

## Exclusion, commodification, and plant variety rights legislation

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**Abstract.** Plant variety rights legislation, now enacted in most Western countries, fosters the commodification of plant varieties. In this paper, we look at the conceptual issues involved in understanding and justifying this commodification, with particular emphasis on Australian legislation. The paper is divided into three sections. In the first, we lay out a taxonomy of goods, drawing on this in the second section to point out that the standard justification of the allocation of exclusionary property rights by appeal to scarcity will not do for abstract goods such as plant varieties, since these goods are not made scarcer through consumption, and considering alternative – economically consequentialist – justifications. In the third section, we consider these justifications as they apply to the particular case of the commodification of plant varieties, and the legislation that fosters it. A definitive answer to the question of whether this legislation is advantageous awaits further empirical information, but we point to several intrinsically problematic aspects of it.

**Key words:** Alienability, Commodification, Justification, Plant variety rights (PVR), Scarcity, Property rights

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### Introduction

The institution of property restricts people's access to goods; so it stands in need of justification. There has been a large degree of consensus in the philosophical literature on the form of such justification, which, following Hume and Rawls, we will call "the circumstances of justice argument."<sup>1</sup> Goods are scarce: humans possess limited sympathy. In the face of scarcity, some people will be excluded from what they want or need. The institution of property (ideally) regulates such exclusion and allocates goods on a reasonable basis. The further question of how, exactly, allocation of goods is to be determined has generated much more controversy and uncertainty, for there appear to be a number of reasonable, but often conflicting, grounds (need, labor, occupation, transfer from previous owners, etc.) on which claims to property rights can be based.

Whatever the merits of "the circumstances of justice argument" as a justification of the institution of property, it seems inadequate to an increasingly important part of that institution, property in abstract objects, such as much so-called "intellectual property." Such goods are "joint"; their consumption by one person does not in itself make it more difficult for others to consume them. Exclusion is therefore not a *necessary* consequence of their consumption. A general justification of property rights of the kind outlined above is not available for these sort of goods: if property rights over abstract objects are to be justified, it will have to be on a case-by-case basis.

In this paper, we consider one such case, the allocation of property rights over plant types made possible by so-called Plant Variety Rights (PVR) legislation, enacted by members of the International Convention on Plant Variety Rights, including Great Britain, the USA, and Australia. Some of the issues raised by such legislation are common,

others are specific to particular countries: we concentrate on the legislation in Australia, since we are most familiar with it. The paper is divided into three sections. In the first section, we are concerned with ontological issues about the nature of goods – particularly the difference between joint and non-joint goods – and commodities. A necessary condition for a good becoming a commodity is that potential consumers can be conditionally excluded from access to it. In the second part we look at the normative status of such exclusion in the case of different kinds of goods, focusing on the particular case of plant variety types in the third section.

### 1. Goods, ownable goods, and commodities

In this section, we wish to consider the nature of goods, ownable goods, and commodities, in order to help explicate the implications of PVR legislation. For our purposes we will work with an economic definition of a good as an instance of a consumable property that is desired by at least one person. Since properties are attached to objects or events, it is more usual to identify goods with the objects or events to which the desired properties are attached. Often nothing rides on such an identification, but sometimes it does, and the advantage of our definition is that it allows for the possibility of an object incorporating more than one good, which, as we will see, is a possibility that can have practical significance.<sup>2</sup>

#### *Excludability and non-excludability*

Within the realm of goods in general we can distinguish between those that possess the property of excludability, and those that possess the property of non-excludability. A good possesses the property of excludability when any member of the group for whom it is a good can feasibly be excluded from consumption of it. Conversely, it possesses the property of non-excludability when no member of the group for whom it is a good can feasibly be excluded from consumption of it. Excludability and non-excludability are contradictories – that is, any good is either excludable or non-excludable, and cannot be both at the same time and in the same respect. Excludability (non-excludability) may be an intrinsic property of some goods. I cannot share the pleasure I take in seeing a beautiful object with others – though I can communicate the pleasure to them – so such pleasure is intrinsically excludable. Often, however, whether a good is excludable or not is a function of natural, social, or legal contingencies. Thus it is by reference to these contingencies that we can determine whether it is in fact feasible to exclude potential consumers; and this determination can vary as those contingencies themselves change.

#### *Alienability*

Goods are ownable when it is possible to exclude others from their consumption. Some of these excludable goods are also alienable, they can be transferred from one person or group to another. In societies such as ours, much of the exchange of alienable goods takes the form of commercial transactions. An exchangeable commercial good possesses a relative value against each other such good; this relative value is often called exchange value, as against use value, and is expressed in price. The exchange value of an object is detachable and, in fact often detached, from the qualities (if any) that makes it desirable in its own right; so someone might wish to control something purely in order to gain access to its exchange value. We will take it that goods that have such exchange value are commodities.<sup>3</sup>

#### *Commodification*

Commodification, then, is the process whereby goods become commodities. Through the regulation of access to goods, property laws help create the possibility for commodification. What is standardly thought of as “full” or “liberal” legal ownership, is plausibly seen as conferring not a single right, but rather a number of more specific rights (and liabilities) over some good, such as the right to use, the right to exclude others from use, the right to profit from its use, the right to sell these rights to others, and so on.<sup>4</sup> Some of these rights are higher-order rights, rights over other of the rights. Of particular relevance to our concerns are the rights to alienate for profit various of the lower-order rights: it is in virtue of being the object of these higher-order rights that a good counts as a commodity. I have, for example, the right to sell you the right to occupation of my house for a specified period, a right that you can, in turn, alienate for profit to someone else. Unlike the lower order rights, these higher order rights possess exchange value, even though they only come to have such exchange value in virtue of the access to desirable properties given by the lower order rights.<sup>5</sup> It is worth noting that while *conditional* excludability (in other words conditional accessibility) is a necessary condition for something to count as a commodity, it is not a necessary condition for something to count as property *tout court* – there is nothing conceptually incoherent in the idea of inalienable property, indeed we know that there is such property in at least some property systems.

