

PAUL, WEISS, RIFKIND, WHARTON & GARRISON

AGRICULTURAL DEVELOPMENT AND INTELLECTUAL
PROPERTY PROTECTION FOR PLANT VARIETIES:
CHINA JOINS THE UPOV

LESTER ROSS - LIBIN ZHANG

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This article examines the development of intellectual property rights in China with respect to new plant varieties. Agriculture was listed as the first of China's Four Modernizations, and agricultural reforms launched the reform of China's economy in the 1970's.^{1/} Food security is a continuing state concern.^{2/} Agricultural development nevertheless has since lagged behind the rest of the economy, in part because of the challenges of consolidating reform and shortcomings in incentives and the legal structure.^{3/} While some attention has been given to the influence of property rights with respect to land use rights tenure and the enforceability of contracts,^{4/} virtually no attention has been given to intellectual property rights with respect to agricultural development. We analyze below China's evolving legal regime with respect to one of the building blocks of modern agriculture, the development and regulation of new plant varieties.

Property rights^{5/} had only a tenuous existence and narrow scope in China until the onset of the economic reform era in the late 1970's. In accordance with Marxist

^{1/} See, e.g., Jean C. Oi, "Two Decades of Rural Reform in China: An Overview and Assessment", China Q. No. 159 (1999) 616-628 at 617; William H. Cooper, "Overview", in China's Economic Dilemmas in the 1990s: The Problems of Reform, Modernization, and Interdependence, 102d Cong., 1st Sess., S. Prt. 102-21, 335-39 at 335.

^{2/} Oi at 622-23.

^{3/} Shwu-Eng H. Webb and Francis C. Tuan, "China's Agricultural Reforms: Evaluation and Outlook", in China's Economic Dilemmas in the 1990s, 365-384 at 373 ("Legal system reforms are key to allowing individual profit-maximizing goals can (sic) be orderly pursued within contractual arrangements... Lack of a legal system to protect property rights creates very little incentive to increase investment or to improve productivity in the long run.") For a discussion of the rural legal system, see Lester Ross, The Changing Profile of Dispute Resolution in Rural China: The Case of Zouping County, Shandong, China, 26 Stanford J. Int'l L. 15 (1990).

^{4/} Oi at 618-19, Roy Prosterman, Tim Hanstad and Li Ping, Can China Feed Itself? Scientific American (November 1996) 90-95; cf. James Kai-sing Kung and Shouying Liu, Farmers' Preferences Regarding Ownership and Land Tenure in Post-Mao China: Unexpected Evidence From Eight Counties, China J. No. 38 (1997) 33-64.

^{5/} Property rights are bundles of claims to control, derive income from and transfer resources or property which vary with the disposition of the legal system or less formal institutions to make such resources

principles, China formerly categorized property as "means of production" and "means of livelihood". China completed the reform of the means of production and the establishment of a socialist property ownership system in 1957. Private land ownership and rights relating thereto were thereby abolished. As in the former Soviet Union, China held that all private property rights of the means of production (other than hand tools, etc.) were manifestations of capitalism or more primitive economic systems, so no such private property rights were allowable under socialism. Only state and, to a lesser extent, collective ownership rights with respect to the means of production, were permitted and other rights were severely limited. This process culminated in the disastrous Great Leap Forward (1958-60) when ownership rights over virtually everything, including hand tools and means of livelihood, were abolished for a time.

The absence of well-defined property rights contributed to China's economic and political disarray in the 1960's-70's which, following a change in the leadership of the Communist Party, led to the reform era. China's economic reforms, which originated at the Third Plenum of the Eleventh Central Committee of the Communist Party in November 1978, have been fostered in part by the gradual, albeit uneven, establishment of property rights regimes, including amendment of the Constitution in 1999 to elevate the status of private ownership.^{6/} The establishment of enforceable property rights regimes is a hallmark

or property (i) eligible for ownership and usage; (ii) on an exclusive basis and (iii) alienable or transferable. Andrew G. Walder and Jean C. Oi, "Property Rights in the Chinese Economy: Contours of the Process of Change" (citing Harold Demsetz, "Toward a Theory of Property Rights," in Demsetz, Control and the Firm: The Organization of Economic Activity (1967, I:104-16) in Oi and Wader, eds., Property Rights and Economic Reform in China (1999) 1-24 at 5; cf. Richard Posner, Economic Analysis of Law 30-33 (3rd ed. 1986).

^{6/} Article 6 of the Constitution of the People's Republic of China (as amended by the Second Plenum of the Ninth People's Congress, March 15, 1999).

of the economic reform process in transitional economies like China although there is disagreement over the extent to which the privatization of property rights is an essential concomitant of economic development.^{7/} Analysts generally agree that intellectual property historically received little protection in China.^{8/} Lack of recognition of intellectual property rights has its roots in Chinese political culture but took new form after 1949 after the establishment of the People's Republic of China (the "PRC"). While gradually establishing some elements of intellectual property protection, the creators of such property were often eligible only for honorific rewards rather than royalties or other ownership rights.

Within the broad category of intellectual property rights, the emergence of a property rights regime for new plant varieties was particularly late. The slow development of such a regime is attributable to several factors including: (i) China's historic ambivalence with respect to protection of intellectual property rights and delay in establishing a regime for the protection thereof; (ii) the higher priority attached to copyrights, patents and trademarks which have broader application; (iii) the perceived strategic and cultural significance of staple food and fiber crops which militates against the creation of a property

^{7/} Walder and Oi at 22 ("Property rights in the Chinese economy have moved decisively away from traditional state ownership"). Edward S. Steinfeld has argued, however, that the establishment of a property rights regime without corporate governance and other elements of a well-functioning legal and political system will produce suboptimal outcomes. Steinfeld, *Forging Reform in China: The Fate of State-Owned Industry*. Cambridge: Cambridge University Press, 1998 at 38-44. Walder and Oi and the contributors to their volume by contrast have argued that even "theoretically flawed and suboptimal solutions [with respect to privatization as an ultimate goal] may nonetheless have highly beneficial results" in China's transitional regime where property rights regimes and enforcement are uncertain. Walder and Oi at 24.

