2006] HCATrans 333 (High Court of Australia, Hayne and Heydon JJ, 16 June 2007).

60 Currently, many seed licences expressly allow farmers to save seed to be used for 'commodity grain, stockfeed, fodder or retained seed': see, eg, 'Pacific Seeds Variety Licence and Royalty Agreement: 2006-2007', <<http://www.pacificseeds.com/products/wheat/documents/VarietyLicence0607.V2.pdf>> at 10 May 2007. However, there is the possibility that non-propagation clauses will become more prevalent as a result of Justice Mansfield's findings, or will be retrospectively applied some time after the propagating material has been sold.

61 The Explanatory Memorandum to the *PBR Act* states that saving seed 'for the purposes of sowing a crop on that farmer's own land is not an infringement': Explanatory Memorandum, Plant Breeder's Rights Bill 1993 (Cth) 6. In addition, the Advisory Council on Intellectual Property has stated that saved seed can be used for 'subsequent cropping cycles' but does not allow a farmer to 'sell, exchange, share or barter' that seed to other growers: Advisory Council on Intellectual Property, above n 12, 17. This also fails to give adequate consideration to s 17(1)(e) which states that the plant breeder's right is not infringed by 'the reproduction of that further propagating material'.

‘reasonable’ under section 14(1)(b) should be narrowly construed. As a consequence, the point of sale is the only ‘reasonable’ time to place any limits on the use of farm saved seed. Moreover, the proliferation of seed licences and contracts means that it is appropriate to include any limitation on future harvested material grown from saved seed at this time. This would have the effect of removing the uncertainty surrounding the use of the phrase ‘reasonable opportunity’ in the event that farmers were reusing their own farm saved seed.

As can be seen, rather than clarifying the interpretation of farm saved seed under section 17 of the *PBR Act*, the *Cultivaust* decision demonstrates confusion and uncertainty in relation to the farm saved seed exception. As we will see though, clarification of this issue may be superfluous;⁶² partly because of a continued problem of compliance, as well as the political sensitivity of the issue. But also from a practical standpoint, owners of plant innovation have already sought alternative strategies to ensure that they are adequately remunerated, cost shifting enforcement into something more efficient and effective. Interestingly, the *Cultivaust* decision may have only reached the courts because the plant breeder’s rights owner, Cultivaust, was unable to come to terms with an alternative strategy for generating revenue, known as end point royalties.⁶³

The connection between end point royalties and farm saved seed is often not explicitly made, although end point royalties have the potential to generate tens of millions of dollars for plant breeders on any saved seed,⁶⁴ irrespective of whether the seed has been legitimately purchased, saved on-farm or traded to other farmers. In this way, the end point royalty scheme does not attempt to prevent the practice of saving seed or the reuse of that seed. Instead, end point royalties can capitalise on the plant’s innate ability to self-reproduce so that substantial tonnes grown means substantial royalties flowing back to the breeder.⁶⁵

62 There has been recent speculation that the seed industry is beginning to manoeuvre itself to remove the farm saved seed exception from UPOV: Grain, ‘The End of Farm-Saved Seed? Industry’s Wish List For the Next Revision of UPOV’ (2007) <<http://www.grain.org/briefings/?id=202>> at 18 September 2007.

63 *Cultivaust* (2004) 62 IPR 11, briefly considered the imposition of end point royalties. Cultivaust claimed it had imposed an end point royalty upon all Franklin Barley delivered. However, on the facts, Mansfield J did not find evidence that the Grain Pool had agreed to an end point royalty payment. Importantly, though, Mansfield J clearly indicates that they could have done so, by stating that ‘[a]t the time of the initial sale of certified Franklin Barley, Tasmania and Cultivaust could have imposed conditions upon the disposition of second and subsequent generations of crop’: *Cultivaust* (2004) 62 IPR 11, 51.

64 For instance, in 2004-05 there were approximately 22,000 million tonnes of wheat, 7.7 million tonnes of barley and 1.5 million tonnes of canola produced in Australia: Australian Bureau of Statistics <<http://www.abs.gov.au>> at 15 June 2007. In addition, the Grains Research and Development Corporation (‘GRDC’) identified a rapid increase in the adoption of wheat and barley varieties attracting end point royalties: GRDC, *Annual Report 2005-2006* (2006) 69 <<http://www.grdc.com.au/about/ar2005/downloads/complete.pdf>> at 20 June 2007.

65 This will also depend on the quality of the variety. For example, in Western Australia the Gamenya wheat variety was successful for 20 years, while other varieties may only be viable for four or five years.

B The Emergence of End Point Royalties

Generally speaking, plant breeder's rights provide an exclusive right to the propagating material of the plant variety⁶⁶ and, as a consequence, breeder royalties have traditionally been sought on the propagating material at the point of sale. As we have seen, though, the problem for plant breeders is that farmers may only purchase seed once, and then rely on their own (or another farmer's) saved seed for future plantings.

An alternative to seed point royalties was legitimised by UPOV in 1991, with article 14(2) introducing the possibility of placing restrictions on the use of harvested material (which had been obtained from protected propagating material).⁶⁷ This was bolstered by the use of the phrase 'within reasonable limits and subject to the safeguarding of the legitimate interests of the breeder' in article 15(2) of UPOV. The combination of these amendments has strengthened plant breeder's rights by enhancing the exclusive rights, and in so doing, is considered to have provided additional justification for collecting revenue on the harvested material post sale.

In Australia, royalties are increasingly being imposed on the harvested material by way of end point royalties.⁶⁸ In this scenario, payment is usually based on the volume, quantity or weight of the harvested material sold by the farmers.⁶⁹ Strictly speaking, the current Australian approach does not depend on this extension of the plant breeder's right per se to harvested material,⁷⁰ but rather it depends on the use of contracts and a centralised collection point to ensure payment on the harvested material.⁷¹

66 *PBR Act* s 11.

67 This is 'cascading' in the sense of extending the plant breeder's right from the propagating material to the harvested material.

68 End point royalties are currently imposed on some varieties of wheat, barley, canola and chickpeas.

69 The end point royalty may be between AS\$1 to AS\$10 per tonne, depending on the collection and management costs, as well as the perceived 'quality' of the new variety.

70 Australia implemented this under s 14 of the *PBR Act*. It was felt that this amendment allowed for the imposition of 'breeder royalties on the delivery of grains': Explanatory Memorandum, Plant Breeder's Rights Amendment Bill 2002 (Cth) 6. The ability to place a royalty on the harvested material was also seen to be facilitated by the *Plant Breeder's Rights Amendment Act 2002* (Cth) s 4. At the time s 18 was repealed and replaced, it was stressed that the '[a]gricultural industry is anticipating the introduction of the amendments positively as they will facilitate commercial arrangements based on plant breeders' rights, including through a system of end point royalties': see Explanatory Memorandum, Plant Breeder's Rights Amendment Bill 2002 (Cth) 11.