#### *Jointness and non-jointness*

Within the class of goods in general, we can further distinguish those goods that possess the property of jointness, and those that do not. We’ll say that a good is joint when consumption of the good by one member of the group for

whom it is a good does not make access to the good more difficult for other members of the group; and non-joint when consumption of the good by one member of that group *does* make access to the good more difficult for other members.

Again, we take it that jointness and non-jointness are contradictories, so any good is either joint or non-joint, and cannot be both in the same respect at the same time. The transmission of a radio station is a good example of a purely joint good for those who have access to a radio receiver within its range, since one person tuning their radio to the station has no effect on its availability to others. (And again, goods may be joint or non-joint either intrinsically or contingently.)

### *Taxonomy*

Given this distinction we can schematise a taxonomy of goods.<sup>6</sup>

	Joint	Non-joint
Non-excludable	Public goods	Common pool goods
Excludable	Toll goods	Private goods

In terms of this taxonomy, a necessary condition for commodifying either public or common pool goods is their shift from the realm of the non-excludable to the realm of the excludable. The case we focus on in Section 3, the commodification of plant varieties in Australia, involves a transformation of public goods into toll goods.<sup>7</sup> As we argue in the next section, differences between joint and non-joint goods are such that rationales for the shift in the case of non-joint goods will not automatically apply in the case of joint goods.

## 2. Scarcity and exclusion

Some goods are excludable (or non-excludable) not intrinsically, but contingently; and for some of these the facts that determine whether they are excludable include social and legal arrangements. It is these arrangements that stand in need of justification. The distinctions drawn in the previous section help define the realm of application of such justifications. As we argue below, justifications that apply in the case of non-joint goods do not automatically apply to joint goods. Similarly, rationales for exclusion from access, or for rights of access, to goods (whether joint or non-joint) may not unproblematically translate into rights over these goods as commodities.

### *Exclusion and non-jointness*

The consumption of a non-joint good by one person makes consumption of that good by another difficult or even

impossible; in the simplest case because the object of the good is destroyed in consumption. It also often makes consumption of goods of that *kind* more difficult for others – it increases scarcity. The phenomenon of scarcity is fundamental to what we have called the “circumstances of justice argument” justifying the institution of property.<sup>8</sup> Jeremy Waldron economically expresses a version of this argument, claiming that as long as scarcity obtains:

individuals (either on their own or in groups) are going to disagree about who is to make which use of what. These disagreements are often serious because, in many cases, being able to make use of a resource that one wants is connected directly or indirectly with one’s survival. A problem, then, which I shall call the problem of *allocation*, arises in any society which regards the avoidance of serious conflict as a matter of any importance. This is the problem of determining peacefully and reasonably predictably who is to have access to which resources for what purposes and when. The systems of social rules which I am calling property rules are ways of solving that problem.<sup>9</sup>

As Waldron implies, it is difficult to see how there could be a viable society that did not have widely respected norms regulating access to non-joint goods; such norms function to transform common pool goods into private goods.<sup>10</sup>

This is an argument to the effect that there are good reasons to create private goods, which restrict access to goods by means of exclusion. There are further arguments to the effect that there are good reasons to create private good *commodities*, where such exclusion is conditional rather than absolute. Two of the most important of these arguments appeal to the notion of economic efficiency. The first looks to distributive efficiency. As expressed by Waldron, the primary task of a system of property rules is to allocate rights to goods. However, there can be no assurance that any such allocation will be welfare efficient – that is that the distribution of goods consequent on such allocation will be Pareto-optimal in terms of preference satisfaction, let alone individual well-being. The commodification of a good both allows for and restricts its exchange, by making it an object salable for a price. Arguably one of the effects of such price setting is to make it more likely that the good will be consumed by those who really value or need it – or at least value or need it more than others; prices here can help bring about a more efficient distribution, in the sense of one in which more desires are satisfied, and to the extent to which the original distribution of wealth was fair, even a fairer outcome.<sup>11</sup> Commodification, then, may help to achieve a better distribution of available goods than simple unconditional exclusion.

The second argument in favor of commodification asserts that it may also be an important factor in achiev-

ing productive efficiency, where the stocks of goods to be distributed is as great as possible. The range of objects that count as goods for each of us in a commercial society is enlarged as these objects come to possess exchange value, for even if we find nothing desirable about the object itself, we may value it as a means to gaining access (through further exchange) to those objects that we do so value. Consequently, we have an incentive to produce such goods that would not exist if they did not have the status of commodities. This incentive, however, lasts only as long as there is a demand for such goods – so this is an incentive to produce enough of any given commodity to satisfy demand, but no more.<sup>12</sup> Further, (assuming that there is a cost of production) the producers of non-joint goods need to charge each and any consumer a certain amount, because otherwise they cannot afford to produce the extra unit of the good required by the consumer.

