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Caught between state-sovereign rights and property rights: regulating biodiversity

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ABSTRACT

This paper examines the interrelationships between the two regimes of sovereignty and property rights over bioresources in the light of two international agreements, namely the CBD and TRIPS. It considers the underlying problem pertaining to the regulation of access to biological resources as a problem which is related to prevailing capitalist relations rather than to the strengthening or undermining of state sovereignty. Thus, it addresses two inter-related issues: the divergence between and intersection of these two regimes, and the question of whether the institutional movement from sovereignty rights to private property rights points to the erosion of biodiversity protection due to the undermining of states' rights over biological resources in favour of corporate interests. An investigation of these issues suggests that the CBD and the TRIPS agreement are part of the same set of politico-economic relations despite their differences in normative and institutional terms, and that the sovereign rights of states and the intellectual property rights of corporations over biological resources are complementary rather than contradictory given the exploitation of the environment in the process of capital accumulation on a global scale.

KEYWORDS

Externalisation of nature and labour; commodification of life; rhetorical distinctions; life patenting; exclusivity; sovereignty.

INTRODUCTION

In Turkish folklore, a witty religious man called Nasreddin Hoca who lived in central Anatolia in the 13th century went to a local lake to wash his yoghurt bucket. When asked by a passer-by what he was doing, he replied, 'I am fermenting the yeast to make yoghurt out of the lake'. Bursting into laughter, the passer-by told Hoca that it was not possible to turn the lake into yoghurt. 'You never know', said Hoca adding 'what if it were?'. Let us

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assume that it is and employ this assumption in today's context. Should the lake turn into yoghurt, the first possibility is that Nasreddin Hoca himself could apply for a patent for the technique that he used, and claim ownership of the yoghurt produced out of the lake's water. Secondly, the state could claim a sovereign right over the yoghurt-producing lake and restrict access to it. Thirdly, a corporation could use a similar technique with a degree of added complexity, obtain a patent and then ask for royalties even from Hoca himself if he has not previously registered his 'invention'. Although the last possibility seems the most ridiculous of all, it is the most likely as the case of the Neem tree indicates. Drawing on the traditional knowledge and practices of Indian farming communities which had used the Neem tree as a pest-control agent and medicinal component for centuries, corporations patented Neem-tree-related products and processes (Dutfield, 2000: 66; Shiva, 2001: 57–61). Regardless of whether a patent is owned by an individual or a corporation, whether access is permitted or denied by the state, there exists an issue of access (or exclusion) arising from the regimes of private and national (state) property. Other problems also exist, such as conditions and the subject matter of patenting. Proponents of patenting deal with these issues by drawing rhetorical distinctions between 'naturally found' and 'human-made' organisms, discovery and invention, traditional and expert knowledge, and inventor and patent holder in such a way that the latter are overemphasised while the former are devalued and their complex relationships overlooked. The justifications for patenting are embedded in these distinctions.

Different links between the patenting of life forms and biodiversity conservation are established by two rival approaches. Property rights defenders suggest that the protection of intellectual property rights (IPRs) through patenting is the basis of biodiversity conservation. Sovereignty rights defenders argue that biodiversity conservation can be accomplished mainly through state-sovereignty rights. These two approaches extend into the international political arena and can be observed particularly in the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and the Convention on Biological Diversity (CBD). Section 5 of the TRIPS agreement sets out the minimum standards of IPRs over components of biodiversity through the patenting of living organisms. The CBD, however, recognizes and reaffirms sovereignty rights over bioresources. The CBD and its entry into force in 1993 brought to the fore the biodiversity-related issues of IPRs. As is shown below, the two perspectives agree in seeing the CBD and TRIPS as mutually contradictory, while their justifications for this differ. Against those views that see a conflict between the two legal regimes, there is a third view which emphasises a synergy between TRIPS and the CBD (Dutfield, 2000: 75–89; Tarasofsky, 1997). This pragmatic approach mainly revolves around an international law viewpoint focusing on the legal relationship. Distancing itself from all these views, and looking

at the issue from a political economy standpoint, this article seeks to investigate the extent to which private property rights and sovereignty rights are complementary rather than contradictory, with particular reference to biodiversity issues.

THE COMMODIFICATION OF LIFE FORMS

For the biotechnology industry, there is no difference between patenting a life form and patenting an industrial product. William Tucker, manager for technology transfer at DNA Plant Technology of Oakland, puts it as follows: 'Just because it's biological and self-reproducing doesn't to me make it any different from a piece of machinery that you manufacture from nuts and bolts and screws' (cited in Powledge, 1995: 442). In this view, life forms are raw materials like other natural resources provided by nature. These raw materials are manufactured through intellectual labour and genetic engineering as with genetically modified organisms (GMOs), and become finished, commercial products like pieces of machinery. So the true distinction, it is argued, is between 'untouched', 'naturally-found' materials and 'human-made', 'finished' products. What follows is the claim for a patent over the 'created' life form or processes applied and the techniques used. When the US Supreme Court in the *Diamond v. Chakrabarty* case granted a patent on a genetically engineered organism designed to consume oil spills on the oceans, the ruling was based on the argument that 'the relevant distinction was not between living and inanimate things, but between products of nature, whether living or not, and human made inventions' (Wilson, 2001: 293). The judgement paved the way for the patenting of life as it emphasised that, as long as it was not nature's handiwork but a human invention, both animate and inanimate things were patentable. This line of argument echoes a dualist understanding of nature–human relations within which 'nature' is separated from humankind and reduced to an object to be exploited and manufactured (see Benton, 1988; Foster, 2000). What is more, the objectification and commodification of nature is extended to life forms as a result of the logic of patentability. Without this externalisation of nature from human activities as the natural–human-made distinction assumes, appropriation of life forms through IPRs would not be possible, since manifestations of nature are not patentable.