71 The Australian approach is in contrast to a number of European countries, where the requirement to pay a fee on farm saved seed is a statutory one pursuant to art 14 of the European Community's Regulation on Community Plant Variety Rights (No 2100/94 of 27 July 1994) and its implementing rules on farm saved seed (No 1768/95 and 2605/98) which requires payment of 'equitable remuneration to the holder, which shall be "sensibly lower" than the amount charged for the licensed production of propagating material of the same variety in the same area', unless the farmers fall within the European Union's categorisation of being a 'small farmer'. Under these provisions, farmers are subject to a statutory requirement to declare all uses of farm saved seed to the British Society of Plant Breeders. There is a discussion of what is 'sensibly lower' in *Saatgut-Treuhandverwaltungs GmbH v Deppe, Hennings, Lubbe*, European Court of Justice, Joined Cases C-7/05 to C-9/05 (8 June 2006). In this case, it was held that a rate of 80 per cent was not 'sensibly lower', although it was stressed that the 50 per cent mentioned in the Community Plant Variety Rights Regulation is not an upper limit. For a general discussion on the European approach, see Margaret Llewelyn & Mick Adcock, *European Plant Intellectual Property* (2006) 230-33.

The introduction of end point royalties has been discussed by Kingwell and Watson,⁷² who have profiled a number of possible advantages and complications in the implementation of the regime. On a positive note, end point royalties were seen as a way for plant breeders to obtain a return on their investment and at the same time reduce the cost of the seed for the farmer.⁷³ This would have the consequence of encouraging the adoption of new plant varieties.⁷⁴ On the other hand, problems of collection were foreshadowed, particularly relating to obtaining accurate farmer declarations and variety identification.⁷⁵ Advocates of the end point royalty regime, most notably plant breeders and the seed industry, also argued that end point royalties were the most equitable means of ensuring continued investment in plant breeding because farmers contribute proportionately, on the basis of success of the crop rather than on the amount of seed that they purchase.⁷⁶

Given the desultory manner in which end point royalties have been introduced, it is unsurprising that some ten years after their implementation there are a number of concerns about the regime.⁷⁷ There is suspicion that the revenue from end point royalties is either not getting back to the breeder or is not being used for further breeding activities.⁷⁸ Moreover, it is the attitude of some plant breeders and farmers that the current administration and collection of end point royalties is inefficient. On one hand, owners and the seed industry lament the cost of collection because it dilutes their returns. On the other hand, some farmers argue that the collection and administration fees are too high and that these fees are arbitrarily set. In 2007, for example, the Australian Wheat Board management fees range from A\$0.30 per metric tonne for one variety of wheat (Drysdale) to A\$0.45 for another variety of wheat (Yitpi). The highest management fee was A\$3.00 per metric tonne a variety of lentil (Tiara).⁷⁹

72 Ross Kingwell and Alistair Watson, 'End Point Royalties for Plant Breeding in Australia' (1998) 5(3) *Agenda* 323.

73 John Hamblin, 'Research for the Pulse Industry in Australia' (Paper presented at ABARE Outlook97, Canberra, 4-6 February 1997). That said, it has never been explicitly explained when and how the cost of propagating material will be reduced.

74 Alistair Watson, 'The Impact of Plant Breeder's Rights and Royalties on Investment in Public and Private Breeding and Commercialisation of Grain Cultivars' (Paper prepared for the Grains Research and Development Corporation, 1997); Alec Lazenby et al, *Trials and Errors: A Review of Variety Testing and Release Procedures in the Australian Grains Industry*, Grains Research and Development Corporation (1994). In addition, the Advisory Council on Intellectual Property laments the 'lack of robust and cost effective variety identification': Advisory Council on Intellectual Property, above n 12, 26.

75 Kingwell and Alistair, above n 72. Importantly though, errors in declaration could potentially be either to the detriment, or to the advantage, of the plant breeder as farmers can make either positive (state that they have a protected variety when they do not) or negative (state that they do not have a protected variety when they do) errors.

76 Kingwell and Watson, above n 72.

77 According to GDRC, identifying standardised contracts and better royalty collection as important considerations for the future of end point royalty schemes: above n 64, 16.

78 See, eg, Rebecca Tyler, 'EPR Debate Defines Crop Breeding Future' (2006) 63 *Ground Cover* 14.

79 See, eg, 'Australian Wheat Board Seed Variety Licence 2007' (2007) 66 *Ground Cover* 16.

It is felt that end point royalties are a form of ‘double or triple dipping’ because farmers contribute levies to research and development corporations,⁸⁰ then purchase seed and are then asked to pay end point royalties on the harvested material. This is seen as a particular problem by farmers because they argue that they have not been given any clear explanation about the exact cost of plant breeding, where the money received from end point royalties actually goes or how the end point royalty scheme contributes to the breeding process.⁸¹

Finally, confusion surrounds administration as there are currently ‘too many different collection methods and too many contracts being used’.⁸² The confusion is amplified because, as well as establishing end point royalty payments, seed contracts may also stipulate other terms and conditions such as price and quality limits. This raises numerous issues for farmers, including uncertainty and misunderstanding about the range of rights and obligations to which they may be bound under various end point royalty contracts. It also raises important questions for the implementation of end point royalties and the relationship between statutory intellectual property laws and common law contract.

While such collection strategies have the potential to close the gap left by the difficulty of enforcing intellectual property protection of plants, the full impact of this shift is yet to be realised.⁸³ Currently, from a user’s perspective, there appears to be little confidence in the end point royalty regime and, while farmers do not appear to be opposed to end point royalties per se, farmers want (and should demand) transparency, clarity and certainty. More specifically, future consideration of end point royalties should focus on two key areas.

First, investigations need to concentrate on the appropriateness and validity of the assumptions underlying the regime. There are a number of questions that need to be considered. Where is the evidence that the existing royalty arrangements, received at the point of sale, are not delivering an appropriate incentive for investment in plant breeding? Is the end point royalty a return on past investment or an upfront payment for prospective, but yet uncommitted, investment in plant breeding?⁸⁴ Has the cost of propagating seed been reduced as a consequence of end point royalties? What proportion of the end point royalty is going directly towards breeding programs? Do end point royalties encourage the

80 An example is the statutory research levies. For instance, there is a one per cent compulsory levy to the GRDC which is matched dollar-for-dollar by the Federal Government: *Primary Industries and Energy Research and Development Act 1999* (Cth). This is an important issue as plant breeder’s rights were developed expressly taking specific levies and taxes into account: see Second Reading Speech, Plant Breeder’s Rights Bill 1994 (Cth), Senate, 24 March 1994 (Senator Faulkner, NSW Manager of Government Business in the Senate).