In terms of these arguments from economic efficiency, then given that exclusion is a necessary condition for commodification, so its value is a function of the increase in production and distribution of goods stimulated by commodification. (This is an important point in the justification of PVR legislation, as discussed in the third section of the paper.)

#### *Exclusion and jointness*

Matters are rather different with joint goods. A good is joint, it will be recalled, when consumption of the good by one person does not diminish access to the good by others. Our focus in this paper is on types – specifically plant types – and types are universals. Universals are paradigms of joint goods, since by their very nature as abstract entities, universals are not the sort of things that can be used up – that is they possess complete jointness, and they possess it intrinsically. So in terms of our schema they will always be located in one of the left-hand boxes – they will be either public goods or toll goods.

*Prima facie* there would seem no good reason to attempt to transform public goods into toll goods, since consumption of these goods by one person does not make access to the good more difficult for others. (Again, this is a point we take up in our discussion of the justification of PVR legislation.) And in fact for many (most?) such goods access *is* unrestricted. This seems to us to be true, for example, of the vast amount of useful knowledge in public circulation.

Nevertheless, it is not always true. There are various forms of legally recognized property rights over universals produced or discovered by human labor; property rights over things like the plot of a novel, an industrial technique, or, for that matter, a plant variety type. As with non-joint goods, many of the joint goods that have been moved into the category of excludable goods have been commodified: again, the difference between joint and

non-joint goods has important implications for putative justifications of such commodification. Since *ex hypothesi* consumption of a joint good by one does not diminish the amount available to others, there is no need to apply exclusionary devices such as prices in order to bring about an efficient or fair distribution. Indeed, since those who can afford the price are not made any worse off by allowing the consumption of the good by those who could not or would not pay the price, while those who cannot or would not pay would be made better off if they were allowed access to the good, there seems to be a good reason to extend such access. And while the producers of a joint good may need recompense for the cost of production, once they have obtained such recompense, there seems to be no justification for further charges, since it costs no more to provide the good to  $n+1$  people than it does to provide it to  $n$  people.

In fact, property rights over joint goods are often not treated with the same degree of respect accorded to property rights over non-joint goods (think, e.g., of “piracy” of computer software, copying of academic texts, etc.); and our discussion perhaps helps to show why this is. In a clear sense, no-one is made worse off merely by the consumption of joint goods, so it is difficult to see that one is doing anything wrong in engaging in such consumption. If I eat the piece of pie you desire you are obviously made worse off than if I had refrained, *just in virtue of my eating it*; and if I refrain from eating it you are better off than if I had eaten it. But if I copy a video it is hard to see that anyone is worse off than if I had refrained from copying it, *just in virtue of my copying it*. In fact, in the video case, the furniture of the world has not been diminished, it has rather been increased, so no-one is worse off, and someone is better off. In the pie case consumption by one *does* diminish the furniture of the world, and does prevent consumption by another: it is true that someone is made better off, but someone is made worse off.

It may be true, of course, that the owner of the rights to the video *is* made worse off by my copying it without compensating him, if I thereby disappoint a well-founded expectation, or violate his right to compensation. But the question is whether he has any such right, or whether his expectation is well-founded; and it is not immediately apparent that the kinds of answers to these questions that are given in the case of non-joint goods apply here. In any case the sociological fact that there is not the same general acceptance of norms of (conditional) exclusivity of access to joint goods as there is in the case of non-joint goods is surely an important datum in the consideration of the advisability of the attempt to enforce such exclusivity legally, for in such cases the law will be in a relationship of opposition to social norms, rather than one of mutual reinforcement.

The most powerful argument for the commodification of joint goods (in particular universals), certainly the one

that has had the most influence, is a variety of the argument for economic efficiency discussed above, what might be called the argument from incentive. The claim is that by allowing the commodification of certain universals, more desirable goods will be produced and made available than would otherwise be the case.

### *Universals and commodification*

The commercial value of a universal is typically dependent on the commercial value of its concrete instantiations; it is only because rotary engines are both cheaper to produce and more attractive to consumers than conventional internal combustion engines that the *idea* of the rotary engine is seen as commercially valuable by car manufacturers, for example. But the attempt to realize such commercial value will often mean that it becomes harder, or even impossible, to exclude others from access to the universal, since access to the concrete particular often also gives access to the universal itself. For some kinds of goods, such access is relatively straightforward – anyone who has access to a novel can easily replicate it; anyone who has a video and a video recorder can very easily replicate the recording – and it is particularly straightforward for many plant types, whose instances are *self-replicating* (albeit often needing human assistance). To the extent to which access to the universal is available, to that extent the universal is a non-excludable good, and accordingly the exchange value of the universal is diminished, and hence its (possible) status as a commodity.

The allocation of property rights over universals to innovators who invent or discover previously inaccessible universals provides incentives for both the discovery and dissemination of useful knowledge. Without such property rights, the potential for the innovator benefiting from her discovery would appear to be small; and such benefit depends on the transmission of the knowledge being restricted – so it may be that if I, as a widget manufacturer, think of a better way of building widgets I will obtain an advantage over other widget manufacturers such that I gain material rewards for my discovery, just as long as the relevant knowledge is not available to my competitors. I have, therefore, good commercial reason to wish to restrict the dissemination of my knowledge – and if such restriction is difficult (and as we have pointed out, it often is), and the process of discovery expensive or arduous, good reasons not to seek such knowledge in the first place. The allocation of property rights transforms the incentive structure. If I am rewarded every time my discovery is made use of, then I have an incentive both to try to make such a discovery, and to have it disseminated as widely as possible. Such dissemination will benefit not only the holder of the property right, but many others.