Human activities take place in nature and human-made products are produced using natural things (Fischer-Kowalski and Haberl, 1993). As Marx (1976: 290) once emphasised, there is 'the metabolic interaction between man and nature'. Human intervention in nature is heavily dependent on the present characteristics of organisms and natural processes. This is so even for Chakrabarty's patented organism that was not made out of thin air, but through a process of isolation, shuffling and modification of

already existing genes in nature. Practices of cross-breeding and manipulation in life forms that have contributed to species variety and diversity for centuries are also testimony to nature–society interactions that do not have the character of an externalised relation. On the one hand, without drawing a distinction between naturally found and human-made matters, the claim to a patent on a modified organism is likely to fail but, on the other hand, unless the distinction between the two is cast aside, the ability to make a profit from the product is likely to be undermined. Thus, when it comes to marketing, it is suggested that there is no difference between naturally grown and genetically modified products. It is said, for example, that a potato is a potato whether genetically modified or not. Without blurring the distinction, the possibility of boosting the market share of GMOs is rather slim. Therefore, in order to win consumer acceptance, the claim of the 'non-naturalness' of GMOs is converted into the claim of 'naturalness' (Meyer, 2000: 167). Under pressure from corporations, regulatory bodies confirm this claim modification in the face of consumer concerns. Hence, the US government's Food and Drug Administration, after changing its risk definition from 'no risk' to 'manageable risk', declared a state of equivalency between genetically and non-genetically altered food products (Lappé and Bailey, 1999: 76; Monbiot, 2000: 238). Patent ownership remains even if one of its justifications based on the distinction between the natural and the human-made collapses in the movement from patenting to marketing.

A similar kind of blurring is also introduced to the distinction between discovery and invention, again for profit-making reasons. In patent law, discoveries are the unveiling of natural causes, properties and phenomena, hence unpatentable (Cornish, 1999: 207–9). Patentable subject matter must be human-made, not found in nature. According to Article 27.1 of TRIPS, patents are available for novel, non-obvious and useful inventions. However novel, non-obvious and useful they may be, discoveries are unpatentable. But it is difficult to draw a thick line between discoveries and inventions. For instance, the unpatentable chemical elements of the periodic table are considered as 'discovery' while patentable genes are considered as 'invention'. Both of these are in fact found in nature and the properties of each have been isolated, described and classified (Rifkin, 1998: 45). If the difference arises from industrial applicability or usefulness, it is still rather inaccurate to say that, unlike genes, the elements do not have a use in manufacture. Thus seen, for most cases in the field of biotechnology, it would be hard to make patent claims to something presented as an invention but in fact considered to be a discovery. To overcome the problem, while the rhetoric of the distinction remains, the recent tendency is to blur the discovery–invention distinction in favour of inventions (Correa, 2000: 177–82; Drahos, 1996: 208–10) so that the biotechnology industry can continue to blossom in monetary terms.

The philosophical reasoning for IPRs protection comes from the Lockean labour theory of property. My intention is not to go deeper into this theory, but to identify further distinctions embedded in Locke's insights which are employed in justifications for IPRs protection.[1] In *The Second Treatise of Government*, Locke (1988 [1689]: 285–302) argues that humans acquire private property by mixing their labour with those things that initially belong to humankind in common and are produced by the hand of nature. As Locke's apple example illustrates, when s/he gathers apples from trees in commons, s/he adds something to them not provided by nature. With that labour s/he establishes a difference between the gathered apples and the apples in commons; this in turn provides the basis for his/her private property rights, as the picking-up and then shuffling of genes was argued as giving Chakrabarty the patent right over certain bacteria. Thus, in Locke's theory, property ownership is presented as a reward for efforts to mix one's labour with nature (Ryan, 1984: 28). For Locke, in the transition from common property to private property, labour is of importance in that, without labour, there is no private property, 'without which the Common is of no use' (Locke, 1988: 289). In this view, spontaneous products of nature have no use until their intrinsic value is made useful to humankind by establishing possession of these products through property rights. But it is not any kind of usefulness that counts, as Locke draws a distinction between 'wild' American Indians living in the state of nature and 'civilised' Europeans. This distinction is supplemented by the prioritising of exchange value over use value. Although Locke (1988: 298) assumes the use value of natural things that satisfy human needs, for him this is too far removed from the value generated by commercial agriculture, industrial activities and the use of money. In this sense the comparison is made between Europeans who produce exchange value and Indians who have no desire to produce exchange value, thereby leaving nature to itself, in a state that Locke calls 'waste'. Locke approves the appropriation of Indian lands by Europeans as the former waste rather than benefit from and improve the land.

One of the objections to the patenting of life forms is based on the similarity between the Lockean possessive view and the logic of patenting regarding the appropriation of indigenous labour (e.g. Shiva, 2001: 43–4). Many patent claims do not recognise the long-standing role of indigenous practices and knowledge in cultivation, breeding, modification and innovation (Meyer, 2000: 169–72) even if the subject-matter of the product in question draws on these practices and knowledge, as in the Neem tree case mentioned above. Therefore, David Harvey (2003: 148–9) regards IPRs as new mechanisms of 'accumulation by dispossession': 'the patenting and licensing of genetic material, seed plasma, and all manner of other products can now be used against whole populations whose practices had played a crucial role in the development of those materials'. IPRs can thus not

only dispossess farmers, but also open up a new field for capital accumulation by turning genetic materials into profitable use. We may also consider the arguments put forward by the seed industry. Exotic germplasm freely available in nature is distinguished from commodity germplasm as valuable private property sold on the market on the grounds that the application of expert labour and knowledge in laboratories adds value to the natural gift of germplasm. But the fact is that 'most plant genetic resources are not simply the gift of nature. Landraces and primitive cultivars have been developed by peasant farmers; they are the products of human labour' (Kloppenburg and Kleinman, 1988: 190). While the labour of farmers, their knowledge and the so-called gift of nature are devalued, they are also appropriated in the process of inventing and patenting products based on life forms. The outcomes of the insertion of market and patent mechanisms into the labour processes and knowledge practices of indigenous communities in the Amazon region (Zerda-Sarmiento and Forero-Pineda, 2002) attest to devaluation and appropriation. By and large, not only are biological resources commodified through market mechanisms, but initially non-commercial human-need meeting interactions with these resources are also pushed into the same logic. The only measure of value becomes the market value, despite the fact that biological resources have use value too. But even the commercial value of biological resources is reduced to the narrow range of the value of commodities (Schücking and Anderson, 1991: 27), cash value, that is, such as the market value of elite commercial germplasm, not primitive germplasm; the seeds of the Neem tree produced in labs, not its naturally grown seeds or the tree itself. In Marxist terms, all that has been said points to the commodity fetishism which presents human-made things as independent from natural materials/processes and centuries of practices, farmers' labour and knowledge. Therefore, commodity fetishism 'obscures the ways in which modern society works on raw materials and the powers of nature to produce things it needs' (Dickens, 2002: 65), as well as the ways in which indigenous communities engage traditional labour and knowledge practices with biological resources.