81 Remembering that the *PBR Act* was intended to ‘encourage increased investment in plant breeding and technology transfer’, and be ‘complementary to the government’s policies geared to promote innovation in Australia’s plant industries by encouraging research and development using production levies and tax concessions’: Second Reading Speech, above n 80, 2305-2306.

82 See, eg, Tyler, above n 78.

83 Collection strategies are a particular focus for the recent review of enforcement of the *PBR Act*: see Advisory Council on Intellectual Property, above n 12, 28-29.

84 If it is the latter then we may have an entirely new justification for intellectual property based on statutory grants for prospective investment which would require further investigation.

adoption of new plant varieties?⁸⁵ How are the end point royalty rates calculated? And, what is the relationship between end point royalties and the practice of farm saved seed?

Secondly, the administrative arrangements and collection methods for end point royalties need to be refined.⁸⁶ Again, a number of questions must be considered. Is it possible to create standardised contracts? Do the motivations and the ramifications for government agencies differ to those of private seed companies? What collection method is most appropriate?⁸⁷ Are a number of collection strategies required depending on the needs of particular industries? What is the justification for charging different amounts for administration and management fees? Is it possible, or necessary, to establish a centralised collection agency? And, should there be legislative consequences for failure to pay royalties instead of relying on individual contracts?

These questions are significant because they concern the capability of the end point royalty regime to achieve its aims. They also provide a basis from which to assess whether end point royalties are the most suitable collection method available and, if so, what form they should take. Notwithstanding these concerns, end point royalties have been successfully adopted in a number of industries including wheat, barley, canola and chickpeas.⁸⁸ Despite this success, a problem for the universality of end point royalties is that some crops can evade royalty capture. For example, niche markets and crops that are used on-farm, eg, oats and lupins.⁸⁹

In the next section, I argue that capturing end point royalties is dependent on two factors. The first factor is the formation of a contract between the intellectual property owner and the grower. The second (and more important) factor is the need for a centralised collection point.

85 In Western Australia, the Department of Agriculture generally includes in the seed licence contract a clause that states that farmer-to-farmer trading will not be permitted for a period of two years. After this time, the Department declares 'open trading' and farmer-to-farmer trading of seed is allowed. The Department considers that the declaration of open trading (farmer-to-farmer trading) makes a significant difference to the adoption of varieties and that an open trading environment dramatically decreases the seed price and substantially improves a grower's access to seed: see Tresslyn Walmsley, Department of Agriculture, Western Australia, 'Variety Release and End Point Royalties – A New System?' GRDC <http://www.grdc.com.au/growers/res_upd/west/w05/walmsely.htm> at 15 May 2007; 'Status of Department of Agriculture and Feed Western Australia Crop Varieties: May 2006' Department of Agriculture and Food: Government of Western Australia <http://www.agric.wa.gov.au/pls/portal30/docs/folder/ikmp/fcp/status_200605.PDF> at 10 May 2007.

86 GRDC Project BBE00003 'End Point Royalty Collection Models': GRDC, above n 64, Appendix 2.

87 This may range from something similar to the British Society of Plant Breeders ('BSPB') who collect and distribute farm saved seed payments, the payment of which is a statutory requirement, to some form of self-regulation in which the industry sets the parameters of collection.

88 GRDC, above n 64, 69.

89 Kingwell, above n 11, 21.

C End Point Royalties: Contracts and Centralised Collection Points

At the point of purchasing seed, a grower usually enters into a contract or licence authorising the deduction of end point royalty payments.⁹⁰ This seed licence will outline the obligations of the grower when purchasing the plant variety including the amount of the end point royalty and when and how the royalty is to be paid. Generally, there are two methods of payment.

The first method of collecting end point royalties involves the farmer making a declaration on the amount of seed that they have saved. Based on this information, the grower is invoiced directly for the end point royalty payment. For example, clause 5 of the Canola Breeders Western Australia's ('CBWA') 'Canola Licence and End Point Royalty Agreement' ('CBWA Agreement') stipulates that the farmer must provide the following information:

- i. the quantity of grain produced from CBWA Seed specifying the variety name. If no CBWA Seed was grown, then this should also be stated;
- ii. the variety name and quantity of CBWA Seed held for subsequent sowing by the Purchaser;
- iii. the quantity of grain held on-farm for uses other than for subsequent sowing by the Purchaser;
- iv. the quantity of grain produced from CBWA Seed delivered to an end-user or their agent; and
- v. the amount of EPR paid by the Purchaser to a Bulk Commodity Delivery Agent for CBWA Seed harvested in that year and the name and contact of the Bulk Commodity Delivery Agent whom the Purchaser paid.⁹¹

Relying on contracts and declarations as a method of collection is limited because this can only capture revenue for those plant varieties that have been legally obtained and that the farmer is willing to declare. This may be overcome, however, if owners can utilise the second method of collection: collecting end point royalties at the point of delivery of the harvested material.

In this scenario, if the variety is delivered to a selected collection agency, eg, a specified grain buyer like the Australian Wheat Board, the payment of the end point royalty and any management or administration fee will be automatically deducted from the grower payment.⁹² Take, for example, clause 8 of the Canola Breeder's Western Australia's (CBWA) 'Canola Licence and End Point Royalty Agreement':

90 This is done differently depending on the company involved and may involve signing a licence at purchase; 'agreement' by opening a bag of seed that contains a 'bag tag' agreement, ie, by opening this bag you agree to be bound, or by clicking 'I Agree' on an electronic contract via the company's website.

91 Canola Breeders Western Australia Pty Ltd, 'Canola Licence and End Point Royalty Agreement' <http://www.cbwa.net.au/CBWA/cbwa_epr_agreement.pdf> at 10 May 2007.

92 Generally, under a separate contract, between the grain buyer and the plant breeder, the end point royalty payment is returned to the plant breeder's rights owner.

Where harvested CBWA Seed is supplied to a Bulk Commodity Delivery Agent, the Purchaser hereby authorises and directs the Bulk Commodity Delivery Agent to deduct an EPR and applicable GST as specified in the Canola Variety Schedule and to pay these sums to CBWA or its Agent.⁹³

The importance of collecting end point royalties at the point of delivery of the harvested material highlights the second requirement for an effective end point royalty scheme: a centralised collection point.⁹⁴ Here, farmers take their harvested material to a specified buyer who automatically deducts the end point royalty. This renders the need for contracts incidental as the collection point provides a mechanism to capture royalties on all protected plants whether they are obtained legally or illegally. Without a centralised collection point, the collection of end point royalties is at best ad hoc, or at worst (for intellectual property owners), non-existent.