Whatever benefits the commodification of universals may bring, such benefits depend on the restriction of the

(*prima facie* desirable) free market in trade in the concrete instantiations of the commodified universals, restricting the exploitation of publicly available information and imposing costs on consumers that they would not otherwise bear. Though property rights in universals, in the form of patents and copyrights, have now existed for over three hundred years, there appears to be no clear evidence that the economic benefits consequent on their institution outweigh the economic costs.<sup>13</sup> Further, as we have implied above, there are likely to be other sorts of costs generated by the granting of property rights in abstract objects, given the need for extensive policing to enforce them.

### **3. Australian PVR legislation**

#### *The commodification of plant types*

We claimed earlier that it follows from our definition of goods that two, or more, goods can be embodied in the one object. This is true of plants. A plant may be a good for a farmer in virtue of its capacity to produce timber, for example. It can also be a good in virtue of its capacity to produce others of its kind. In the past, control of these two goods, including control over their commercial value, was generally interlocked. By selling a token of the type to the farmer, the seed merchant was also selling potential access to the type itself, and to its reproductive capacity. In so doing, of course, he was in effect providing his customer with the means to become a producer of tokens, for sale to others or for his own use.

There are, then, good commercial reasons for seed merchants to split control of the two kinds of goods asunder, so that by selling access to a token he does not also sell access to the type. It is only by so doing that the plant variety can become a commodity, with an exchange value of its own. For plant variety types to be commodified, they must be transformed from non-excludable to excludable goods: given that they are necessarily joint goods, this means that they are shifted from the class of public goods to the class of toll goods. However, the very nature of plants stands in the way of such a transformation. Plant varieties tend to be intrinsically highly non-excludable; this is true, at least, of many of the plant varieties that have been in common use in Australian agriculture and horticulture. They are non-excludable for those who have access to a particular instantiation of the universal, given their nature as self-replicating entities. In order for ownership of plant varieties to become commercially significant, then, ways must be found to impose excludability. One way of doing this is through the process of hybridization. Hybrid plant varieties are either sterile – further plants cannot be produced from their seed – or do not breed “true,” so the grower is obliged to return

to the seed merchant for each crop. Here plant types are being made *intrinsically* excludable by technical means. Much of the privately funded research over the past sixty years has been devoted to the creation of superior hybrid varieties. However, not all plant varieties have been equally amenable to hybridization.<sup>14</sup> The exclusionary process has been furthered by the introduction of Plant Variety Rights legislation: we turn now to a description of that legislation and a brief discussion of its rationale.

### *PVR legislation*

In 1987, the Australian Federal Parliament passed the Plant Variety Rights Act, making possible for the first time in Australia the legal ownership of genetic plant types. This legislation was modified and extended in 1994 by the Plant Breeder's Rights Act. (In what follows, we'll generally refer to both pieces of legislation as Plant Variety Rights – PVR – legislation.) Australian legislation is modeled on that previously enacted in Northern Hemisphere countries such as the USA and Great Britain, and informed by The International Convention on Plant Variety Rights (originally formulated in 1961, revised in 1972, 1978, and 1991), a statement of which is contained in the Act. As that statement makes clear, members of the Convention are required to extend the allocation of rights of ownership to as many kinds of plants as possible.

There are constraints on the eligibility of plant types for registration as owned under the PVR legislation. Plant types must satisfy what are known as DSU requirements – they must display “distinctiveness,” “stability,” and “uniformity.” A plant type is held to display “distinctiveness” when it is perspicuously different from varieties “whose existence is common knowledge”; “stability” when it is demonstrated that each succeeding generation of the plant is actually an instantiation of the same universal, which seems to mean, “has the same genetic structure as”; and “uniformity” when it is shown that within each generation all plants bred from the same seed stock have the same genetic make-up.<sup>15</sup>

The holders of a plant variety right gain ownership rights over a universal – a plant variety – and are granted legal control over access to that universal. Such legal control gives them a number of entitlements, over both the abstract object, the universal, and the particular concrete instantiations of that universal. They have the exclusive right to produce and sell, or to license others to produce or sell, plants of that type. They are also empowered to charge royalties on all sales of seeds or other propagating materials, either directly or through agents. And they are entitled to sell or give away their ownership of the plant variety type, with all attached entitlements, to others. In certain circumstances, holders of a plant variety right are entitled to control of the material harvested from plants of that type and products made from this material.<sup>16</sup>

One of the striking features of the legislation is the way in which it privileges commodity ownership rights over other sorts of ownership rights. It does this in two ways. Firstly, it is a condition of the retention of rights over a registered variety that the concrete instantiations of that variety must be available as commodities. Normally, the higher order property right to sell a good (the existence of which is partially constitutive of the good being a commodity) is a discretionary right:<sup>17</sup> the holder of such a right is legally permitted to sell the good to others, but she is not *required* to do so. In the case of the concrete instantiations of the goods over which plant variety rights are granted, however, the right to sell is not discretionary but rather mandatory – the holders of such rights are required, not simply allowed, to make the good available for sale to those who wish to have access to it.<sup>18</sup> Secondly, previous mixing of labor to develop or use a good or kind of good in itself provides no legal basis for claiming plant variety rights, or disqualifying others from claiming such rights. Ownership rights over plant varieties are available to those recognized as innovators, those without whom the good in question would not have been available to others. In the case of PVR legislation, however, the innovator is taken to be the person who first brings the good to the market-place, or expresses their desire and willingness to do so, not necessarily the person(s) who invented or discovered it. A variety is eligible for ownership under the PVR legislation provided it satisfies the DSU requirements, and in the words of the Act, “the variety has not been *exploited* or has only recently been exploited . . .”<sup>19</sup> (our emphasis). In other words, in the case of plant variety rights, the innovator is the person who first treats a variety as a commodity; the innovation is at the level of exchange value, not (necessarily) at the level of use value.