In patent claims, the externalisation of biological resources and processes from human-made things goes hand-in-hand with the externalisation of the researcher's labour from the patented products. The appropriation of life forms and outputs of traditional labour and knowledge practices is completed by the appropriation of the outputs of the researcher's labour and knowledge. Therein emerges the distinction between inventor and patent holder. Legally speaking, individuals are eligible to hold patent rights, but in practice most patents belong to corporations. Generally, researchers do not work for themselves to invent novel things, but for employers who have the tools and technological equipment that facilitate the labour process in knowledge production. The labour power of researchers is purchased by the employer who owns the means of production. When

researchers as employees make patentable inventions, it is not they who can become the patent holders, but the owner of the means of production. In IPRs law, the contract mechanism allows the contracting employer to appropriate the intellectual outputs of the workforce (Cornish, 1999: 266–72). It is true that, from the viewpoint of law, the contract relation between employee and employer legitimises the rights of the employer over the invention. As the employer provides tools, resources and organisation for knowledge production on the one hand, and labour contracts 'contain clauses mandating ownership of any knowledge outputs with the employer' on the other, the enclosure of any ideas created by the employee into the property of the employer is lawfully legitimate (May, 2002a: 1044). However, from the sociological point of view, there is an obvious similarity between the inventor–patent holder relation and the labour–capital relation (May, 2002b: 324). Despite the fact that the employee has made the invention that is the subject-matter of the patent, the inventor-employee is dispossessed from his/her rights over the output. This is even at odds with the ostensible logic of patenting that argues that IPRs protection is about the protection of intellectual labour that has created added value. If patent rights are meant to protect the added labour (value), it would be expected that the inventor should hold the patent, not the employer who has little to do with intellectual labour. Once again, Locke's theory of property seems relevant to the inventor–patent holder distinction. For Locke (1988: 300–1), the labourer and the owner are one and the same individual in the beginning, in the sense that the gatherer of apples has property rights over them through his labour. However, in his theory, the invention of money and the development of trade bring about the separation of labourer from owner as it thereafter becomes possible for the labourer to produce more than he needs and to sell the products of his labour on the market. In this case, the buyer becomes the owner, entailing the owner's right to property as distinct from the labourer's right to the products of his labour. In Locke's view, as Pierre Manent (1994: 44) puts it, 'the right of property is naturally separated from the labour that is at its origin. . . . Once property, which enters the world through labour, becomes a value represented by money, the owner's right is legitimately separated from the labourer's right'. In modern times of IPRs, the similar separation between inventor and patent holder is presented as a justification for the employer's/patent owner's rights. The employer becomes patent holder as if his purchasing of intellectual labour power granted him property rights over the products of the intellectual labourer.

To summarise, just as the commodification of life forms turns biological resources which were previously commonly used into commercial commodities and the biological commons into the subject-matter of private property, so the commodification of intellectual labour and knowledge generates a similar outcome for the intellectual commons where knowledge

is a common resource. But commodification itself does not create property rights. For the creation of IPRs it is necessary to presume an external relation between nature's handiwork and patented product, and between intellectual labour and its product.[2] Through externalisation, it can be claimed that the patented product (life form) has nothing (perhaps little on occasion) to do with nature and does not belong to the labourer either, but is the private property of his employer-patentee. Thus, the externalisation of labour power in its products, and of nature in human activity, becomes the precondition of intellectual private property. IPRs regimes like the TRIPS agreement are then constructed on the foundation of presumed externalisation. As discussed earlier, there is not an external but an internal relation between patented life forms and nature's products. Therefore, regulatory measures as in the CBD are needed to avoid over-exploitation of nature's products regarded as the 'raw materials' of life patenting. In this sense, the CBD seeks to protect nature's products (biodiversity) from over-exploitation in order to secure future capital accumulation in the biotechnology industry (I will return to this below). But to what extent does the CBD differ from TRIPS in acknowledging the patenting of life forms? I now turn to discuss this.

ECOLOGY OF PRIVATE PROPERTY RIGHTS VERSUS ECOLOGY OF STATE-SOVEREIGNTY RIGHTS?

There is little doubt that the loss of biodiversity is accelerating (Schücking and Anderson, 1991; Shiva, 2000; Swanson, 1999; World Resources Institute, 2000). The contentious issue, however, is about the institutional ways in which biodiversity can be protected. Two opposing perspectives can be taken into consideration. The first is an ecology of private property rights, to borrow Kuehls' (1996: 97) term. This perspective deeply resonates with the theory of 'the tragedy of the commons' (Hardin, 1968) in that, when there is no private property, individuals tend to use up biological resources to the extent of over-exploitation and destruction. This is the view taken by Roger Sedjo (1988: 294). He argues that private property provides the incentive to protect and maintain species and habitats. Therefore, rather than limited, property rights should be expanded and extended to cover natural species and habitats as well as genetic stock, breeder lines and genetically modified organisms. The second perspective is an ecology of state-sovereignty rights. Here it is argued that the framework of sovereignty provides appropriate institutional mechanisms for the conservation of biodiversity. As sovereign rights over biodiversity are meant to control access, the sovereign state has the capacity to allow only sustainable utilisation of biological resources. Discussing the possible problems arising from the common heritage status of plant genetic resources, Kloppenburg and Kleinman (1988: 188–99) find a viable solution in the principle of sovereignty. In this view,

establishing sovereign control over biological resources is especially important for developing countries since, by controlling access, they can benefit from the appropriation and utilisation of their own resources by developed countries and corporations.

In the international arena, Section 5 of TRIPS can be considered as corresponding to the ecology of private property rights while the CBD corresponds to the ecology of state-sovereignty rights. TRIPS provides standards and principles for IPRs protection in the field of biotechnology based on the utilisation of bioresources, while the CBD establishes an international regime of biodiversity protection and utilisation through sovereignty rights. From within each perspective, one could readily jump to the conclusion that TRIPS and the CBD are contradictory. This is exemplified, for example, in the US position. Although the US initially proposed an umbrella convention on biodiversity – while the TRIPS negotiations were in progress – it refused to sign the CBD[3] on the grounds that 'the Convention's provisions failed to recognise the positive role that intellectual property rights could play in the conservation of biodiversity' (Walden, 1996: 172). President G. Bush declared that the CBD 'threatens to retard biotechnology and undermine the protection of ideas' (Boyle, 1996: 36; McConnell, 1997: 51. This objection was based on economic issues such as possible liabilities for US biotechnology corporations exploiting biodiversity resources). Just as the first perspective is exemplified in the American position which overvalues the role of IPRs protection in biodiversity conservation and thereby presumes that TRIPS and the CBD are contradictory, the second perspective overvalues the role of the regime of sovereignty rights and likewise presumes that the two agreements are contradictory. This second perspective is exemplified in Vandana Shiva's view that TRIPS is in direct conflict with the CBD since the former is a trade treaty, enforces patent rights over life and has no conservation obligation, while the latter is an environment treaty, is based on the principle of sovereignty and aims to protect biodiversity, indigenous knowledge and practices. Under the sovereignty principle of the CBD, the state regulates access to biodiversity and denies it 'if it appears harmful to its national interests'. The IPRs regime of TRIPS undermines sovereignty rights, hence the CBD's objective of biodiversity protection (Shiva, 2000: 45–6, 2001: 102–4).