Combined together, the need for a centralised collection point and the existence of contracts means that end point royalties will not always be an effective mechanism for generating revenue on plant innovation. These requirements are difficult, if not impossible, for niche markets and crops used on-farm to satisfy. For these industries, patents and technological protection may provide alternative strategies for the generation of revenue over plant-related innovations.

III NEW STRATEGIES FOR THE CONTROL OF PLANT VARIETIES

A Patents and Restrictive Licences

Patent law is increasingly seen as a viable way of generating a return on plant innovation,⁹⁵ partly because of developments in plant breeding that have enabled

93 Canola Breeder's Western Australia, *Canola Licence and End Point Royalty Agreement* <http://www.cbwa.net.au/CBWA/cbwa_epr_agreement.pdf> at 10 May 2007.

94 This would also rely on accurate variety identification.

95 For some time, it was felt that the patent system was inappropriate for plant varieties because of the uncertainty of whether plants were suitable subject matter, as well as perceived difficulties in meeting the requirements of novelty, inventiveness and disclosure: see, eg, Margaret Llewelyn, 'The Legal Protection of Biotechnological Inventions: An Alternative Approach' (1997) 19(3) *European Intellectual Property Review* 115. For an Australian position see Alec Lazenby, *Australia's Plant Breeding Needs: A Report to the Minister for Primary Industry*, Canberra (1986); K Ayer, S Castle and M Ross, Australian Patent Office, 'Background Paper on Patents for Plants' (1989). Now, in Australia, plants are clearly patentable subject matter see *Australian Patents for Plants*, IP Australia, <<http://www.ipaustralia.gov.au/pdfs/patents/specific/Australian%20Patents%20for%20Plants.pdf>> at 11 October 2007. For a discussion of some of the problems of describing heterogeneous biological material see Charles Lawson, 'Depositing Seeds to Comply with the *Patents Act 1990* (Cth) – The Adequacy of Definitions and Description?' (2004) 23(1) *University of Tasmania Law Review* 68.

the introduction of a wide range of desirable characteristics into plants,⁹⁶ as well as the stronger protection granted by patent law. Broadly speaking, three categories of plant patents have been identified:⁹⁷ plant varieties, referring to patents on specific plant varieties; method inventions, which refer to methods of manufacture or plant breeding and includes the use of DNA markers; and gene inventions, which refer to the patenting of biological materials, including DNA sequences.⁹⁸

There are a number of possible ramifications for Australian agricultural, horticultural and garden industries as a result of the patenting of plants.⁹⁹ In particular, because there is no farm saved seed or breeder exemption under the *Patents Act 1990* (Cth), the seed industry generally views patents as providing a greater level of protection and therefore constituting a more robust protection method. On the other hand, farmers are concerned about the consequences that the patenting of plant innovations may have on farming practices; they fear that they will be forced to purchase seed that they may otherwise be able to save.

Despite this theoretically stronger protection, there are at least two problems in using patent law to manage plant varieties. First, there is a question of whether the sale of patented seeds carries with it an implied licence to freely use those patented seeds.¹⁰⁰ In relation to the sale of patented products, the Privy Council has opined that ‘a sale having occurred, the presumption is that the full right of ownership was meant to be vested in the purchaser’.¹⁰¹ More specifically, where there is a sale of patented goods, an implied licence for the ‘undisturbed and unrestricted’ use of those goods will arise unless there is evidence of the

96 Including sterility, enhanced plant colour, vitamin and pharmaceutical enrichment. Since genetic engineering was developed, a number of plant patents have been filed covering the use of specific genes, types of genes, gene promoters, plant components, hybrids, seeds and plant varieties. The primary transgenic crops grown globally are herbicide-tolerant soybeans, maize, cotton and canola. The global area of ‘biotech’ crops has increased from 1.7 million hectares to 102 million hectares in 2006: International Service for the Acquisition of Agri-biotechnology Applications, *Global Status of Commercialised Biotechnology/GM Crops 2006*, ISAAA Briefs No 35-2006 (2006) <<http://www.isaaa.org>> at 12 May 2007. The Australian position has the potential to change dramatically depending on the outcome of the reviews of the ‘Genetically Modified Organisms’ moratoria in place throughout the states and territory.

97 Phoebe Chan, ‘International Patent Behaviour of Nine Major Agricultural Biotechnology Firms’ (2006) 9(1) *AgBioForum* 59; Gregory Graff, Gordon Rausser and Arthur Small, ‘Agricultural Biotechnology’s Complementary Intellectual Assets’ (2003) 85(2) *The Review of Economics and Statistics* 349.

98 A closer inspection of these categories may reveal anomalies in relation to patent claims for parts of plants, eg, over seeds.

99 For a discussion of the differences between plant breeder’s rights and patents, see Llewelyn and Adcock, above n 71, 29-37; Mark Janis and Jay Kesan, ‘US Plant Variety Protection: Sound and Fury...?’ (2002 – 2003) 39 *Houston Law Review* 727, 745-52; WIPO-UPOV, Symposium on the Co-Existence of Patents and Plant Breeder’s Rights in the Promotion of Biotechnological Developments (Geneva, 25 October 2002) <<http://www.upov.int/en/documents/syposium2002/index1.htm>> at 20 May 2007.

100 It is accepted that there is an implied right to ‘repair’ a patented product so as to prolong the useful life of that product. However, the repair cannot be so extensive that it amounts to a ‘remaking’ of the product: see *Sirdar Rubber Co v Wallington Weston & Co* (1907) 24 RPC 539; *Weir Pumps Ltd v CML Pumps Ltd* (1983) 2 IPR 129. As we will see later, the problem of implied licence has largely been overcome through the use of contracts and licences.