### *Justifying PVR legislation*

The effect (and clearly the intention) of PVR legislation is to aid the process of commodifying plant varieties by splitting certain types of control of the type from control of the token. The owner of a plant variety type (or the licensee) always retains control of the commodity rights over that variety. However, since one of the products of self-replicating plants is commercially valuable reproductive material, plant owners have financial incentives not to conform to such prohibitions. There are obvious and notorious difficulties in enforcing such prohibitions on activities engaged in by freely consenting adults, particularly when those activities involve a widely available and easily transportable object, and occur in a population as geographically scattered as Australian farmers.

So legal prohibition by itself is unlikely to be effective in bringing about the transformation of plant types from non-excludable to excludable goods, unless the associated penalties are substantial, and the enforcement mecha-

nism is highly intrusive. In fact, current PVR legislation provides for potentially financial ruinous penalties for infringers, though it remains unclear how widespread such infringement is. There are obvious reasons to be wary about such an extension of the power of the state, even for those who support PVR, since such extension is likely to be resisted by those who may suffer from it.

Likewise, it is clearly in the interests of the seed selling corporations to promote those kinds of seeds over which they possess effective property rights, rather than those, such as kinds that have been in common use, where they are unable to obtain such rights. The effect of PVR legislation has been to make it more likely that seed sellers will be able to manipulate the market in this way. Research of the kind necessary to develop a plant variety of the kind eligible for registration is, typically, costly, and that cost is only likely to be recovered if plants of this type and their products are properly marketed, or if the rights to the type are sold. Consequently, the large seed companies are likely to end up holding most of the rights to plant variety types, either through original research or purchase. This in fact is what has happened, along with the increasing domination of the market by a handful of companies.<sup>20</sup>

The effect of making plant variety types excludable by legislative fiat and technical and economic manipulation, is to remove access to goods that have previously been freely available. This claim is surely true if we interpret “goods” here to mean “class of goods” – in the past plant variety types were generally available, at least to those who had access to a token of the type (in particular farmers and horticulturists), now they no longer are. But it also is likely to be true if we interpret “goods” to mean *particular* goods – in the past, people had free access to particular plant variety types, but this is no longer always the case, and, as we have pointed out, this can be true whether or not Plant Variety Rights are granted for those types.<sup>21</sup>

It seems to us, however, to be axiomatic that people should not be excluded from that to which they have always had access – particularly if it is something that provides them with real benefits, and does so without unfairly disadvantaging others – unless there are overwhelmingly good reasons for such exclusion. Are there any such reasons in the case of plant varieties?

Before addressing this question, we should note that the nature of PVR legislation itself restricts the kinds of justifications that are available to its defenders. Since the kinds of ownership rights at issue are commodity rights, it is ownership of plant varieties as commodities that must be justified. Furthermore, the sorts of justifications for the granting of property rights commonly collected under the rubric of “natural law,” which found legal property rights on pre-legal moral rights, do not apply, since the legislation is simply incompatible with them. Locke, for example, famously gave a justification of this kind when he argued that the mixing of one’s labor with a previously

unowned object entitled one to ownership in it. But, as we have seen, PVR legislation does not recognize such action as providing any basis for legal rights of ownership. In fact, not only is the legislation not supported by natural law arguments, it appears incompatible with them. Virtually every useful plant variety, even those that satisfy DSU requirements, are the culmination of a long process of development from their wild ancestors. (Think for example of the relation between modern wheat and the grasses from which it arose.) At least in Lockean terms, there would seem no good justification for an individual now claiming ownership rights over such goods, given the amount of labor mixed with them by others.<sup>22</sup>

Without the possibility of recourse to natural rights arguments, the only kind of justification available to supporters of PVR legislation is consequentialist in nature, depending on the claim that the social benefits deriving from the legislation outweigh its social costs, and are greater than any feasible alternatives. The most promising argument for the granting of property rights over plant variety types is what we have called the argument from incentive – the allocation of property rights is necessary to transform the incentive structure in order to enable those who develop new types to profit from their efforts, and thereby promote the creation and distribution of goods. We characterized this argument as a version of the “argument from efficiency,” which holds that the market facilitates both the production and distribution of goods to a greater extent than alternative institutional arrangements. This is the argument that has been most influential in both popular and governmental defenses of PVR legislation.

### *Assessing PVR legislation*

On our account, the assessment of the desirability of PVR legislation rests on assessment of its consequences.<sup>23</sup> The introduction of PVR legislation aims to promote the shifting of the costs associated with developing new varieties from the public to the private sphere. By allowing private industry to commodify plant varieties, it allows for a greater return for investment in such development. If such legislation is to be justified, two sorts of claims must be established: that the benefits it produces – in particular the development and promulgation of desirable new plant varieties – are greater than the costs it imposes; and that there is no alternative possible system that is more cost-effective.