^{8/} Xiang Wang, *Chinese Patent Law and Patent Litigation in China*, University of Maryland School of Law Occasional Papers/Reprints Series in Contemporary Asian Studies No. 5-1998 (148) at 7-8 ("IPR received little protection in reality, both before the fall of the Qing empire in 1912 and in the ensuing Republican era, In fact, the protection of patents was almost entirely ignored by the Chinese legal system until China opened its door to the outside world after 1976."); William P. Alford, *To Steal A Book Is An Elegant Offense: Intellectual Property Law in Chinese Civilization* (1995) at 1 ("intellectual property law has never taken hold in China" principally for cultural reasons).

rights regime; (iv) the delayed response to the increase in scientific capability to create new varieties through genetic modifications; and (v) the perception that a strong intellectual property rights regime, particularly in this sector, inequitably enriches developed countries at the expense of developing countries. Even after the initial establishment of such a regime, further delay ensued before foreign plant breeders were extended effective legal protection.

The recent emergence of such a regime is a significant event in China's agriculture and forestry sectors, including genetic engineering of plant varieties, and is also relevant to the development of Chinese intellectual property law and China's participation in international regimes. This article analyzes China's new property rights regime for plant varieties in China, including issues that are as yet unresolved.

I. Regulatory History.

The PRC from its establishment denied patent protection to agricultural inventions. Under Article 8(2) of the Provisional Regulations on the Protection of Invention Rights and Patent Rights (1950) (the "1950 Regulations"), inventors of pharmaceuticals and agricultural and livestock varieties were ruled ineligible for patents and eligible only for honorific inventor's certificates because their inventions infringed on the welfare of the great majority of people and necessitated rapid diffusion. In other words, patent protection and royalty payments were deemed an impediment to the diffusion of inventions, which outweighed the incentive effects of patent protections. The Regulations to Reward Inventions (1963) and Regulations to Reward Improvements in Technology (1963) abolished the 1950 Regulations and replaced patents and inventor's certificates with a system of modest

monetary awards.^{9/} The Regulations to Reward Inventions did not modify the exclusion of pharmaceuticals and agricultural and livestock varieties from protection as inventions, but improvements to plant protection technology, animal husbandry technology and medical practice, among others, were made eligible for monetary awards under Article 3 of the Regulations to Reward Improvements in Technology.

Patent protection was not restored until enactment of the Patent Law in 1984. The Patent Law^{10/} provides in Article 25(4) that plant and animal varieties are not eligible for patent protection, although the techniques for producing such varieties are eligible for patent protection.^{11/} The exclusion of plant varieties from eligibility for patent protection is not unique to China. Many civil law states characteristically excluded plant varieties from their patent regimes for some or all of the following reasons: (i) plant varieties are products of nature and not inventions; (ii) plant varieties are living organisms rather than inanimate matter; (iii) lack of novelty; (iv) lack of invention; (v) lack of industrial applicability or utility; (vi) impossibility of producing a written description of the distinctive features of a

^{9/} Alford, 58-65.

^{10/} Patent Law of the People's Republic of China, March 12, 1984 as amended September 4, 1992.

^{11/} The 1984 version also did not provide patent protection for pharmaceuticals and chemical processes, but China subsequently agreed to allow the patenting of such items, in part due to processes from the United States and China's other trading partner. Xiang Wang at 9-10. Biological products, defined as microbes, cells and other biological matter of animal or human source tissues, liquids, etc., and drugs used in the prevention and cure, therapy and diagnosis of human disease, which are obtained through ordinary or genetic engineering, cell engineering, protein engineering, fermentation engineering or other biological technologies, were subsequently made eligible for protection under State Drug Administration Decree No. 3, Measures on the Approval of New Biological Products (1999). The authors confirmed, on September 6, 1999, with the newly established State Intellectual Property Office that proposed amendments to the Patent Law are not intended to alter the treatment of plant and animal varieties.

plant variety as required of a patent application; and (vii) inability to reproduce or replicate the invention.^{12/}

Even the United States excluded plant varieties from patent protection until the enactment of the Plant Patent Act of 1930, which provided that new, distinguishable plant varieties that are generated by asexual breeding are patentable under a special patent regime.^{13/} The Plant Variety Protection Act of 1970 subsequently created a new system of protection for seed-grown and tuber propagated plant varieties.^{14/} The United States made man-made living organisms, including plant varieties, eligible for ordinary patent protection under the Patent and Trademark Office in a series of court decisions beginning in the 1970's which culminated in two landmark rulings in the 1980's, Diamond v. Chakrabarty and Ex parte Hibberd.^{15/} The Patent & Trademark Office subsequently held that "anything under the sun that is made by man," including "non-naturally occurring non-human multi-cellular living organisms," is eligible for patent protection.^{16/} The Court of Appeals for the Federal Circuit subsequently confirmed that Chakrabarty and Hibberd made seeds and seed-grown

^{12/} Geertrui Van Overwalle, Patent Protection for Plants: A Comparison of American and European Approaches, 39 J. L. & Tech. 143 (1999).

^{13/} 35 U.S.C. §§161-64.

^{14/} 7 U.S.C. §§2321 et seq., which established the Plant Variety Protection Office within the Department of Agriculture and established plant variety protection and extended protection to seed-grown and tuber propagated plants. Both the Plant Patent Act and Plant Variety Protection Act are cited for a Chinese audience in Qiao Dexi, On Protection of Intellectual Property Projects to Plant Varieties, 116 "Collection of Theses on the Protection of Intellectual Property Rights Integrated Circuits and Plant Varieties" (PRC Patent Documentation Publishing House, April 1996).

^{15/} Diamond v. Chakrabarty, 447 U.S. 303 (1980); Ex parte Hibberd, 227 U.S.P.Q. (BNA) 443 (P.T.O. Bd. App. & Int. 1985). The United States had long permitted plant patents for asexual or vegetatively reproduced plant life under the Plant Patent Act of 1930, 46 Stat. 376 (1930).