At first sight, it appears that the two agreements are contradictory in regard to biodiversity as they are based on different objectives, norms, principles and enforcement mechanisms (see Rosendal, 1999). The general objective of TRIPS is to provide and enforce rules to protect IPRs in such a way that these rights do not themselves become impediments to international trade. The objectives of the CBD (Article 1), however, are 'the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources'. As IPRs are individual rights, patenting is likely to

hinder the implementation of the objective of benefit sharing with the countries providing genetic resources. The emphasis of the CBD (Article 15) on sharing the benefits of access to resources could be incompatible with the patentee's exclusive rights embedded in the externalisation of nature and local knowledge, as discussed above. Similarly, it may be hard to reconcile the rights of patent holders over biotechnological processes with the CBD's norm (Articles 16-9) of developing countries' access to and transfer of technology. In fact, the difficulty in reconciling the aims of benefit sharing and access to technology is related to the clash of two assumptions. The first assumption is that IPRs protection contributes to 'the promotion of technological innovation and to the transfer and dissemination of technology' (Article 7 of TRIPS). Because novel things and biotechnological advances are made by spending time and money, free accessibility will undermine incentives to invest, hence eroding the potential for the technological advances necessary for sustainable development (Cottier, 1998: 61). The counter assumption is that, 'by restraining the free circulation of new knowledge, the generalised application of patents hampers rather than encourages research' (de la Perrière and Seuret, 2000: 95), hence it is an impediment to the development and dissemination of sustainable technologies. If the first assumption is true, IPRs protection helps the sustainable use of biodiversity. But, if the second is true, it does not, since the monopoly rights of patent holders restrict access to relevant technologies. The importance of access to and transfer of technology for the conservation and sustainable use of biodiversity is underlined in the CBD. In contrast, Article 16.2 of the CBD also reaffirms the protection of patents and IPRs. Clearly, the CBD's terms of 'sustainable use of biological diversity', 'access to and transfer of technology' and 'effective protection of intellectual property rights' are mutually contradictory. Either both assumptions are true at the same time, or the CBD tries to reconcile the supposed overall conflict between TRIPS and the CBD at the expense of eroding its own objectives.

There are also differences between the two agreements concerning enforcement mechanisms. TRIPS contains strong wording backed by international enforcement mechanisms such as 'national treatment', 'most-favoured-nation treatment', 'trade sanctions' and most importantly 'dispute settlement machinery'. As an international agreement, the enactment of its provisions is reliant on national legislation. One of the key mechanisms to bring IPRs into national legislation has been the US pressure (via the threat of unilateral, retaliatory trade sanctions) on developing countries such as India, Brazil and Thailand (Russell, 2000: 89; Sell, 1999: 186; Shiva, 2000: 47–50; Williams, 2000: 76) where strong IPRs legislation was adopted as a result. (It must be added that the US Trade Representative is dissatisfied with 'mere' TRIPS compliance and requires 'TRIPS Plus' for more action against infringing countries.) The CBD, however, uses the words, 'as far as possible and as appropriate' so frequently that this confirms the lack

of commitment to its objectives. As it is a framework convention with only one adopted protocol (on biosafety), it is not really operative. Moreover, there is no compulsory, binding third-party dispute settlement mechanism in the CBD regime. The main method for settling disputes is negotiation. This means that the issues of benefit sharing and transfer of technology between contracting parties are left to good will in the negotiation processes (Boyle, 1996; Johnston, 1996). Its implementation largely requires national legislation and adoption of administrative or policy measures. Yet, the weak commitment of the CBD to its own objectives mentioned above is likely to become even weaker at the hands of national governments keener on economic growth than environmental protection. Its weakness can also be seen in its provisions for the protection of local knowledge. In contrast to TRIPS, the CBD recognises the importance of local knowledge and practices for the conservation and sustainable use of biodiversity. Because of this importance, as Article 8.j reads, contracting parties shall 'encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices'. Yet again, this approval of the holders of local knowledge is contingent on national legislation, 'as far as possible and as appropriate'. Furthermore, as Woodliffe (1996: 266) points out, the beneficiaries 'are left unspecified, as are the methods for quantifying an equitable share'. For these reasons, the CBD's supposed difference with TRIPS in this respect is inadequate to make a real difference.

A consequence of the strong enforcement of TRIPS, contrary to that of the CBD, is that it leaves a little room for contracting parties to manoeuvre. In this way, TRIPS forces the parties to establish IPRs over life forms through patents. However, its Article 27 also provides contracting parties with the option to exclude inventions from patentability 'to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment'. Signatory states 'may also exclude from patentability plant and animals other than micro-organisms, and essentially biological processes for the production of plants and animals other than non-biological and microbiological processes'. First of all, exclusion from patentability is an option, not an obligation, that leaves the door open not to exclude. Secondly, the terms of 'public order' and 'morality' are rather controversial and can be interpreted in diverging ways and this is likely to bring about disputes subject to the binding dispute settlement machinery (see Correa, 2000: 62–7). Thirdly, although it stipulates that plants and animals and essentially biological processes may be excluded from patentability, this does not mean that the treaty widely restricts patentability. Rather, the patentability of micro-organisms and micro-biological processes which are the cornerstone of the biotechnology industry provides very broad scope for patent rights over biotechnological products and processes. More importantly, if non-biological (genetic engineering) and micro-biological processes have been employed in the

production of plants and animals, these living 'products' are also patentable (Williams, 2000: 73). Put otherwise, the TRIPS agreement's provision on patenting does not diverge from the view of the biotechnology industry that life is patentable.