101 *National Phonograph Company of Australia Ltd v Menck* (1911) 12 CLR 15, 28.

imposition of restrictive conditions by the patentee.¹⁰² Therefore, when a farmer purchases patented seed in an authorised sale, without any contrary contractual terms from the patent owner, it is possible that the farmer is deemed to have received an implied patent licence to use and dispose of the seed in ‘ordinary’ ways.¹⁰³ Due to the animate nature of seeds, and the well-known and highly prevalent practice of farm saved seed, such ‘ordinary’ practice is likely to include the practice of saving seed. In Australia, the practice of saving seed was seen as a particular impediment for the patenting of plant related innovation:

[S]aving seed is so endemic to Australian [a]griculture, it is arguable that when an Australian farmer buys [patented] seed to sow he is impliedly licensed to save seed of the patented variety for a further plant (or further plantings) for his own commercial gain. This implied license would need to be negated by the terms of sale, and the farmer given express prior notice of this fact, before he could be proceeded against for infringement of the patent.¹⁰⁴

The second complication with seeking patent protection over plants is that patent infringement is notoriously difficult to enforce.¹⁰⁵ A recent empirical investigation into the Australian patent litigation landscape investigated the use of the Australian court system as a mechanism for enforcing patent rights.¹⁰⁶ While acknowledging that patent rights were ‘probabilistic’ in nature and do not guarantee validity, the authors concluded that a patent right is akin to a ‘very expensive lottery ticket’ that gives rise to uncertainty.¹⁰⁷ In relation to plants, the problem of patent enforcement is compounded by a plant’s ability to reproduce and the associated problems of a ‘volatile, unstable and dynamic’ innovation.¹⁰⁸ More specifically, plants are difficult to define and describe and if plant innovations were adequately defined others would be able to more easily distinguish their plant from the patented one.¹⁰⁹ A further complication for patent

102 Ibid 24.

103 Known as the doctrine of ‘first-sale’ in the United States: see Bryan Endres, ‘State Authorized Seed Saving: Political Pressures and Constitutional Restraints’ (2004) 9(3) *Drake Journal of Agricultural Law* 323; Mark D Janis, ‘Supplemented Forms of Intellectual Property Protection for Plants’ (2004) 6(1) *Minnesota Journal of Law, Science & Technology* 305.

104 Noel Byrne, *Legal Protection of Plants in Australia under Patent and Plant Variety Rights Legislation* (1990) 63-64.

105 In 1999, the Advisory Council on Intellectual Property wrote, ‘[a] major problem facing Australian patent owners is the difficulty in effectively enforcing their rights against infringement’, Advisory Council on Intellectual Property, ‘Review of Enforcement of Industrial Property Rights (Patent Enforcement)’ (1999) <<http://www.acip.gov.au/library/patents%20enforcement%20reprt.doc>> at 10 May 2007; see also Advisory Council on Intellectual Property, ‘Review of Post-grant Enforcement Strategies’ (Issues Paper, November 2006) 7-11 <<http://www.acip.gov.au>> at 10 May 2007.

106 Kimberlee Weatherall and Paul Jensen, ‘Empirical Investigation Into Patent Enforcement in Australian Courts’ (2005) 33(2) *Federal Law Review* 239.

107 Ibid. In this regard, one could argue that a patent will always be a ‘lottery ticket’ unless greater effort is taken in examining the original application, and, without certainty in the claim and specification, enforcement will always be uncertain.

108 Brad Sherman, ‘Biological Inventions and the Problem of Passive Infringement’ (2002) 13 *Australian Intellectual Property Journal* 146, 146.

109 Lawson, above n 95.

enforcement is the reluctance of farmers and others in rural communities to provide evidence against those individuals that they suspect of saving seed.¹¹⁰

Together, the problems of implied licences and the difficulties of patent enforcement have led to greater emphasis being placed on restrictive seed contracts and licences.¹¹¹ In fact, plant breeders and seed companies have attempted to overcome these limitations by licensing the seed instead of selling it and, in this way, the patented product is combined with a detailed set of agreed terms and conditions. One such condition may attempt to maximise revenue by expressly preventing farmers from saving seed. For example, a farmer purchasing genetically engineered seeds may sign a licence, sometimes known as a 'Technology Agreement', with the seed provider that may contain a clause whereby the farmer relinquishes rights to the seeds produced by the harvested crop.¹¹² These types of clauses are aimed at preventing farmers from saving, reusing or reselling patented seed, and have been described as 'terminator clauses'.¹¹³ For example, in the 2006 Monsanto Technology Agreement the grower agreed to:

use seed containing Monsanto Technologies solely for planting a single commercial crop. Not to save any crop produced from Seed for planting and not to supply Seed produced from Seed to anyone for planting other than to a Monsanto licensed seed company. Not to transfer any Seed containing patented Monsanto Technologies to any other person or entity for planting.¹¹⁴

Under seed licence agreements, companies may pursue breach of contract remedies if a farmer saves seed, uses the harvested seed for replanting on their own field or sells the saved seed to another farmer.¹¹⁵ While common law contract may provide more certainty than patent law, like patents, the enforceability of seed licences is not guaranteed; it requires sufficient time, finance and evidence.

While the trend may be for an increase in the use of patent law to manage plant varieties, patents will not easily resolve the problems associated with maximising revenue over plant innovations. While patents may make it clearer when infringement has occurred, difficulties of enforcement still remain. This problem of enforcement of plant breeder's rights and patents has prompted the seed industry to consider alternative strategies outside of formal legal

110 This is a problem for many legal fields, including the plant breeder's rights scheme. In relation to the *PBR Act*, see Advisory Council on Intellectual Property, above n 12.

111 Janis and Kesan, above n 99.

112 For the United States experience, see Sina Muscati, 'Terminator Technology: Protection of Patents or a Threat to the Patent System?' (2005) 45 *IDEA: The Journal of Law and Technology* 477.

113 Samantha M Ohlgart, 'Terminator Gene: IP Rights vs. The Farmers' Common Law Right to Save Seed' (2002) 7(2) *Drake Journal of Agricultural Law* 473.

114 Monsanto Technology/Stewardship Agreement (2006) <<http://www.farmsource.com/images/pdf/2006%20EMTA%20Rev3.pdf>> at 10 May 2007.

115 Seed licences that impose express restrictions on a farmer's ability to save seed have generated controversy. Despite this, courts have been willing to uphold seed use restrictions contained in licensing agreements and 'bag tags'. Therefore farmers planting seeds that were purchased subject to these licensing arrangements risk prosecution for saving seed: see Keith Aoki, 'Weeds, Seeds and Deeds: Recent Skirmishes in the Seed Wars' (2003) 11 *Cardozo Journal of International and Comparative Law* 247, 255; Donald L Uchtmann, 'Can Farmers Save Roundup Ready® Beans for Seed? *McFarling and Trantham Cases Say No*' (2002) 19 *Agricultural Law Update* 4.

frameworks. In relation to plants, technological protection measures such as hybridisation and genetic use restriction technologies ('GURTs') may ensure that farmers come back to purchase seed from year-to-year. In this way technological protection of innovation can bypass intellectual schemes and their enforcement structures.