^{16/} 1077 Official Gaz. Pat. Office 24, 31 (April 21, 1987), cited in David S. Tilford, Saving the Blueprints: The International Legal Regime for Plant Resources, 30 Case W. Res. J. Int'l L. 373, 405 (1998).

plants patentable even though plant varieties are also eligible for protection through plant patents or as plant varieties under other statutes because advances in technology had removed longstanding impediments to patent protection.^{17/} United States patents are presently valid for 20 years from the date of application, but new legislation has ensured a minimum period of protection to a minimum of 17 years from the date of issuance, thereby adding life to a patent if the approval process takes longer than three years.^{18/}

Civil law countries, such as Germany, which did not permit the patenting of plant varieties established separate legal regimes for special protection of plant varieties, which later developed into the international plant varieties protection system known as the International Convention for the Protection of New Varieties of Plants (the "UPOV Convention") in 1961.^{19/} After UPOV was concluded, however, several European states such as Belgium, France, Germany and the Netherlands, modified their own patent laws to allow the patenting of plant varieties that satisfy novelty and other requirements and thus are products of human intervention, rather than nature, and were not protected under a separate plant varieties legal regime.^{20/} The scope for patenting of plant varieties has since been further refined and broadened to the entire European Union. The Enlarged Board of Appeal of the European Patent Office in 1998, interpreting the Convention on the Grant of European

^{17/} Pioneer Hi-Bred International, Inc. v. J.E.M. Ag Supply, Inc., 200 F.3d 1374, 1376-77 (Fed. Cir. 2000); cited in Nigel Jones and David R. Marsh, "E.U., U.S. favor flora inventions," Nat'l L.J., March 27, 2000 at C1, C7.

^{18/} American Inventors Protection Act, 106th Cong., H.R. 1948, incorporated in H.R. 3194.

^{19/} Van Overwalle; for a Chinese perspective, see Qiao Dexi at 116.

^{20/} Van Overwalle. Article 2(1) of the UPOV 1961 Act permitted countries whose national laws so provided to maintain both patent and special protections for plant varieties so long as no botanical genus or species was protected under both regimes.

Patents ("European Patent Convention"), held that the prohibition on the grant of European patents "in respect of ... (b) plant or animal varieties or essentially biological processes for the production of plants or animals"^{21/} did not apply to claims that were not otherwise protected under UPOV or domestic plant varieties protection laws,^{22/} even though the claim may embrace and be embodied in multiple plant varieties. In other words, patent protection is available for claims that are not directed to plant varieties or identify a specific plant variety, but is available if the claim is embodied in multiple plant varieties. Although genetic modification enjoys no special protection, in this regard, the European Patent Office's decision indirectly protects genetic modification if the modification affects multiple plant varieties, even if any such plant variety enjoys plant variety protection.

The WTO Agreement on Trade Related Aspects of Intellectual Property Rights ("TRIPs") (1994), with which China must comply as a condition of its accession to the WTO, also requires that all countries provide intellectual property protection for all inventions in all fields of technology. It permits WTO member states to "provide for the protection of plant varieties either by Patents or by an effective sui generis system or any combination thereof."^{23/} Under its disjunctive language, TRIPs provides for protection of plant varieties under either but not both patent and plant variety regimes. However, the UPOV 1991 Act deleted the long-standing bar to dual patent and plant variety protection,

^{21/} Article 53(b) of the European Patent Convention of October 5, 1973 (as amended December 10, 1998).

^{22/} Decision G 0001/98 (Novartis II/Transgenic plant) of the Enlarged Board of Appeal, European Patent Office, December 20, 1999; discussed in Marsh and Jones at C5-6.

^{23/} TRIPs, Article 27.3(b). TRIPs came into force on January 1, 1995. This subparagraph was expressly made subject to subsequent review four years after the entry into force of the WTO Agreement.

creating a conflict with TRIPs but opening the door further to patent protection of plant varieties.

Paragraph 10 of China's National Medium and Long Term Science and Technology Development Program, approved by the State Council on March 8, 1992, declared that the development of high-yielding, superior and resistant new animal and plant varieties through genetic engineering, as well as hybridization, would be a focus of agricultural science and technology. China's official commitment to the development of new varieties through genetic engineering distinguishes it from many developing countries which have been slower to respond to this new scientific capability, and reflects a stronger official commitment to genetic engineering than sometimes found in advanced industrialized democracies. Nevertheless, the adoption of the Program lagged over a decade behind biotechnology advances in developed countries. China's delay in responding to the biotechnology revolution is understandable given its level of development and competition from other programs. However, an additional impediment to the development of Chinese agriculture was the failure to extend protection to plant varieties, whether through patents or by establishing a sui generis property rights regime specific to plant varieties, as many more developed countries had instituted much earlier.^{24/} The absence of protection meant that breeders were not entitled to compensation for the use of such varieties by others which rendered licensing and assignments moot. Breeders were instead expected to devote

^{24/} European states led in this regard. Following their example and the establishment of an international convention in this regard, as discussed below, the United States in 1970 enacted the Plant Variety Protection Act, Pub. L. No. 91-577, 7 U.S.C. 2321-2582, which extended protection to new varieties of sexually reproduced plants and extended coverage to most valuable commercial agricultural crops. Cf. Daniel G. Scalise and Daniel Nugent, International Intellectual Property Protections for Living Matter: Biotechnology, Multinational Conventions and the Exception for Agriculture, 27 Case W. Res. J. Int'l L. 83, 88, 93 (1995).

themselves to their work without prospect for significant material benefit and without the ability to attract private capital. The largely symbolic awards available under China's planning system for outstanding achievements were no longer providing sufficient motivation given the rising costs of research and development and more lucrative opportunities in market-driven sectors of the economy.

As a result, breeders who engaged in the development of new varieties could not hope to profit except by the sale of their own seeds. Yet, the characteristically sharp distinction between research units and production units greatly impeded the commercialization of scientific and technological innovations. Some officials and research personnel in the Ministry of Agriculture ("MOA") and from the former State Science and Technology Commission (now Ministry of Science and Technology) became aware of plant variety intellectual property rights and began to recognize the deleterious effects on Chinese agriculture caused by the lack of an appropriate property rights regime.