In this matter, a crucial question with regard to the CBD is whether or not it prohibits the patenting of life forms as a way of protecting biodiversity. This question is especially significant considering the implications of life patenting for both the understanding of nature–human relations and the acknowledgment of community rights and knowledge practices as discussed in the opening section. There is no such prohibition within the CBD regime. Quite to the contrary, it recognises IPRs in the field of biotechnology (Article 16.2/3/4). This means that the CBD accepts life patenting leading to the commodification of life forms which are components of biodiversity. After all, the CBD resonates with the dualist understanding of nature–human relations (Attfield, 1999: 139) within which the justification for life patenting is also embedded. In the Preamble, 'the intrinsic value of biological diversity' is mentioned, but there is no attempt to articulate this into regulatory institutions and mechanisms for biodiversity conservation. Instead, it speaks of the exploitation and utilisation of biological resources in an instrumentalist manner (e.g. Article 3). The emphasis on the use of biological resources and the equitable sharing of benefits legitimises 'a market for owned species and genes (i.e. living resources and their parts) and effectively diminish[es] most biodiversity to the status of property of the master species' (Burrows, 2001: 242).

A different understanding of nature–human relations could lead to the introduction of a regime of property ownership different from the present IPRs regime recognised by the CBD. Whereas property-rights theorists 'often see the right to property as more important than the property itself', an alternative ecological theory of property views 'the ecosystems of which that property is a part as more important than either the property or ownership rights' (Breen, 2001: 46). This theory is backed by ethical and philosophical views which argue that nature exists for its own sake rather than for human interests, and that natural entities have an intrinsic value (Eckersley, 1992; Naess, 1989). In the case of the biodiversity regime, the alternative would entail that the protection of life forms and ecosystems should be given more importance than the protection of patent holders' property rights. The CBD, supposedly designed to conserve biodiversity, adheres to the prevailing property regimes as it emphasises the 'adequate and effective protection of intellectual property rights'. Rather than the adverse impact of life patenting on biodiversity conservation, the important issue for the CBD is the access to and transfer of technology subject to patents. The CBD sees only a possibility that IPRs 'may have an influence on the implementation of this Convention'. Yet again, even the possibility of such an influence is not about the conservation of biodiversity. According

to a paper submitted by the CBD Secretariat to the 3rd Conference of the Parties, 'if IPR have an impact on the Convention's objectives, this is most likely to occur in the context of technology transfer, rather than in the context of conservation and sustainable use' (see UNEP/CBD/COP/3/22). Further, recognising this possibility, contracting parties 'shall cooperate in this regard subject to national legislation and international law in order to ensure that such rights are supportive of and do not run counter to its objectives' (Article 16.5). It is clear that, as far as the CBD is concerned, there is no immanently contradictory relationship between IPRs protection and the CBD regime; conversely, patent rights are considered to be supportive for the accomplishment of the CBD's objectives.[4]

This being said, these two agreements seem to be at variance in terms of the risk assessment of GMOs. As noted above, TRIPS allows countries to exclude inventions from patentability to protect health and avoid serious prejudice to the environment. Presumably, some inventions based on genetic modifications could be excluded from patentability on this ground. In this case, serious prejudice or the seriousness of the threat need to be proved with scientific certainty. However, scientific discussions about the risks involved lead to ambiguity rather than certainty (Burrows, 2001; Guay, 2002: 218–27; Manning, 2000: 27–8). Besides, it is not the job of patent offices to find out whether there is any serious health or environmental risk involved (Dutfield, 2000: 49). Under the CBD (Article 8.g and h), countries shall establish 'means to regulate, manage or control the risks associated with the use and release of living modified organisms resulting from biotechnology which are likely to have adverse environmental impacts' and 'prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species'. Obviously, this wording is stronger than the terms of TRIPS. However, further elaboration is needed. First, the CBD itself does not establish an international regulatory mechanism in this respect and countries shall do so 'as far as possible and as appropriate'. National regulatory bodies assess related risks of GMOs by generally relying on reports presented by the very corporation that has developed the product (Nottingham, 1998: 123–7). And, as we have seen in the US case, some countries may change the risk definition from 'no risk' to 'manageable risk', rather than expand the application of the precautionary principle which entails that the lack of scientific certainty about risks cannot be the ground for not taking regulatory measures. Related to this, second, is that the CBD does not mention the precautionary principle as a tool for regulating risks.[5] The principle was removed from the fifth draft and is only implied in the Preamble, which makes its status less clear and leaves it open to the interpretation of national regulatory bodies (Boyle, 1996: 37; Johnston, 1996: 55). For these two reasons, the difference between the CBD and TRIPS in regard to risk management in legal terms becomes vague.

THE COUPLING OF THE TWO REGIMES

So far, I have tried to show that the differences in legal terms between the two agreements are not as significant as presumed. Even in terms of their most potentially conflicting provisions, their relationship cannot be considered as contradictory, but rather supportive due to the fact that, while the CBD's commitment to its own objectives are loose, it nevertheless accepts the objectives of TRIPS, i.e. the protection of life patents and IPRs. So, it is not that TRIPS (property rights) undermines the CBD (sovereignty rights) as suggested, but that the CBD undermines itself. Given this fact, the only remaining reason why the two agreements are presented as if they were contradictory may lie in the CBD's recognition of the sovereignty rights of the state. Many CBD negotiators from developing countries emphasised the importance of sovereignty rights over bioresources, while the US and the biotechnology industry saw it as a threat to IPRs. This begs the question that sovereignty rights work against property rights. In this section I closely examine the characteristics of the relationships between sovereignty and property rights.

As was seen above, the necessity of establishing either the state-sovereignty or private property regime starts from the shared assumption that, if there is no exclusive right over biological resources, if access is not restricted, there is no ground for conservation. So, rather than contradicting each other at the outset, these two regimes actually share the aim of establishing exclusive rights over biodiversity, either in the form of sovereignty rights or of IPRs. This shared aim poses two problems. First, the basis of regulation/protection does not necessarily entail either exclusive state or private property rights. The absence of an exclusive property regime or the presence of an open access regime do not necessarily lead to the lack of protection or regulation. Historically, the commons in England were not an ungoverned space but subject to commoners' 'social regulation' (Frow, 1996: 100; Vogler, 1995: 13). Thus, second, it writes off the alternative concepts of collective community rights and the common heritage of humankind. For example, farmers' rights are recognised by the 1989 FAO non-binding International Undertaking on Plant Genetic Resources. The concept refers to the rights 'arising from the past, present and future contributions of farmers in conserving, improving and making available plant genetic resources' and to full benefit for farmers 'from the improved use of plant genetic resources, through plant breeding and other scientific methods'. The Undertaking also regards plant genetic resources as a common heritage of humankind, hence freely available for use. It must be noted that the concept and implementation mechanisms of farmers' rights were not well-developed in the Undertaking on the one hand, and that the international agenda was moving towards sovereignty and property rights rather than towards the common heritage status in the early 1990s on the

other. Indeed, during the CBD negotiations, the same states party to the FAO Undertaking rejected the common heritage status in order to control access to genetic resources (Cooper, 1991: 112). If it had not been rejected, plant genetic resources would be accessible without restriction.