B Technological Protection

Technical solutions to the problem of controlling plants and their propagating material emerged with deterioration techniques used at the end of the 19th century.¹¹⁶ These techniques became more systematic with the commercial use of hybrids, beginning in the 1930s, and more recently, with the patenting of GURTs.

Hybridisation involves the crossing of two genetically distinct plants and results, after a number of generations, in progeny that possess the most desirable, or exhibit amplification of the desired, characteristics of both plants. In the early 1900s it was recognised that hybrid plant varieties exhibited hybrid vigour and had yields higher than open-pollinated varieties.¹¹⁷ Since then, hybridisation has been a major tool in plant breeding and has been used successfully to develop new varieties of corn, cotton, canola and sorghum.¹¹⁸ While the improved characteristics of the hybrid varieties helped to justify the technique, it has been suggested that it was the proprietary character of hybridisation that was most appealing to plant breeders and the seed industry.¹¹⁹

One consequence of hybridisation for farmers is that the seed of second and later generations of hybrid varieties lose some yield potential and uniformity. Consequently, seed saved from a hybrid variety, when replanted, may display a considerable decrease in the quality and quantity at the next harvest. The effect of this is that there is little, if any, benefit in saving and replanting hybrid seed, making it necessary for farmers to purchase new seed each year. Because of the reduced output and quality of second and later generations, hybridisation serves as a way of ensuring biological control over propagating material.¹²⁰ In this way, hybridisation became an effective way for plant breeders to protect their innovation from unauthorised use and exploitation, as farmers could only reliably access the sought-after trait for one, or possibly a few, generation(s). Because of this protective characteristic, it was suggested that breeders would 'divert their

116 A technique where plant varieties 'deteriorate' in the farmer's field: Jean-Pierre Berlan and Richard Lewontin, 'Cashing in on Life: Operation Terminator', *Le Monde Diplomatique* (UK), 2 December 1998 <<http://mondediplo.com/1998/12/02gen>> at 10 May 2007.

117 Hybrid vigour refers to an increase in the level of production and is also known as heterosis. For an overview of the developments of plant breeding, see MC Kharkwal and D Roy, 'A Century of Advances in Plant Breeding Methodologies' in HK Jain and MC Kharkwal, *Plant Breeding: Mendelian to Molecular Approaches* (2004) 21; Maarten Koornneef and Piet Stam 'Changing Paradigms in Plant Breeding' (2001) 125(1) *Plant Physiology* 156.

118 BS Dhillon, AK Singh, BPS Lather and G Srinivasan, 'Advances in Hybrid Breeding Methodology' (2004) in Jain and Kharkwal, above n 117, 419.

119 Kloppenburg, above n 3, 125.

120 The use of technological protection measures may also prolong the monopoly beyond the life of any plant breeder's right or patent.

efforts to the creation of hybrid varieties, with an inherent biological solution to the problem [of farm saved seed]¹²¹. In fact, in 1994, as part of the Senate Standing Committee on Natural Resources Report into plant variety rights, it was stated that Australian plant breeders had focussed on the development of new hybrids ‘because of their biological protection’.¹²²

Importantly though, some crops, including wheat and barley, are difficult to breed using hybridisation techniques.¹²³ The technical difficulties associated with applying hybridisation techniques to some crops and the shift to genetic engineering has meant that plant breeders were able to specifically target gene expression;¹²⁴ creating the potential for technological control of biological material at the molecular level. The latest example of this is GURTs.¹²⁵

GURTs can be classified into two types: trait-related (‘T-GURTs’), which regulate the expression of certain characteristics, eg, drought resistance; and variety-related (‘V-GURTs’), which can render the subsequent generation sterile.¹²⁶ GURTs, and especially V-GURTs, provide a means of biologically protecting against unauthorised reproduction of the seed, making any saved seed inert.¹²⁷ The seeds only produce one harvest and if a farmer wants additional seed

121 Noel Byrne, *Commentary on the Substantive Law of the 1991 UPOV Convention for the Protection of Plant Varieties* (1996) 61.

122 Standing Committee on National Resources, Senate, *Plant Variety Rights* (1984) 14.

123 For a discussion of hybridisation in various crops, see SS Banga and SK Banga, *Hybrid Cultivar Development* (1998).

124 Genetic engineering refers to the use of recombinant DNA technology and marked an important shift in plant breeding methodology. Breeders can identify a DNA sequence for a particular characteristic and then attempt to transcribe and transpose that characteristic into another organism. The two main methods of producing transgenic plants are by transporting the DNA into the plant cell via the bacterium *agrobacterium tumefaciens* or by shooting the DNA through the cell wall using biolistics: see Jim Dunwell ‘Review: Intellectual Property Aspects of Plant Transformation’ (2005) 3 *Plant Biotechnology Journal* 371.

125 For an explanation of the early technology, see Martha Crouch, ‘How the Terminator Terminates: An Explanation for the Non-scientist of a Remarkable Patent for Killing Second Generation Seeds of Crop Plants’ (1998) *The Edmonds Institute* <<http://www.edmonds-institute.org/crouch.html>> at 9 October 2007. See also Richard Jefferson et al, *Genetic Use Restriction Technologies: Technical Assessment of the Set of New Technologies which Sterilize or Reduce the Agronomic Value of Second Generation Seed, as Exemplified by US Patent No 5,723,765 and WO 94/03619*, UNEP/CBD/SBSTTA/4/9/Rev.1 (1999) 25-35.

126 V-GURTs are also known as ‘terminator genes’, a term coined by the Rural Advancement Foundation International (‘RAFI’) (now the action group on Erosion, Technology and Concentration (‘ETC’)) in 1998: ETC Group ‘Terminator and Traitor’ (2006) <http://www.etcgroup.org/en/issues/terminator_traitor.html> at 10 May 2007.

127 While the first relevant patent was awarded in 1998, to Delta and Pine Land Company and the United States Department of Agriculture for the ‘Control of Plant Gene Expression’ (U.S. Patent No. 5,723,765 (issued Mar. 3, 1998)) there have been a number of patents granted since for various methods of producing ‘controlled sterility’, eg, U.S. Patent No. 5,808,034 (issued Sept. 15, 1998) and 6,700,039 (issued Mar. 2, 2004). In Australia, patent applications have been submitted for the ‘Control of Gene Expression in Plants’; ‘Biotin-Binding Compounds for Induction of Sterility in Plants’; and the ‘Process for Producing Plants with Female Sterility’.

of that variety, he or she must go back to the seed company to purchase it.¹²⁸ Put simply, if a farmer saves seed from these plants, they will not grow.