There was slender progress, however, until 1993 when a UPOV-sponsored workshop was held in Beijing. Representatives from MOA, the former Ministry of Forestry, State Science and Technology Commission, the former Patent Office and Agricultural Science Research Institute attended the workshop. Vice Premier Zhu Rongji reportedly took a personal interest in the problem during his inspection of an agricultural research institution in Hunan, after which he instructed the former Patent Office (now part of the State Intellectual Property Office) to commence research on measures to protect new plant varieties. Such measures would encourage innovation by providing incentives to create new varieties and, by providing breeders with a right to compensation for the use of their

varieties, encourage dissemination of their research results.^{25/} Such instructions showed awareness that the lack of an appropriate property rights regime generally impeded the development of agriculture and life sciences while widening the gap with the developed countries.^{26/} The drafting process was impeded, however, by opposition from state-owned seed companies affiliated with the MOA which were the primary beneficiaries of the "free goods" provided by new plant varieties.

With the overall backing of Mr. Zhu, continuing after his elevation to the Premiership, the PRC Regulations on the Protection of New Varieties of Plants (the "Plant Variety Regulations") were promulgated by the State Council on March 20, 1997, effective as of October 1, 1997. The Plant Variety Regulations consist of forty-six articles organized in eight chapters. Their guiding objective is the establishment and protection of property rights in new plant varieties ("Variety Rights") to foster the development of agriculture and forestry by creating a regime for the breeding and utilization of such varieties.^{27/} The dividing line between agriculture and forestry in this regard is generally clear. Non-woody plants are classified as agriculture and woody plants generally are classified as forestry. With respect to fruit trees, however, fleshy fruit-bearing trees are classified as agriculture while nut-bearing trees are classified as forestry.

^{25/} Scalise and Nugent at 86-87.

^{26/} Klaus Bosselmann, Focus: Plants and Politics: The International Legal Regime Concerning Biotechnology and Biodiversity, 7 *Colo. J. Int'l Env'tl. L. & Pol'y* 111, 121-22 (1996) ("Throughout the century there has been a steady movement toward allowing the total ownership of biological products via the medium of intellectual property rights. This movement has been led by developed countries, and especially by the United States and European countries, whose private sectors are heavily involved in the biotechnological industry.").

^{27/} Article 1.

The concept of Variety Rights expressly includes the right of exclusion, *i.e.*, without an authorization from the Variety Rights holder or except as otherwise provided in the Plant Variety Regulations, no unit or individual may for commercial purposes (i) produce or sell any breeding material for which Variety Rights have been awarded or (ii) make repeated use of such breeding material to create new varieties.^{28/} Such a right of exclusion is an integral element of property rights. This right becomes enforceable after a successful preliminary review of an application for Variety Rights.^{29/} Infringers are subject to administrative mediation and civil litigation as well as administrative sanctions.^{30/}

However, no authorization is required and no compensation need be paid if a variety subject to Variety Rights is (i) used for breeding or other scientific research activities or (ii) peasants^{31/} use the breeding material for their own use. Both exceptions are problematic. The first deprives the rights holder of any interest in derivative varieties, particularly if the protected variety's use or other essential characteristics are narrowly defined. The second allows peasants the customary right to retain seed from their own plantings for future replanting, the so-called "farmer's privilege." Although producers of genetically modified seeds have sought to enforce their property rights by prohibiting the commercial sale of seed from a prior crop's plantings, they generally accept the farmer's

^{28/} Article 6.

^{29/} Article 33.

^{30/} Chapter 7.

^{31/} Chinese legislators and officials continue to refer to "peasants [nongmin]" rather than "farmers [nongren]" as the former refer to individual farming smallholders while the latter may include large farmers who arguably should not be entitled to such privilege.

privilege.^{32/} These exceptions would not arise if new plant varieties were eligible for patent protection, which also provides protection for breeding methods and may provide broader protection against infringement.^{33/}

Other shortcomings are comparable to those found under the Patent Law. As under Chapter 6 of the Patent Law, the approval authority has the right to compel a Variety Rights holder to license its new plant variety,^{34/} even to competitors or at below-market prices. As under Articles 57-58 of the Patent Law, the recipient of a compulsory license under such circumstances would be required to pay a reasonable fee for use of the variety and the Variety Rights holder would have the right to appeal an order to issue a compulsory license or the amount of such fee.^{35/} The likelihood of such a compulsory license may be low, but it still exerts a chilling effect on the development and introduction of new plant varieties, especially in the absence of any clearly stated restrictions (such as national emergency) on the exercise of such power.^{36/} A more market-oriented alternative would

^{32/} The Monsanto Company has disavowed any intention to commercialize sterile seed technology popularly known as the "terminator gene" that would prevent any replanting of genetically-modified seeds. Address of Monsanto Chairman Robert B. Shapiro to Greenpeace Business Conference, London, October 6, 1999; "Monsanto Will Not Sell Sterile Seed Technology", BNA International Environment, October 13, 1999, p. 860. Monsanto's decision to do so is attributable in part to the advice of Dr. Gordon Conway, President of the Rockefeller Foundation. David Stipp, "The Voice of Reason in the Global Food Fight", Fortune, February 21, 2000 at 164-65.

^{33/} Van Overwalle.

^{34/} Article 11.

^{35/} Article 11. There is a similar provision in the United States under the Plant Variety Protection Act, 7 U.S.C. §2404, but the conditions for invocation are somewhat narrower and procedural due process protections are likely to be stronger. Specifically, the Secretary of Agriculture may declare a protected variety open to use only upon a finding that a declaration is necessary to ensure an adequate supply of fiber, food or feed in the United States and the owner of the variety is unwilling or unable to supply the public needs for the variety at a price which may reasonably be deemed fair.