At first sight, it seems that this would work against developing countries as the donors of plant genetic resources. However, the common heritage status within the FAO Undertaking includes, not only 'primitive' germplasm, but also the 'elite' breeding lines of corporations. This makes it understandable why both seed corporations and states oppose the common heritage status (Vogler and McGraw, 2000: 128). By rejecting the common heritage status, states and corporations benefit, albeit unequally, from exclusive access to plant genetic resources. In this sense, states' rights and corporate/private rights over plant genetic resources are not in opposition, while farmers have to pay the price for their restricted access to elite lines. The CBD uses the term 'common concern of humankind' only in the Preamble, and the context of the term is not about access but about the conservation of biological diversity. Nor does it accept and develop the Undertaking's term, 'farmers' rights'.[6] Article 15 of the CBD recognises sovereign rights over genetic resources but requires that states 'shall endeavour to create conditions to facilitate access to genetic resources'. Access to resources is balanced with access to biotechnology. States shall take legislative measures providing access to technology and the sharing of benefits arising from the utilisation of these resources (Article 16). As Flitner (1998: 156) suggests, 'the very functioning of the CBD depends on the restriction of both access to "raw material" and access to technologies and organisms derived therefrom'. Put otherwise, rather than pitting the sovereignty regime against the property regime, the CBD counterbalances sovereignty rights with IPRs.

Taking the analysis further, it can be argued that it is difficult to reconcile the conceptual conflict between property rights over genetic resources and their common heritage status. While individuals or corporations have the right to plant genetic resources, how can these, at the same time, be considered as freely available to be used, replanted or exchanged by others? In other words, the significant opposition is not between property regimes, whether referring to collective (farmers), private (individual/corporation) or public (state) rights over natural resources, but between property regimes and the common heritage status. These regimes establish exclusive rights and give the proprietor (individual, group of individuals or the state) the right or power to control access. When taking exclusivity into account, 'collective property and particularly state property', as Balibar (1994: 218) puts it, 'is in itself nothing but *private* property'. He goes on to argue that 'the conflict that can oppose it to the properties of 'private persons' is only a conflict between competing exclusivities'. These regimes are based on the same principle, what Balibar (1994: 219)

calls, 'the principle of total possession of objects': 'every object, every raw or refined material, every natural or artificial (or even immaterial) 'thing' is effectively appropriable (whether by an individual or an institution) in the form of an exclusive disposal'. However, the common heritage status refers to 'neither private property nor public or collective property, but *universal property*, 'without a subject', or without any subject but the *fiction* of a unified humanity' (Balibar, 1994: 220–1). It does not mark the end of the appropriation of things or the elimination of existing forms of property, but rather expresses restrictive limitations on exclusive rights and shows the 'intrinsic limits of the total possession' of things, since its very existence is predicated on the participation of all 'proprietors' and on the reciprocal control of the collective activity of humanity on nature.

As property/sovereignty regimes are about exclusivity, the debate on these two regimes turns out to be a political debate, not only in terms of the power relations embodied in various interests, but also in that the privilege of possession and controlling access is protected through the installation of politics in the form of property/sovereignty rights. This brings us to discuss these regimes in terms of power relationships and the role of law. It is argued that sovereignty has both outward (non-intervention and territorial integrity) and inward (judicial jurisdiction, rule making and state-society relations) aspects (Conca, 1994: 707). For my purpose here, I deal only with the latter aspect. Internal sovereignty traditionally refers to the concentration and distribution of power within the state (Heywood, 1999: 90). Similar to sovereignty rights, the establishment of property rights by the state grants some the right to exclude others from the appropriation and use of or access to things, hence the right to property becomes an instrument of power. Thus seen, property rights refer to power relations within which some power is concentrated in the hands of individuals and distributed among property holders and between them and the excluded. This is what Drahos (1996: 150) calls a 'sovereignty effect' of the property mechanism which 'concentrates power to produce imbalances in the relations of power between individual actors'. Drahos plausibly argues that this is especially the case for intellectual property. Consider that a pharmaceutical company owns the patent right on a life-saving drug, such as malaria, tuberculosis, AIDS and cancer drugs. This right creates a sovereignty effect within which the intellectual property right of the company takes the form of a monopoly embodying immense power while patients literally experience a situation of life and death depending on their purchasing power. Although sovereignty technically refers only to states, the sovereignty effect is indicative of the non-contradiction between sovereignty right holders (states) and monopoly IPRs holders.

Moreover, in the case of intellectual property, sovereignty rights over bioresources work in tandem with property rights since the realisation of IPRs necessitates the juridical protection provided by law as the

terrain of the sovereign state. As Picciotto and Campbell (2003: 1) point out, '[p]roperty rights of all sorts are social relationship underwritten by the state rather than "relationships" between persons and things'. We have already seen how the logic of externalisation works in the process of the commodification of life forms. But it is through IPRs protection that externalisation becomes part of the process of capital accumulation. In the absence of a strongly protected intellectual property status, ideas, inventions and discoveries, or abstract objects in general, would be accessible without paying royalties. For instance, US and European intellectual property-exporting corporations claimed that 'they were losing up to $61b per annum through "product piracy"' (Dunkley, 2000: 187). An IPRs regime provides regulatory measures to protect the rights of intellectual property owners against the unauthorised use of patented products. That is to say, IPRs law tends to secure the monopoly income of the right holder by prioritising the property right of the owner against the right of the user (Picciotto and Campbell, 2003: 7). In the absence of a legally protected IP monopoly, competitive production by others of an imitated product might reduce the inventor's revenue based on the commercial exploitation of the innovation. Without a property claim to, say, a formula for a medicine, without the judicial protection of rights over it, the inventor cannot be said to have the monopoly right over the product because of the difficulty in making the knowledge of the medicine exclusive.