Establishing or rebutting this second, counter-factual, claim is often virtually impossible for categories of abstract property, simply because there is no plausible reference class. Consider copyrighting. It seems plausible that the benefits of copyright, in particular the incentive for literary production, outweigh its costs. But there are other ways of achieving a similar outcome, such as a patronage system. Is such a system more effective than copyright-

ing? How could we decide, given the lack of extensive patronage systems in societies like ours? Given these sorts of difficulties, often the only live question in considering property rights in abstract goods is whether the benefits outweigh the costs. In the case of property rights in plant varieties, however, this difficulty, though not entirely absent, is much less substantial, largely because the legislative establishment of such rights is so recent. In recent times, there have been two main institutionalized forms of development of plant varieties: public breeding schemes, located in universities and scientific institutions, and often involving growers, and private industry. Private industry invested considerably in such development prior to PVR legislation, and public bodies are still involved in research, though the character of this research and its use is changing as a consequence of the effects of PVR legislation schemes.<sup>24</sup>

As we have already in effect noticed, there are non-economic costs involved in the imposition and enforcement of PVR laws, since it criminalizes customary behavior<sup>25</sup> and extends the power and reach of the state.<sup>26</sup> As to economic consequences, the Australian agricultural economist David Godden has concluded that “theoretical economic argument cannot be used to substantiate the existence of net economic benefits from PVR.” Examination of the net economic effects of PVR requires detailed knowledge of their operation in practice.<sup>27</sup> Some of the relevant facts seem clear enough. Private breeders have embraced the plant varieties registration scheme enthusiastically, and increased their investment in plant breeding.<sup>28</sup> However, the detailed empirical investigation necessary to allow a fully informed assessment of the effects of PVR legislation remains to be done. (Indeed it is part of the purpose of the present work to support the call for such investigation.) We can, however, point to some salient considerations that weaken the strength of the argument from efficiency as applied to PVR.

The first of these considerations involves the requirement, that to be eligible for registration under the PVR legislation, plant varieties must display DSU (“distinctiveness,” “stability,” “uniformity”). Plant varieties that do not display these characteristics cannot be owned, since it would be too difficult to show that any particular individual plant was an instantiation of some specified universal.<sup>29</sup> The requirements are imposed, then, to make effective property rights over plant types possible, rather than because they are seen as properties that it is good for plant types to have anyway. And in fact, stability and uniformity are properties that it is not good for plant types to have. Many varieties in common use have not possessed the degree of stability and uniformity necessary to be eligible for registration.<sup>30</sup> There are, in fact, positive advantages to the possession of such genetic variability in a plant type – apart from the likelihood of greater yield and hardiness in local variants, desirable new types can

develop through random mutations. There are also dangers in the lack of such variation in the genetic make-up of crops. It has been amply demonstrated that so-called “mono-cultures” are prone to devastation; this devastation is likely to become both more probable and more severe as crop types become more genetically uniform over time and space.<sup>31</sup> Given the potentially catastrophic consequences of such devastation, we believe that there is good reason to adopt a conservative approach to the promulgation of varieties exemplifying DSU, rather than fostering it, as PVR legislation does.

In his book *First the Seed: The Political Economy of Plant Biotechnology*, J. R. Kloppenburg points out that public breeders have been involved “in the development of ‘mixed lines’ or ‘multi-lines’ that show a wider range of genetic variability, wider adaptation and more stable performance over a period of years than standard genetically homogenous varieties. Such lines are a potential solution to the problem of genetic vulnerability . . .”<sup>32</sup> One of the effects of the development of PVR is the strengthening of private seed companies and the weakening of public breeders and their effect on agricultural practice. This is not accidental, nor can it be controversial that it is happening. It springs from the very rationale for the legislation, which aims to shift the risks, costs – and benefits – of plant development from the public to the private sphere. In order to do this, however, PVR legislation has to impose requirements that make it less likely that the varieties that are promoted in the market place are as good as they could be.

Moreover, there is no necessary connection between the possession of DSU by some plant type, and the possession of such actually valuable properties as yield and hardiness. To the extent to which resources are channeled towards the development of varieties with DSU – and clearly they must be so channeled – they are unavailable for the development of varieties with properties that are desirable from the consumer’s point of view. Finally, to the extent to which PVR legislation provides incentives for companies to invest in the development of new varieties, it also gives them the incentive to keep the results of such research secret, until they are able to profit from them. Such secrecy will retard the growth of socially useful knowledge.

So, although it may be true that PVR legislation gives companies commercial incentives to develop new plant varieties, there are legal and commercial constraints on such developments that are likely to lead to a less than optimal outcome for consumers, and to this extent the argument from efficiency is weakened. This is true, at least, where there are other ways of fostering such development. And clearly there are other methods, in particular through the funding of publicly available research. Such a method of development is compatible with a free market in the sale of plants, perhaps a market that is considerably



freer than the one that presently exists, and that does not depend on morally and practically dubious restriction of access to previously available goods.