GURTs therefore overcomes the problem of compliance and enforcement under plant breeder's rights, patents and common law contract.¹²⁹ It also removes the requirement of a centralised collection point that end point royalties are so reliant upon. In comparison to the legal mechanisms for prohibiting farm saved seed, it was felt that GURTs were 'broader, more effective and less limited by time constraints, than the protection conferred by intellectual property rights'.¹³⁰ According to one of the pioneers of GURTs, Melvin Oliver:

The need was there to come up with a system that allowed you to self police your technology, other than trying to put on laws and legal barriers to farmers saving seeds, and to try and stop foreign interests from stealing the technology.¹³¹

Despite the potential for generating revenue, the controversial nature of the sterilisation of plants (and other biological material) and the potential ramifications for farming practices, GURTs have generated heated debate and controversy.¹³² Discussions regarding GURTs have involved a number of forums, most notably, the Conference of the Parties to the *Convention on Biological Diversity* ('CBD').¹³³ At the CBD, attention has been focused on the potential consequences of GURTs, including the impact of GURTs on agricultural diversity, biosafety, ethics, intellectual property protection and the practice of farm saved seed.¹³⁴ Initially, the Conference of the Parties to the CBD, expressed concern in relation to GURTs; asking governments to act cautiously and

128 Jeremy P Oczek, 'In the Aftermath of the "Terminator" Technology Controversy: Intellectual Property Protections for Genetically Engineered Seeds and the Right to Save and Replant Seed' (2000) 41(3) *Boston College Law Review* 627, 628. In addition, some commentators argue that GURTs are more a 'strategic bargaining device' that can be used to coerce governments into implementing some form of intellectual property protection for plants: see Stephen Hubicki and Brad Sherman, 'The Killing Fields: Intellectual Property and Genetic Use Restriction Technologies' (2005) 28(3) *University of New South Wales Law Journal* 740, 746.

129 These seeds are different from hybrid seeds because hybrid seeds are not sterile and offer, at least in theory, the benefits of 'improved agronomic performance'. On a commercial level, GURTs will not be successful until the technology is paired with a desirable characteristic such as drought tolerance or salinity resistance so that farmers are given an incentive to purchase the seeds containing GURTs over those that do not.

130 Jefferson et al, above n 125, 13.

131 Vandana Shiva, *Stolen Harvest: The Hijacking of the Global Food Supply* (2000) 82. For similar comments see Melvin Oliver, 'End of the Germ Line' *New Scientist* (United Kingdom), 28 March 1998.

132 See, eg, Alejandro Segarra and Jean Rawson, 'The "Terminator Gene" and Other Genetic Use Restriction Technologies (GURTs) in Crops' (CRS Report for Congress, October 21 1999) <<http://www.ncseonline.org/NLE/CRSreports/Agriculture/ag-83.cfm>> at 10 May 2007. As a result, in 1999, Monsanto, one of the major companies involved, announced that '[u]ntil a thorough, independent examination of gene protection systems has been conducted and all points of view considered, we will not commercialize these technologies': Statement from Monsanto, 'Gene Protection Technologies; a Monsanto Background Statement' in Jules Janick (ed) *Perspectives on New Crops and New Uses* (1999) 127.

133 In Australia, the CBD entered into force on 29 December 1993. As at 1 November 2006, there were 188 Parties to the CBD: *List of Parties* (2007) Convention on Biological Diversity <<http://www.biodiv.org/world/parties.asp>> at 20 February 2007.

134 *Consequences of the Use of the New Technology for the Control of Plant Gene Expression for the Conservation and Sustainable Use of Biological Diversity*, UNEP/CBD/SBSTTA/4/9/Rev.1 (17 May 1999).

requesting that the Subsidiary Body on Scientific, Technical and Technological Advice ('SBSTTA') consider, and assess, possible consequences of the commercialisation of GURTs.¹³⁵

In 2000, the Conference of the Parties recommended that governments be prohibited from field-testing and commercialising GURTs. In effect, this established a 'de facto' moratorium on the field testing and commercial use of GURTs until transparent scientific assessments of the potential impacts were made and the socio-economic impacts of GURTs were validated.¹³⁶ The Conference of the Parties adopted Decision V/5 (Agricultural biological diversity) section III, paragraph 23, which recommended that:

... in the current absence of reliable data on genetic use restriction technologies, without which there is an inadequate basis on which to assess their potential risks, and in accordance with the precautionary approach, products incorporating such technologies should not be approved by Parties for field testing until appropriate scientific data can justify such testing, and for commercial use until appropriate, authorized and strictly controlled scientific assessments with regard to, inter alia, their ecological and socio-economic impacts and any adverse effects for biological diversity, food security and human health have been carried out in a transparent manner and the conditions for their safe and beneficial use validated.¹³⁷

At the Eighth Meeting of the Conference of the Parties to the CBD, held in 2006, the issue of GURTs was raised again. Australia, Canada, New Zealand and the biotechnology industry initiated discussions regarding the field testing of GURTs, arguing for a 'case-by-case' approach which could open the door for countries to start commercialising GURTs and other similar technologies.¹³⁸ However, the Conference of the Parties encouraged parties to '[c]ontinue to undertake further research, within the mandate of decision V/5 section III, on the

135 *Report of the Fourth Meeting of the Conference of the Parties to the Convention on Biological Diversity*, UNEP/CBD/COP/4/27 (1998) <<http://www.biodiv.org/doc/meetings/cop/cop-04/official/cop-04-27-en.pdf>> at 12 May 2007.

136 Some national legislatures, notably India and Brazil, have passed laws prohibiting the use, sale, registration and patenting of GURTs, and, more recently, a private members Bill was introduced into the Canadian Parliament that proposes to 'prohibit the release, sale, importation and use of organisms incorporating, or altered by, variety-genetic use restriction technologies', Bill C-448, House of Commons of Canada, First Reading (31 May 2007). However, in spite of the moratorium, companies have continued to file patents in the field of GURTs. See, eg, Cullen Pendleton, 'The Peculiar Case of 'Terminator' Technology: Agricultural Biotechnology and Intellectual Property Protection at the Crossroads of the Third Green Revolution' (2004) 23 *Biotechnology Law Report* 1; Greenpeace and Kein Patent auf Leben, *Terminator-Technology: Patents and Patent Applications: No Patents on Life*, Report (2005) <http://www.keinpatent.de/doc/Terminator_en.pdf> at 10 May 2007; ETC Group, *Terminator: The Sequel*, (2007) ETC Group Communiqué No 95 (2007) <http://www.etcgroup.org/en/materials/publications.html?pub_id=635> at 20 June 2007, which examines three areas of current research – reversible transgenic sterility; gene excision; and conditional lethality genes.