As knowledge 'is in principle infinitely transferable without depletion of the resource' (Frow, 1996: 98–9), the knowledge of the medicine initially is not a scarce commodity. Its non-exclusive utilisation or implementation does not deplete the amount of the knowledge. However, 'the role of intellectual property is to construct such scarcity in the realm of knowledge and make it legitimate' (Sell and May, 2001: 472), without which opportunities for profit would be slim. The introduction of exclusive control over dissemination, distribution or utilisation through IPRs artificially limits the supply of abstract objects (Ostergard, 1999: 167). IPRs over life forms function in a similar way. If 'the possessor of an intellectual property right clearly does not own the particular manifestations of her ideas, but is instead said to own the ideas themselves' (Meyer, 2000: 164), then, again, the ideas as the subject matter of a patent over life forms are not scarce by definition. However, as discussed in the opening section, patented life forms are created using natural things. In this case, despite the fact that the physical nature (e.g. land) and quantities of some natural resources (e.g. oil) display naturally imposed scarcity, living organisms on which life patents are based reproduce and replicate themselves. The imposed scarcity comes into play in the commodification of life forms through two different mechanisms: 'a biological-technical one, and a legal one' (Flitner, 1998: 151). For instance, seeds are not scarce as they reproduce themselves when they are harvested. But, the 'terminator technology' arrests the

reproduction of the seed, thereby the non-scarce resource is turned into a scarce commodity. So long as this technology cannot be applied to every species, the legal mechanism of IPRs is needed. IPRs legislation forces farmers to stop reusing 'subsequent generations of newly invented life forms such as new plant varieties' so that the income stream of seed corporations can continue (Tansey, 1999: 4). As Shiva (2000: 30) suggests, '[c]onverting biodiversity from a renewable resource, freely and perennially available to farmers and local communities, into a non-renewable commodity to be bought each year is achieved technologically through industrial breeding, and legally through patent and intellectual property rights'. All that has been said shows that commodification involves legally introduced and politically enforced property rights (Görg and Brand, 2000: 375). Therein the realm of IPRs intersects the realm of the sovereign state.

The role of the state in the field of biodiversity is not merely confined to the creation and protection of IPRs. The enclosure of the commons is facilitated by the state. 'In the case of the English pastoral commons', as Vogler (1995: 17) points out, 'it was state legislation that transferred communal property to private hands and state power that enforced enclosure'. Similarly, the CBD's recognition of states' sovereign rights over biological resources is seen as a 'precondition of the enclosure of the global commons' (Görg and Brand, 2000: 385). Having been granted these rights, state authorities determine access to biological resources through national legislation. State authorities and private actors then work together in the process of the commodification of life forms as in 'bioprospecting' projects. A case in point is the agreement between US-based pharmaceutical company Merck, Sharp & Dohme and the Instituto Nacional de Biodiversidad (INBio) of Costa Rica. In return for obtaining the samples of plant, animal and microbial extracts collected and prepared by INBio which had access to indigenous wild species in the protected areas of the country, the company agreed to give the Costa Rican government one million dollars and a proportion of the license fees from patented products based on the material handed over (Blais, 2002: 148; Flitner, 1998: 157; Martinez-Alier, 1997: 202).

Not only does the sovereign state serve to extend the mechanisms of the exploitation of nature, it is also expected to deal with the environmentally detrimental effects of capitalism through regulation and policy measures. It is said that the market has failed to register the value of biodiversity and other ecosystem services in its price system – a 'market failure'. First, proper pricing and the creation of markets for ecosystem services are suggested as effective ways of overcoming a 'market failure' which leads to a lack of incentives for conservation (World Resources Institute, 2000: 30–2). So construed, 'environmental harms themselves become commodified and subject to the logics of the market' (Saurin, 2001: 77). The second form of creating incentives is to establish ownership or property rights based

on the assumption of the 'tragedy of the commons' as discussed above. Again, extending property rights becomes a solution rather than being part of the problem arising out of the market-based rationale itself (O'Neill, 1997). The third way of correcting the 'market failure' is regulatory measures taken at the national or international levels (Dawson, 1998; Swanson, 1999). Mechanisms of regulation (taxes, environmental standards, biodiversity protection measures, pollution control, etc.) based on the exercise of state sovereignty are designed to internalise environmental externalities and socialise environmental costs in a market economy. However, environmental degradation (e.g. loss of biodiversity) that is presented as a 'market failure' is considered as endemic to capitalism in Marxist approaches. For instance, James O'Connor (1998: 144–71) argues that capitalist accumulation inherently tends to undermine its own conditions in three ways: it destroys natural, physical (infrastructure) and social (labour power) conditions of production and thus threatens the sustainability of capitalism – e.g. acid rain destroys forests, buildings, people's health and profits. Especially important for our purposes here are the environmental conditions of production. State intervention 'as a kind of interface between capital and nature' is an attempt to restore degraded environmental conditions to secure future capital accumulation.

Having said that, identifying the role of the state in both the commodification of nature and the restoration of environmental conditions of production does not necessarily lead to underestimating the role of capital in the domain of the political. The relationship between capital and the state in terms of the availability to capital of environmental conditions of production (the guarantee of raw material monopolies, the granting of property rights in environmental resources, pollution control, health and safety measures, and the like) at the right time and place, structures state agencies one way or another to adopt or resist policies concerning the definition and management of these production conditions at both national and international levels. Industry influence on the negotiating positions of states is so clear that the changing interests of the industry are likely to prompt the government to play important entrepreneurial leadership roles, as with the US role in the negotiations on the protection of the Ozone Layer (see Parson, 1993: 41). Robert Falkner (2001: 169) suggests that 'industry has always been a powerful force in the formation of a US biodiversity/biosafety policy, limiting the scope for American participation in international policy making'. In the TRIPS case, corporations also forged alliances with state authorities, which exercised sovereign power, in order to influence the outcomes of the negotiations. As Sell (1999: 170) shows, US 'corporations played a significant role in mobilising domestic support for the TRIPs agreement and in shaping the content of US negotiating proposals'. As a result, the alliance between biotechnology corporations and their home governments succeeded in globalising their preferred

international regulation of IPRs. The Merck-INBio case also exemplifies how the interests of the state and the company (put otherwise, sovereignty rights and property rights) converge in the single process of capitalist accumulation by bringing life forms to the market.