^{36/} The draft Seeds Law (copy on file with the authors), introduced in the Standing Committee of the National People's Congress in December 1999, would generally encourage the breeding and development of new varieties (Article 11) and require that the State establish a system for the

provide for government subsidies of socially important but commercially nonviable varieties in a manner comparable to the Orphan Drug Act in the United States.^{37/}

II. Procedures.

The right to apply for Variety Rights in new plant varieties belongs to the work unit unless an individual conducted the breeding outside of the individual's scope of employment and without primarily making use of the work unit's material conditions. The right to apply may also be determined by contract.^{38/} In the event of a conflict between multiple applicants with the right to apply, as is generally the case with respect to other property rights in China, the Variety Rights are awarded to the first applicant in time and, in the event of a tie, to the applicant who first completed the breeding of the new variety.^{39/} The right to apply and the Variety Rights themselves are assignable, but any assignment to a foreign person is subject to the approval of the approval authority, and any assignment by a State-owned unit is subject to the approval of the applicable administrative department-in-

protection of new plant varieties and the lawful interests of rights holders (Article 12). However, Article 10 and Chapter 8 would step backwards by asserting state sovereignty over all seed resources by prohibiting the export of seed resources without government approval, without distinguishing between natural and cultivated seeds. Restrictions on the freedom to export would diminish the value of Variety Rights.

^{37/} 21 U.S. C. §§ 360aa et seq. (1999); originally enacted as Pub. L. 97-414, 96 Stat. 2049 (1983).

^{38/} Article 7.

^{39/} Article 8.

charge.^{40/} The additional approval required for licenses to foreign persons reflects a protectionist bent with respect to the country's botanical genetic endowment.^{41/}

Responsibility for the award of Variety Rights in new plant varieties, which includes both artificially-bred varieties and wilderness varieties which have been developed, is assigned to the agriculture and forestry departments of the State Council which are delegated the power to receive and examine applications for the award of Variety Rights.^{42/}

The MOA in 1997 established the Office for the Protection of New Varieties of Plants (the "MOA Office"), housed within MOA's headquarters, to handle the examination and approval of applications for Variety Rights for new agricultural varieties. The State Forestry Administration ("SFA"), now an independent agency under the State Council, handles its responsibility through its own Office for the Protection of New Varieties of Plants. The varieties must meet the tests of novelty, distinctiveness, consistency and stability and be properly named in order for Variety Rights to be awarded. More specifically, the variety must belong to a plant genus or species that is included in the State plant varieties catalogue issued by the approval authorities.^{43/} Novelty means that the variety must have been (i) sold prior to the date of application; or (ii) with the approval of the breeder, sold within the PRC more than one year prior to the date of application; or (iii) sold outside the PRC more than

^{40/} Article 9.

^{41/} See, e.g., the comments of Xu Zaifu, director of the Xishuangbanna Tropical Botanical Garden under the Chinese Academy of Sciences: "Since mankind is still unable to create new genes, the more existing genes a country preserves, the greater advantage it may enjoy in global competition during the next century." Xu decried the export of plants like soybeans, kiwis and some native medicinal herbs with major actual or potential economic value. See "Plant Protection Urgently Needed." China Daily, June 10, 1999, p. 9.

^{42/} Article 3.

^{43/} Article 13.

four years (six years for vines, forest trees, fruit trees and ornamental trees) prior to the date of application.^{44/} Distinctiveness refers to the differences that distinguish this variety from all other varieties prior to the date of application.^{45/} Uniformity refers to the variety's retention of its relevant characteristics or specific properties after reproduction.^{46/} Stability refers to the variety's retention of such characteristics or properties after repeated reproduction or a specified reproduction period.^{47/} Further, the name of the variety must be distinctive, and it must not consist entirely of numerals, be contrary to social morality, and not be misleading with respect to its characteristics, properties or the identity of its breeder.^{48/}

Foreign persons or entities may apply for Variety Rights, but such applications are to be handled only in accordance with bilateral agreements, international agreements to which both China and the applicant's country have acceded, or the Variety Regulations based on the principle of reciprocity.^{49/} In the absence of any of these three structures, a foreign person or entity has no right to apply for protection in China. An applicant who first files overseas may be entitled to priority based on a bilateral agreement or international treaty to which both China and the applicant's country have acceded if the application is filed within twelve months of the overseas application.^{50/} As discussed below,

^{44/} Article 14.

^{45/} Article 15.

^{46/} Article 16.

^{47/} Article 17.

^{48/} Article 18.

^{49/} Article 20.

^{50/} Article 23.

however, China had not yet acceded to an international treaty governing plant variety rights when the Variety Rights Regulations entered into force on October 1, 1997.

All applications for Variety Rights must be submitted in Chinese and in accordance with the prescribed forms, including written application, description and photographs of the variety^{51/} and claim for priority, if any.^{52/} The approval authority is required to complete its preliminary examination within six months after acceptance of the application, and applicants then have three months to raise objections or make corrections in the event of disapproval.^{53/} If the preliminary examination is positive, the applicant then pays an examination fee and the approval authority undertakes a substantive examination.^{54/} Variety Rights certificates are awarded after successful substantive examinations.^{55/} An unsuccessful applicant may appeal the rejection to the New Plant Varieties Review Committee^{56/} within three months of the rejection and, if still dissatisfied, to the people's court within fifteen days after rejection by the Review Committee.^{57/} No such appeals have been filed as of mid-October 1999 but there is potential for litigation, as in other areas of intellectual property law.^{58/} Further, there is as of yet no judicial guidance as to jurisdictional

^{51/} Article 21.

^{52/} Article 23.

^{53/} Article 28.

^{54/} Articles 29-30.

^{55/} Article 31.

^{56/} Officials of MOA and SFA informed us that MOA and SFA are respectively in the process of establishing such New Plant Varieties Review Committees.

^{57/} Article 32.