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### Notes

1. John Rawls, *A Theory of Justice* (Oxford: Oxford University Press, 1980), pp. 126–130. Rawls cites H. L. Hume; A. Hart and J. R. Lucas as arguing along similar lines – as have many others.
2. Nothing follows, of course, from this definition about whether any particular good is actually good – the class of goods and the class of the good are not identical either in intension or extension, though there is a fair bit of overlap – a lot of goods are in fact good, and much of the good is available as goods.
3. For a more elaborated account of the nature of commodities compatible with that given here, see Margaret Jane Radin, *Contested Commodities* (Boston: Harvard University Press, 1996), pp. 118–120; for further discussion of the concept of alienation, see the same author, “Market inalienability,” in 100 *Harvard Law Review*, 1848–1925 (1987).
4. The general approach to the nature of property taken here was influentially enunciated in A. M. Honore’s paper, “Ownership,” in A. G. Guest (ed.), *Oxford Essays in Jurisprudence* (Oxford: Clarendon Press, 1961). Honore’s specific list of rights and limitations has been modified and extended by, e.g., Lawrence C. Becker in “The moral basis of property rights,” *Nomos 22: Property* (New York: New York University Press, 1980), pp. 190–191; Jeremy Waldron, *The Right to Private Property* (Oxford: Clarendon Press, 1988), p. 49. Nothing we say depends on the choice of one of these formulations.
5. Our approach is somewhat similar to that of John Christman in *The Myth of Property* (Oxford: Oxford University Press, 1994), who argues for a “bifurcated conception of ownership. . . . control ownership and income ownership are separable rights bundles” (p. 147). However, Christman “[f]ollow[s] other writers . . . in analyzing ownership in terms, first, of *tangible* things, and then assuming that the main elements of the model can be extended to other kinds of property” (p. 24), whereas we argue, in effect, that the differences between tangible and intangible goods are such that the justifications for the allocation of property rights may not automatically translate from one to the other.
6. Here following Jan-Erik Lane, *The Public Sector* (London: Sage Publications, 1993), p. 22; drawing on distinctions found in Mancur Olson, *The Logic of Collective Action* (Cambridge, MA: Harvard University Press, 1965), pp. 14–15.
7. For discussions of the relationship between common pool and private goods see David Schmidtz, “When is original appropriation required,” *The Monist* 73 (1990): 504–518, who puts the case for transforming common pool goods into private goods; contra, e.g., Richard A. Epstein, who argues against it in “Why restrain alienation,” 85 *Columbia Law Review* (1985).
8. Hegel, in *The Philosophy of Right*, trans. Knox (Oxford: Oxford University Press, 1976), pp. 37–57, presents an argument that may be taken as denying that scarcity is always a necessary condition for the institution of property. For Hegel, property rights over certain artifacts (using this term in a broad sense) are justified, in fact obligatory, since these artifacts are expressions and extensions of the creator’s personality, so that to use or alter them without the creator’s consent is unjustifiably to ignore and curtail her autonomy. This argument appears to us to have some force. If accepted it may also point to possible tensions in our concept(s) of property rights, since there can be no guarantee that property rights allocated on the basis of creator’s rights will serve the social ends justifying property rights on the “circumstances of justice” argument. However, the creator’s rights argument will be limited in application, relevant only to those things that *can* plausibly be seen as expressions of personality. Typically, this will not include plant types.
9. Jeremy Waldron, *The Right to Private Property*, op. cit., p. 32.
10. Lawrence C. Becker, in “The moral basis of property rights,” op. cit., claims that anthropological evidence indicates that there never has been such a society; James O. Grunebaum, in *Private Ownership*, op. cit., p. 67, claims that as a matter of logic there could not be.
11. See Amartya Sen, “The moral standing of markets,” in E. F. Paul, F. D. Miller, and J. Paul (eds.), *Ethics and Economics* (Oxford: Basil Blackwell, 1985), pp. 1–19, esp. 9–12.
12. We are not of course claiming that under- or over-production never occurs in a capitalist society – just that there is a tendency towards sufficiency. Nor are we denying that there is a tendency within capitalist economies to generate more and more desires.
13. Or, for that matter, that they play a major role in the promotion of desirable innovation. What evidence there is gives cause for skepticism about their general importance, though they are arguably significant for particular firms and industries. See, e.g., D. S. Thomson et al., *The Economic Implications of Patents in Australia* (Canberra: Australian Patent Office, 1981), esp. the papers by Macdonald and Llewellyn; C. T. Taylor and Z. A. Silberston, *The Economic Impact of the Patent System* (Cambridge: Cambridge University Press, 1973); Joel Mokyr, *The Lever of Riches: Technological Creativity and Economic Riches* (Oxford: Oxford University Press, 1990), esp. pp. 246–247. For a discussion of the benefits and costs of intellectual property regimes in biological goods see Michele Svatos, “Biotechnology and the utilitarian arguments,” *Social Philosophy and Policy* 13 (1996): 113–144.
14. See J. P. Berland and R. Lewontin, “Breeder’s rights and patenting life forms,” *Nature* 322 (1986): 785–788, esp. 788; Frederick H. Buttel and Jill Belsky, “Biotechnology and