137 *The Convention on Biological Diversity*, adopted Decision V/5 (Agricultural biological diversity) Section III, para 23 (2000) <<http://www.biodiv.org/decisions/default.aspx?m=COP-05&id=7147&lg=0>> at 12 May 2007.

138 *Report of the Eighth Meeting of the Conference of the Parties to the Convention on Biological Diversity*, UNEP/CBD/COP/8/31 (2006) <<http://www.cbd.int/doc/meetings/cop/cop-08/official/cop-08-31-en.pdf>> at 20 June 2007.

impacts of genetic use restriction technologies'.¹³⁹ While the 'case-by-case' recommendation failed to gather the necessary support, the issue is likely to be raised again at the next CBD meeting, in 2008, as companies seek, through the States, to develop an 'acceptable' in-built technological control mechanisms.¹⁴⁰ Nevertheless, it is highly unlikely that GURTs would gain the necessary support in the near foreseeable future.

IV BACK TO THE FUTURE

At the present time in Australia, end point royalties appear to be the most appealing option for generating revenue on plant varieties.¹⁴¹ As we have seen though, end point royalties have not enabled all industries to successfully manage plant varieties, particularly those not amenable to establishing a centralised collection point. Fortunately for intellectual property owners, these industries are left with a small number of strategies which may effectively capture revenue on their plant innovations.

At first glance, the most obvious alternatives appear to come from other jurisdictions. Looking to the United Kingdom, one option is for Australia to implement legislative requirements on users of plant innovation to declare all uses of saved seed and to pay 'equitable remuneration' for that seed.¹⁴² Another option is for the self-regulation of farm saved seed by those industries that are most affected. This could be achieved through the imposition of a levy of some sort. In this case, farmers may be required to make an additional levy payment based on the quantity of seed purchased or the harvested material they produce; this could then be distributed proportionally depending on the prevalence of farmers saving seed.¹⁴³ Unfortunately, however, both approaches are likely to suffer the same fate as end point royalties because they are dependent on a centralised collection point. Thus, imposing legislative requirements to pay 'equitable remuneration' or establishing a levy system are unlikely to fill the gaps left by the end point royalty scheme.

By turning our attention to the issues of centralised collection points and enforcement we may be able to come up with more strategies to satisfy the needs of niche markets and crops used on-farm. Firstly, it may be possible for owners of plant-related intellectual property to establish an artificial collection point through the use of closed loop contracts.¹⁴⁴ A closed loop contract is a contract in which one party (eg, the owner) can control one, or all, aspects of the supply

139 The *Convention on Biological Diversity* adopted Decision VIII/23 (Agricultural biological diversity) Section A (2006) 216 <<http://www.biodiv.org/doc/decisions/COP-08-dec-en.pdf>> at 20 May 2007.

140 It is also important to note that the United States is not a party to the CBD. As the country with the bulk of research and development in plant-related science and technology this could be significant to the commercial adoption of GURTs. In the future, the World Trade Organization is likely to be another forum where disputes about GURTs could be addressed.

141 See Advisory Council on Intellectual Property, above n 12.

142 This is the approach taken by the European Community: see Llewelyn and Adcock, above n 71.

143 France has adopted a 'mandatory voluntary fund' which is currently only applied to all bread wheat, regardless of what seed was used: see Grain, above n 62, 8.

144 'Closed loop' is an industry term, not a legal one.

chain with another party (eg, farmers). In so doing, the closed loop contract will place restrictions on what the grower can and cannot do. This may include placing restrictions on how, where and with whom they can do business.

Importantly, in the context of this article, closed loop contracts may be used to maximise returns on plant innovation by stipulating where the harvested material can be taken, and then by ensuring that some form of royalty or subsequent payment is made. In this way, closed loop contracts serve as one way of creating an artificial collection point.¹⁴⁵ However, they also have limitations. While they may satisfy the centralised collection point prerequisite, they only do so by relying on a series of contracts. Because of this, closed loop contracts are unlikely to capture revenue from those individuals who obtain their plants from an unauthorised source.

Finally, because of the recurring problems of establishing collection points and relying on contracts it may be necessary for some industries to revisit the traditional approach of imposing seed point royalties.¹⁴⁶ As we saw earlier, end point royalties were introduced for a number of reasons, including to overcome the problem of farmers only purchasing seed once and then relying on their own or another farmer's saved seed for future plantings.¹⁴⁷ It must be stressed though, that royalty payments and licence fees may be determined in a way that takes these problems into account. For instance, the protective risk posed by farm saved seed could be built into the seed point royalty rate. In addition to this, other factors such as the lifecycle of the variety, investments and other risks could be used to calculate the most appropriate seed point royalty.¹⁴⁸ While the seed point royalty alternative would necessitate a systematic approach to royalty calculation, it has the potential of overcoming the problems apparent in the other approaches considered throughout this article.

V CONCLUSION

In the past ten years, the approach to managing plant varieties has become more sophisticated. This article set out to examine these approaches and showed how the legal and technical mechanisms adopted have been largely unsuccessful. These attempts have been hampered by the inherent reproductive characteristic of plants, the traditionally unhindered ability of farmers to use plants, and the difficulties of intellectual property enforcement. Moreover, while the imposition of end point royalties has been relatively successful this relies heavily upon a centralised collection point. Because of this requirement, the article has argued

145 There are a number of possible legal implications of using closed loop contracts. Due to the requirement to use particular collection agencies, there are also potential implications under the *Trade Practices Act 1974* (Cth) in relation to third line forcing. In this regard, some end point royalty contracts may require authorisation or notification pursuant to the *Trade Practices Act 1974* (Cth), although the removal of *per se* illegality for third line forcing may have resolved this issue, except where there is substantial market power.

146 Some plant varieties may still have a seed point royalty built into the purchase price.

147 Though there was a lack of empirical data to support such claims.

148 Noel Byrne and Amanda McBratney, *Licensing Technology: Negotiating and Drafting Technology Transfer Agreements* (2005) 47-62.

that a system of end point royalties does not suit all crops and industries, particularly niche markets and crops that are used on-farm such as oats and lupins which can avoid royalty capture.

Currently in Australia, it appears that collection is being presented as an imperative, rather than as an alternative. However, there will be limits as to what can be achieved using collection methods. In this context, it is necessary to recognise these problems, acknowledge their existence and attempt to address them because all the problems of generating a return on plant innovation will not be easily overcome by collection strategies. Plant breeding is a heterogeneous activity and the demands, requirements and limitations of each industry will affect their capacity to generate a return on investment. One thing is clear: managing plant varieties is not amenable to a 'one size fits all' approach.