^{58/} Interview with Mr. Chen Ruming and Dr. Cui Yehan of the MOA Office on October 25, 1999.

and other issues governing proceedings for handling disputes over Variety Rights but an MOA official has noted the need for such guidance.^{59/} The production, sale and diffusion of new plant varieties, i.e., their commercialization, must conform to the State's seed regulations which in many instances include provincial approval requirements.^{60/} Variety Rights are awarded for a term of fifteen years (twenty years for vines, forest trees, fruit trees and ornamental trees) from the date of issuance of the Right.^{61/} This contrasts with the twenty-year term for patents on inventions under Article 45 of the Patent Law. Annual fees must be paid during the term to maintain the Variety Rights and further examination and testing may be required by the approval authority during the term.^{62/} Variety Rights may be voluntarily forfeited, or forfeited by failure to pay the required annual fee or failure to submit breeding material during the term as required by the approval authority, or voided if the variety is determined to no longer retain the characteristics and specific properties upon which the Variety Right was granted.^{63/}

III. Union for the Protection of New Varieties of Plants (UPOV).

The international treaty applicable to Article 20 of the Variety Regulations is the International Convention for the Protection of New Varieties of Plants (the "UPOV Convention"). UPOV emerged out of recognition of the need for protection of biological

^{59/} Interview with Mr. Chen Ruming, Director of the MOA Office, on April 15, 1999.

^{60/} Article 5.

^{61/} Article 34.

^{62/} Article 35. Annual fees also must be paid to maintain patents under Article 46 of the Patent Law.

^{63/} Article 36.

innovations, including plant varieties, which had nevertheless not risen to the level of technological advance required of patent protection, therefore necessitating a separate regime.^{64/} Protection under UPOV attaches to the whole plant, however, rather than its constituted chemicals or genes.^{65/} The UPOV Convention was adopted on December 2, 1961 and subsequently revised on November 10, 1972, October 23, 1978 and March 19, 1991. The UPOV 1961 Act became effective on August 10, 1968. Although the UPOV 1991 Act is now in effect, accession to UPOV Acts adopted after a state has become a member is voluntary. Most member states are parties only to the UPOV 1978 Act, and two (Belgium and Spain) are parties only to the UPOV 1961/1972 Act. UPOV membership has expanded beyond its original core of European states and now includes most major agricultural exporters and OECD countries. In all, there were forty-four members of UPOV as of December 20, 1999 [See Appendix I]. The states that are parties to the UPOV Convention constitute the Union for the Protection of New Varieties of Plants ("UPOV"), an intergovernmental organization based in Geneva. UPOV operates in close coordination with the World Intellectual Property Organization ("WIPO") whose Director General is concurrently Secretary General of UPOV. WIPO provides administrative and financial services to UPOV.

As discussed above, China began to recognize the need to protect plant variety rights on the 1990's. In order to extend the protective scope under the Plant Variety Regulations to foreign applicants from all UPOV-member states and thereby attract more advanced agricultural technology, the Fourth Meeting of the Standing Committee of the

^{64/} Bosselmann at 122-23; *cf.* Scalise & Nugent at 109.

^{65/} Bosselmann at 124.

Ninth National People's Congress approved China's accession to the UPOV 1978 Act on August 29, 1998. On March 23, 1999, China deposited its instrument of accession with the UPOV, including a declaration of nonapplicability to the Hong Kong Special Administrative Region, effective from April 23, 1999 in accordance with the UPOV 1978 Act.^{66/} Applications in Hong Kong are now treated as domestic applications.^{67/} Upon the accession of the PRC to the UPOV 1978 Act, foreign applicants from jurisdictions which are member states of the UPOV may apply for variety rights in China. China has no present intention to accede to the UPOV 1991 Act.

The initial list of protected varieties under the Plant Variety Regulations totals eighteen genera and species, including rice, corn, Chinese cabbage and potato.^{68/} The eighteen genera or species subject to protection satisfies the requirements of Article 4(3)(b)(ii) of the UPOV 1978 Act. However, China is obligated to increase the list to at least 24 genera or species under Article 4(3)(b)(iii). China anticipated no difficulty meeting the requirement to increase the number of eligible genera and species under Article 4(3)(b)(iii),

^{66/} Article 33(2) provides that accession takes effect thirty days after deposit of the instrument of accession. Article 36(1) allows member states to except parts of their territory from application of the UPOV 1978 Act when acceding to the UPOV Convention.

^{67/} On the questionable application of certain international law regimes to Hong Kong, see Benjamin L. Liebman, *Autonomy Through Separation?: Environmental Law and the Basic Law of Hong Kong*, 39 *Harvard Int'l L. J.* 231 (1998).

^{68/} The genera and species on the list are as follows: *Oryza sativa* L.[rice], *Zea mays* L.[corn], *Brassica campestris* L. ssp. *pekinensis* (Lour.) Olsson [Chinese cabbage], *Solanum tuberosum* L.[potato], *Cymbidium goeringii* Rchb. f [cymbidium orchid], *Chrysanthemum* L.[chrysanthemum], *Dianthus* L.[carnation], *Gladiolus* L.[gladiola], *Medicago sativa* L.[alfalfa], *Poa pratensis* L.[Kentucky bluegrass], *Populus tomentosa* Carr.[hybrid white poplar], *Paulownia sieb.* Et Zucc.[pawlownia], *Cunninghamia lanceolata* Hook [Chinese fir], *Magnolia* L.[magnolia], *Paeonia suffruticosa* Andr.[tree peony], *Prunus mume* (Sieb.) Seib. Et Zucc.[Japanese apricot], *Rosa* L.[rose] and *Camellia* L.[camellia or tea oil] See Li Xiangnan, *China Joins UPOV*, [Keji Ribao \[Science and Technology Daily\]](#), March 27, 1997. Each member state must submit its list of genera and species which it undertakes to protect when submitting its application for accession under Article 35(1) of the UPOV 1978 Act.

and is preparing to issue a second list of nine genera or species in 2000, including soybeans and wheat, with additional varieties in the pipeline.^{69/} The MOA Office officials acknowledged that they are under pressure from within China to increase the number of varieties eligible for protection, but also reported that they are hampered by staff shortages and start-up difficulties.^{70/}

At present, foreign applications for Variety Rights are limited to the varieties on the lists of genera and species, which includes several plants such as Pawlownia and *Cunninghamia lanceolata* that are grown principally in China and are unlikely to attract widespread interest from foreign plant breeders. Notably excluded are cotton varieties. As noted above, however, the list of eligible varieties is likely to continue to be expanded.