- intellectual property: Social and ethical dimensions," *Science, Technology and Human Values* 12 (1977): 31–49.
15. For these constraints see Ch. VI of the "International Convention for the Protection of New Varieties of Plants" in *Plant Breeder's Rights Act 1994*; and 43.1-9 of that Act.
  16. *Plant Breeder's Rights Act 1994*, 11–15.
  17. Here we follow Joel Feinberg, "Voluntary euthanasia and the inalienable right to life," in Sterling M. McMurrin (ed.), *The Tanner Lectures on Human Values: 1* (Cambridge: Cambridge University Press, 1980), pp. 221–251.
  18. PVR legislation has generally been understood by analogy with existing intellectual property rights legislation, in particular that governing industrial patents. This analogy is fragile at a number of points, but in this respect at least it appears sound, in Australia anyway, where the right to sell patented goods is (roughly speaking) mandatory. (Though it seems that in the USA it is discretionary.) The relevant section of the Australian legislation is *Patents Act 1990* (Cat. No. 92 8522 3) 12.135. As a referee for this journal pointed out, one important point where the analogy breaks down is that it is a precondition of gaining a patent that one displays intellectual innovation at the level of the production and replication of a product or process, while this is not true of registration for ownership plant varieties. Provided that the variety is eligible for registration, the only knowledge that need be displayed is that possessed by any competent horticulturist. A useful discussion of some of the conceptual issues involved in the relationship between PVR and patents is found in Gerd Winters, "Patent law policy in biotechnology," *Journal of Environmental Law* 4 (1992): 167–187. For a discussion of the economic argument in favor of the granting of mandatory rights as a spur to innovation see Theodore M. Horbulyk, "Intellectual property rights and technological innovation in agriculture," *Forecasting Social Change* 43 (1993): 259–270, esp. 261–263.
  19. *Plant Breeder's Act 1994*, 43.1(e). Though the Act contains a relatively lengthy "Definitions" section, no definition is given of 'exploitation'. The only plausible reading of its meaning, in the context of the Act, is that it refers to commercial exploitation.
  20. See "Breeder's rights and patenting life forms," op. cit.
  21. For a description of how PVR legislation has actually impacted on commercial farming practice in a particular instance, see Tracey Clunies-Ross, "Creeping enclosure: Seed legislation, plant breeders' rights and Scottish potatoes," *The Ecologist* 26 (1996): 110–114.
  22. See, e.g., F. H. Buttel and J. Belsky, "Biotechnology, plant breeding and intellectual property," op. cit.; S. A. Scotchmer, "Standing on the shoulders of giants: Cumulative research and patent law," *Journal of Economic Perspective* 5 (1991): 29–41; Theodore M. Horbulyk, "Intellectual property rights and technological innovation in agriculture," op. cit.
  23. We focus on consequences at the national level. However, there are clearly issues of international justice involved in the institution of PVR legislation, particularly since the majority of commercially valuable plant types come from the Third World. For relevant empirical data and a discussion of some of the issues, see Franz Broschimmer, "Botanical imperialism: The stewardship of plant genetic resources in the Third World," *Critical Sociology* 18 (1991): 3–18.
  24. J. I. Stallman, "Plant patents and public research priorities," *Choices* 5 (1991): 29–41.
  25. Tracey Clunies-Ross, "Creeping enclosure: Seed legislation, plant breeders' rights and Scottish potatoes," op. cit.; "Custom puts farmers at odds with seed breeders," *Congressional Quarterly Report* 54 (1994): 2245.
  26. There may also be what we might call sociological costs, borne by farmers whose role and range of interactions in the local economy is restricted by PVR legislation. In buying and selling plant reproductive material they now have the role only of the buyer of such material from a small number of commercial organizations, whereas previously they may have been both buyers and sellers in a market that involved a series of transactions with their fellow farmers – transactions that produced social as well as economic benefits. This line of thought has been stimulated by the approach of such social exchange theorists as Peter Blau in *Exchange and Power in Social Life* (New York: John Wiley, 1967). Again, there is an issue here that awaits empirical clarification.
  27. David Goddden, "Plant variety rights: Framework for evaluating recent research and continuing issues," *Journal of Rural Studies* 3,3 (1987): 255. Other papers by the same author on PVR include "Economic issues concerning plant variety rights: General and Australian perspectives," *Agricultural Economics Bulletin*, No. 26 (1981), Department of Agricultural Economics and Business Management, University of New England, Armidale; "Induced institutional innovation: Plant variety rights, patents and genetic engineering," *Oxford Agrarian Studies* 19 (1991): 3–19; "Plant variety rights and the incentive to innovate" (with John Kennedy), *Oxford Agrarian Studies* 21 (1993): 105–118.
  28. Though Buttel and Belsky claim that in the USA at least the Introduction of PVR legislation "may not have led to any increase in private plant breeding beyond that which would have been expected from historical trends." See "Biotechnology, plant breeding and intellectual property: Social and ethical dimensions," op. cit., p. 35. For evidence that might seem to contradict this claim, at least in the case of a particular crop type, see Carl E. Pray and Mary Knudson, "Impact of intellectual property rights on genetic diversity: The case of US wheat," *Contemporary Economic Policy* 12 (1993): 102–112.
  29. There are complex issues about universals here that we will not delve into, merely noting that it seems that for the purposes of the legislation biological types are characterized in purely structural terms, whereas we usually think about them in historical terms too.
  30. The talk of "degree" here is appropriate since even those varieties that are held to manifest uniformity and stability usually do so less than totally. The point remains that more is seen as better.
  31. The dangers of monocultures were graphically and famously illustrated by the Irish Potato Famine of the late 1840s. English explorers returned from the Caribbean coast in the 16th century with only one variety of potato. Planted everywhere in northern Europe, when this genetically-uniform crop was struck by blight, it denied the Irish their primary

source of food. Combined with the policies of the British Government and English absentee landlords, the famine left two million dead and two million searching for a new life in other countries. See P. R. Mooney, *Seeds of the Earth: A Public or Private Resource* (Ottawa: Inter Pares, 1979); Joel Mokyr, *Why Ireland Starved: A Quantitative and Analytical History of the Irish Economy 1800–1850* (London: Allen and Unwin, 1983); K. H. Connell, “The potato in Ireland,” *Past and Present* 23 (November 1962): 57–71.

32. Jack Ralph Kloppenburg Jr., *First the Seed: The Political Economy of Plant Biotechnology 1492–2000* (Cambridge: Cambridge University Press), p. 143.

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