Thus, the political (the 'public realm', public regulation attempting to restore environmental conditions of capitalist accumulation, or sovereignty rights in a narrow sense) and the economic (the 'private realm', market, or private property rights in a narrow sense) are two aspects of the 'capital relation'. The formal separation between the political and the economic is 'a peculiar feature of capitalism' (Poulantzas, 1978: 18). This formal 'distinction operates to deny the mutually constitutive nature of the economic and the political domains' (Cutler, 1997: 277). Despite their differentiation, the political and the economic are, in their integrity, specificity, connection and inter-relation, complementary spheres of capitalist relations of production, 'separation-in-unity', so to speak (Holloway and Picciotto, 1977: 77–84).

CONCLUSION

This paper has investigated the interrelationship between IPRs and sovereignty rights over biological resources with particular reference to the CBD and TRIPS. It has not intended to devalue or overvalue the regime of sovereignty rights over biological resources *vis-à-vis* the regime of IPRs, or vice versa, but has instead tried to show the problematical character of both devaluing and overvaluing perspectives. The examination of the intersecting legal terms of these two international agreements has demonstrated that, despite the differences in their objectives, implementation and enforcement mechanisms, their similarities in terms of norms, principles and institutional tools are based on the exploitation and commodification of biological resources, the patenting of life forms and the dualist understanding of nature–society relationships. We have also seen that both property and sovereignty regimes are manifestations of exclusivity and power relations; that both work together in the commodification of life forms; that the creation and realisation of IPRs entails the exercise of state-sovereignty rights; and that the structural relationship between the economic/private actors/property rights and the political/state authorities/sovereignty rights manifests a 'separation-in-unity'. In contrast to views that see these two regimes of property and sovereignty rights as contradictory, the paper has thus shown that they are complementary in the process of capitalist accumulation. If so, like the rhetorical distinctions used in justifying the commodification of life forms discussed above, the separation which prevents one from considering the interrelationships between sovereignty and private property regimes obscures more than it reveals about the role of the sovereign state in relation to

biological resources. The recognition of sovereignty rights is not so much related to the conservation and sustainable use of these resources, but rather to the facilitating role of the state in the capitalist accumulation process.

This has some implications for both policy and theory. A policy strategy suggesting a 'bio-friendship' between biotechnology corporations and local communities for the protection of biodiversity through existing IPRs regimes (Heald, 2003: 532–4) is profoundly ill-fitted since it leads to the further commodification of life forms, as bioprospecting projects testify. So too an alternative policy strategy defending state-sovereignty rights is seriously unsatisfactory as it fails to see how IPRs and sovereignty regimes work together in the exploitation of bioresources, as discussed above. Vandana Shiva's (2001: 84–5, 124–28) view defending sovereignty rights against patenting actually shows the permeability of property regimes. Shiva argues that 'there can be no sovereignty of the country' without farmers' rights. She therefore emphasises the necessity for the well-established property rights of farming communities in the form of 'community intellectual rights'. As the state's claim to sovereignty is thereby fortified through a new form of IPRs in this policy suggestion, ironically then, both strategies unwittingly meet on the ground of IPRs protection. A truly alternative strategy would emerge only if one could theoretically consider the characteristics of the intertwined relationships between the public (sovereignty) and private (IPRs) domains under capitalism. In this sense, the implication of the paper's analysis for policy is interrelated with its implication for theory. It has shown that sovereignty and property rights are part of the same set of capitalist politico-economic relations. This argument resonates with the investigation, within the International Political Economy tradition, of the interrelationships between the political and the economic, public and private, state and market, agency and structure, international and national (e.g. Cutler, 1997; Gill and Law, 1993; Palan, 2000; Saurin, 2001: 74–80; Sell, 1999; Strange, 1988). Indeed, as we have seen, the political sphere defines legal forms and rules of economic relations such as private property, the process of commodity exchange and contractual relations between producers and appropriators. Therefore, it plays an essential role in the process of the reproduction of the relations of production by depicting its conditions as constituents of the productive relations themselves (Wood, 1981: 79). The forms of particular juridical and political institutions (e.g. the domestic enforcement mechanisms of IPRs protection, state control of access to biological resources, enclosure of the commons) are constituents of the productive relations as the economic itself (e.g. profiting through IPRs from biological resources) is articulated through them. So, sovereignty rights pertaining to the 'political/public domain' and IPRs pertaining to the 'economic/private domain' are two sides of the same coin.

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NOTES

1 For a discussion of whether or not Locke's labour theory of property can be read as a philosophical defence of IPRs, see Child (1997), Drahos (1996: 48–54), Hughes (1997), Meyer (2000: 162–7), Moore (1997), Ostergard (1999: 159–62). It should be noted that, apart from the Lockean argument, the Hegelian theory of property is also employed in the philosophical justification of IPRs (see Drahos, 1996: 73–91; May, 2000: 21–8).

2 Labour-related issues of appropriation are shown in Marx's theory of alienated labour. Chris Arthur (1985: 63) cites a passage from Marx's *Early Writings*: 'The *externalisation* (*Entäusserung*) of the worker in his product means not only that his labour becomes an object, an *external* existence, but that it exists *outside* him independently of him an alien (*fremd*) to him, and begins to confront him as an autonomous power; that the life which he has bestowed on the object confronts him as hostile and alien'. My point is that the nature-related aspects of appropriation in the case of IPRs are similar to the labour-related aspects of appropriation due to a supposedly external relation between natural things and human-made things (in fact, the former inherently being a component of the latter).

3 The US signed the CBD under the Clinton administration but has not ratified it.

4 Some documents of the 3rd Meeting of the Conference of the Parties to the CBD also find the relationship between IPRs and the implementation of the CBD's objectives 'mutually supportive'. See Decision III/17, and UNEP/CBD/COP/3/23.

5 It must be noted that 'the precautionary approach' is overtly referred to in the Cartagena Protocol on Biosafety to the CBD. The Protocol also establishes specific rules to enforce. However, it is criticised for its inability to control risks due to many legal uncertainties present in the Protocol (see Stoll, 2000; Vogler and McGraw, 2000).

6 It is not my intention here to present the Undertaking as preferable to the CBD in the field of plant genetic resources, but to draw attention to some other concepts of international institutions apart from those concepts of sovereignty and private property. It should, however, be noted that farmers' rights are counterbalanced by plant breeders' rights, and the Resolution 3/91 of the 25th Session of the FAO Conference in 1991 limited the concept of humankind's heritage by endorsing the principle that 'nations have sovereign rights over their plant genetic resources'. For a discussion about the relationships between the Undertaking, CBD and TRIPS, see Blakeney (2002), Leskien and Flitner (1997).

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