The Plant Variety Regulations and the UPOV 1978 Act are generally consistent. However, there is some variation with respect to the length of the period of protection. The period is fifteen years for most plants and twenty years for vines and trees under the Plant Variety Regulations compared to the twenty-year period for utility patents under the Patent Law. By contrast, the minimum period for plants is fifteen years and eighteen years for trees under the UPOV 1978 Act, which permits member states to adopt longer periods of protection. The Plant Variety Regulations therefore provide the minimum period of protection for most new plant varieties permissible under the UPOV 1978 Act, but

^{69/} Interview with Chen and Cui. The additional varieties are *Triticum aestivum* L. [wheat], *Glycine max* (L.) Merrill [soybeans], *Brassica napus* L. [rape], *Arachis hypogaea* L. [groundnut or peanut], *Lycopersicon esculentum* Mill. [tomato], *Cucumis sativus* L. [cucumber], *capsicum* L. [pepper], *Pyrus* L. [pear] and *Rumex* L. [garden sorrel]. The new list is expected to be published in Issue No. 3 of the Gazette on the Protection of New Plant Species (May 2000).

^{70/} Interview with Chen and Cui.

longer protection for Variety Rights for vines and trees than required under the UPOV 1978 Act.

The compulsory license of a plant variety under the Plant Variety Regulations^{71/} is consistent with the UPOV 1978 Act which permits restrictions on the exercise by the breeder or his successor in title of the exclusive right for reasons of public interest, provided that every effort is made to ensure the payment of equitable remuneration.^{72/} However, Article 11 of the Plant Variety Regulations does not limit the scope of the examination and approval authority's discretion in this regard, even by conditioning the exercise of such discretion to the public interest, and is therefore potentially chilling.

The right of exclusivity under Article 6 of the Plant Variety Regulations is partially inconsistent with the UPOV 1978 Act. Article 6 prohibits the production or sale of breeding material for which Variety Rights have been awarded and the repeated use of such breeding material to create new varieties. Exceptions are provided for breeding or other scientific research activities and for peasants making use of the breeding material for their own use. Article 5(1) of the UPOV 1978 Act requires prior authorization from the breeder (or the breeder's successor-in-title) for the (i) production for purposes of commercial marketing, (ii) offering for sale and (iii) marketing of the reproductive or vegetative propagating material of the protected variety. Authorization is not required under Article 5(3) for utilization of the protected variety as an initial source of variation for the purpose of creating other varieties or for the marketing thereof. Authorization is required, however,

^{71/} Article 8.

^{72/} Article 9.

when repeated use of the protected variety is necessary for the commercial production of another variety. These provisions are comparable to those of Article 6 of the Plant Variety Regulations. The UPOV 1978 Act does not, however, provide an exception for self-use by farmers.

The conditions specified in the Plant Variety Regulations for protection of a plant variety are consistent with the conditions specified in Article 6(1) of the UPOV 1978 Act, as provided below:

(i) "clearly distinguishable by one or more important characteristics from any other variety whose existence is a matter of common knowledge at the time when protection is applied for;"

(ii) no prior sales or marketing within the state more than one year prior to the date of application, or four years prior to the date of application of any other member state (six years for vines, forest trees, fruit trees and ornamental trees);

(iii) sufficient uniformity with respect to sexual reproduction or vegetative propagation;

(iv) stability in its essential characteristics; and

(v) a proper denomination.

The forfeiture and voiding provisions of Variety Rights under the Plant Variety Regulations parallel those of Article 10 of the UPOV 1978 Act.

China's accession to the UPOV 1978 Act rather than to the UPOV 1991 Act (to which thirteen of the forty-four UPOV members have subscribed) reflects an unwillingness at present to assume certain more demanding obligations. The UPOV 1978 Act limits the scope of protection to certain listed plant genera and varieties. By contrast,

Article 3(2) of the UPOV 1991 Act requires that new members commit to provide protection to all plant genera and species within ten years after accession, which would most notably extend protection to cotton and wheat varieties.

The UPOV 1991 Act also goes beyond the Plant Variety Regulations and the UPOV 1978 Act with respect to the scope of breeder's rights. The UPOV 1991 Act omits the prohibition on dual patent and plant variety protection for plant varieties that had been carried forward from Article 2(1) of the UPOV 1961 Act to Article 2(1) of the 1978 Act, and is mirrored in the prohibition in China's Patent Law on the patenting of plant varieties. Under Article 14(1), the UPOV 1991 Act extends the range of acts requiring the breeder's authorization to conditioning for the purposes of propagation, exporting, importing and stocking for any protected purpose. Further, although occasional reproduction does not require the breeder's authorization, the breeder's rights are extended under Article 14(1) to variations which are essentially derived from the protected variety and varieties which are not clearly distinguishable from the protected variety. In other words, the UPOV 1991 Act, in contrast to the Plant Variety Regulations and UPOV 1978 Act, extends the breeder's right downstream to derived and not clearly distinguishable varieties. However, Article 15(1)(i) of the UPOV 1991 Act, like the Plant Variety Regulations, but in contrast to the UPOV 1978 Act, makes an exception for private, non-commercial acts. Article 15(2) goes even further by providing an optional exception for propagation by farmers of the product of their own harvest or their own holdings. This optional exception is comparable to Article 10(2) of the Plant Variety Regulations.^{73/} However, the Diplomatic Conference for the Resolution of

^{73/} The exception and farmer's privilege in general will remain feasible with genetically modified seeds to the extent that all biotechnology companies disavow any intention to commercialize sterile seed technology.

UPOV Act 1991 recommended that the so-called "farmer's privilege" not be extended to sectors where it is not a common practice in the territory of the contracting party.

IV. Biosafety.

Advances in biotechnology including genetic modification have accelerated human capacity to create new plant varieties as well as other genetically modified organisms. Under Article 19, paragraphs 3-4 of the United Nations Convention on Biological Diversity (1992) (the "Convention on Biodiversity"), efforts were initiated to adopt a Protocol on Biosafety at the Second Meeting of the Conference of the Parties ("COP") to the Convention on Biological Diversity in Jakarta, November 6-17, 1995. Adopted on November 17, Decision II/5; Consideration of the Need for and Modalities of A Protocol for the Safe Transfer, Handling and Use of Living Modified Organisms, authorized establishment of the Open-Ended Ad Hoc Working Group on Biosafety (the "Ad Hoc Working Group") to develop a biosafety protocol focusing on the transboundary movement of living modified organisms ("LMOs") resulting from modern biotechnology that might have adverse impacts on the conservation and sustainable use of biological diversity. China has participated as a full member, while the United States, which is not a party to the Convention on Biodiversity, and two other countries have participated as observers.

The initial meeting of the First Extraordinary Meeting of the COP to Finalize and Adopt a Protocol on Biosafety was held in Cartagena de Indies, Colombia on February 22-23, 1999, and resumed in Montreal on January 24, 2000 resulting in agreement on the

Cartagena Protocol on Biosafety to the Convention on Biological Diversity (the "Protocol") on February 23, 2000.^{74/}

The objective of the Protocol, taking into account the precautionary approach, is to contribute to ensuring an adequate level of protection in the field of the safe transfer, handling and use of LMOs resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, also taking into account risks to human health, and specifically focusing on transboundary movements.^{75/}

The Protocol establishes an advanced informed agreement procedure with respect to the first intentional transboundary movement of LMOs for intentional introduction into the environment of the importing Party, but does not regulate products derived from LMOs.^{76/}

With its large population and per capita scarcities of land, water and other resources, China generally supports the commercialization of biotechnology in agriculture.^{77/} China has generally sided with the Group of 77 less developed countries in favor of regulating the transboundary movement of LMOs, including monitoring, liability provisions, etc.^{78/} More like the United States than the European Union, however, China has moved more cautiously with respect to the regulation of products derived from LMOs, a provision which was omitted from the Biosafety Protocol. By late 1999, however, some experts and legislators,

^{74/} Note, "The Negotiation of the Cartagena Protocol on Biosafety," 6 *Environmental Lawyer* 578 (2000).

^{75/} Article 1.

^{76/} Nick Nuttall, China Sows Seeds of GM Group Expansion, *Sunday Times* (February 29, 2000) (citing Prof. Chen Zhangliang of Beijing University); Karby Leggett and Ian Johnson, China Bets Farm on Promise (and Glory) of Genetic Engineering, *Wall Street Journal* (March 30, 2000) at A17.

^{77/} Yu Hui and Xu Han, Jiyin Gongcheng yu Guoji Shengwu Anquan Guifan [Genetic Engineering and International Biosafety Regulations], *Chinese Yearbook of International Law* 1997. Beijing: Law press, 1999 at 104-05.

including in particular Member of the Standing Committee of the National People's Congress Wang Tao, favored legislative action to regulate the biosafety of foodstuffs made from LMOs.^{79/} China has already promulgated a set of domestic regulations with respect to biosafety: the Safety Administration Regulation on Genetic Engineering (former State Science and Technology Commission 1993). Now under the administrative authority of the Ministry of Science and Technology, these genetic engineering regulations are intended to promote research and development in biotechnology under safe conditions while protecting public health, preventing pollution and maintaining ecological balance. Neither the conservation of biodiversity nor the regulation of derived products are within the scope of these regulations. New regulations covering such matters are in preparation at the Ministry of Science and Technology. Meanwhile, Article 14 of the draft Seed Law would require that the agriculture and forestry departments establish safety assessment programs for the breeding, testing and diffusion of bioengineered plant varieties.

V. Conclusion.

China recognizes the benefits of advised agricultural technology but has moved more slowly than its needs would dictate to define and protect intellectual property rights to plant varieties. Accession to the UPOV Convention signified that China accepted the legitimacy of the established international regime with respect to plant variety rights, but only with respect to the older UPOV 1978 Act. The Plant Variety Regulations are generally

^{78/} Article 7 par. 1. The procedure is govern by Articles 8-10 and 12.

^{79/} "Zhongguo Lifa Renyuan Yaoqiu Zhongshi Dui Zhuan Jiyin Shipin Guanli [Chinese Legislator Demand Attention to the Regulation of Genetically Modified Foodstuffs]," Xin Hua She [New China New Agency] (November, 1, 1990).

in line with such older version of the international regime on the protection of new plant varieties. Moreover, procedures for resolving disputes with respect to Variety Rights have not yet been established, even though the time to do so is before disputes arise, not afterwards. Enforcement of decisions with respect to intellectual property rights is also of general concern.^{80/}

The speed at which additional genera and species are listed, whether China will ultimately accede to the UPOV 1991 Act, and if so, whether it will accede to any of the optional provisions therein, remain uncertain. Furthermore, China has no plans to make plant varieties and other living organisms eligible for the stronger protections afforded by the Patent Law and now permitted by the UPOV 1991 Act, even though the bar to patenting plant varieties is eroding even in civil law countries. While a sui generis system of protection for plant varieties is consistent with TRIPs and has been characteristic of civil law countries, its protections are less extensive than for patents which may impede the development of biotechnology in China with respect to plants. Unlike patents, foreign persons and entities are also prohibited from applying for Variety Rights outside the narrow range of crops eligible for Variety Rights protection. This reduces the incentives for foreign persons and entities to breed other plant varieties or license new plant varieties to China. Despite these uncertainties and shortcomings, the promulgation of the Plant Variety Regulations and accession to the UPOV 1978 Act mark important milestones in China's growing commitment to define and protect intellectual property rights and should promote the development of agriculture and forestry, albeit at a slower pace than permitted under international law and practiced in many advanced industrialized countries.

^{80/} Interview with Chen, *supra*, note [], at 15.

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The authors are attorneys in the Beijing office of Paul, Weiss, Rifkind, Wharton & Garrison. The views expressed herein do not necessarily reflect those of the law firm with which they are associated.