

The Reformation of Legal Regime for Intellectual Property Protection of Plant Varieties in Thailand

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Declaration

I, Pawarit Lertdhamtewe, confirm that the work presented in this thesis is all my own work. Where information has been derived from the other sources, I confirm that this has been indicated in the thesis.

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Abstract

Thailand's plant protection regime presents a unique *sui generis* plant protection system, which is used as a model by several developing nations. The current Thai Plant Variety Protection (PVP) law has attracted some criticism, and whether or not farmers and breeders actually benefit from the system is in doubt. The questions this situation raises are: has Thailand adopted clear, coherent, and workable rules for plant variety protection in response to the needs of the nation? Is the introduction of intellectual property rights (IPRs) in agriculture via a PVP regime a desirable and contributory factor to the development of Thailand? More precisely, how might such an IPR regime be made compatible with Thailand's development needs, bearing in mind the obligations the country has accepted through its membership of the WTO and adherence to the TRIPS Agreement? This thesis attempts to address these questions.

By highlighting the salient features of the Thai plant protection regime, this thesis addresses the major concerns of the rights of farmers, local communities, and plant breeders. It is suggested that the protection of plant varieties is vital to Thailand, considering the fact that agriculture represents a fundamental economic activity and the livelihood of a large section of the total population; therefore, introducing IPRs in agriculture via the PVP regime is critical to the development of agriculture in Thailand. Thus, a new developmental approach to the IP protection of plant varieties is desirable to ensure the unique needs of the nation,

the validity of national legislation, and the long-term promotion of agricultural development and sustainability in Thailand.

Thailand can provide a more coherent framework for plant variety protection by carefully calibrating the PVP provisions and establishing a coherent set of rules in the form of a new legislative framework. It is concluded that a number of possible elements are available from a variety of instruments that exist in international law, notably the TRIPS Agreement, the UPOV Convention, the CBD, and the ITPGRFA. Lastly, the proposed regulatory reforms suggest that Thailand's PVP provisions should be amended in three major areas, including (1) provisions for the rights of farmers and local societies, (2) legal protection for plant breeders' rights, and (3) institutional apparatus governing plant protection issues in Thailand.

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Abbreviations

I. GATT/WTO AGREEMENTS

Short title	Full citation
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
TRIPS Agreement	Agreement on Trade-Related Aspects of Intellectual Property Rights
WTO Agreement	Marrakesh Agreement Establishing the World Trade Organization

II. TREATIES

Short title	Full citation
Berne Convention	Berne Convention for the Protection of Literary and Artistic Works
CBD	United Nations Convention on Biological Diversity
EPC	European Patent Convention

Short title	Full citation
ICESCR	International Covenant on Economic, Social and Cultural Rights
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
Paris Convention	Paris Convention for the Protection of Industrial Property
Rome Convention	International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations
UPOV Convention	International Convention for the Protection of New Varieties of plants
Vienna Convention	Vienna Convention on the Law of Treaties
Washington Treaty	Treaty on Intellectual Property in Respect of Integrated Circuits

III. OTHER INTERNATIONAL INSTRUMENTS

Short title	Full citation
Canada–Patent Protection	Canada–Patent Protection of Pharmaceutical Products
Doha Declaration	Declaration on the TRIPS Agreement and Public Health
International Undertaking	International Undertaking for Plant Genetic Resources
Millennium Declaration	United Nations Millennium Declaration
Rio Declaration	Rio Declaration on Environment and Development
Rome Declaration	Rome Declaration on World Food Security
Stockholm Declaration	Stockholm Declaration on the Human Environment

Short title	Full citation
UDHR	Universal Declaration of Human Rights
UDRD	Declaration on the Right to Development

IV. NATIONAL LEGISLATIONS

Short title	Full citation
PPA	Plant Patent Act 1930 of the United States
PPVFR Act	Protection of Plant Varieties and Farmers' Rights Act 2001 of India
PVPA	US Plant Variety Protection Act 1970
PVP Act	Plant Variety Protection Act B.E.2542 (AD1999) of Thailand
PVA	Plant Varieties Act 1997 of the United Kingdom

V. OTHER ABBREVIATIONS

Short title	Full citation
ASEAN	Association of Southeast Asian Nations
ASSINSEL	International Association of Plant Breeders for the Protection of Plant Varieties
BIOTECH	National Centre for Genetic Engineering and Biotechnology of Thailand
DIP	Department of Intellectual Property of Thailand
DOA	Department of Agriculture of Thailand

Short title	Full citation
DUS	Distinctness, Uniformity and Stability Requirements
EC	European Community
EDVs	Essentially Derived Varieties
FAO	Food and Agriculture Organization
FIS	International Seed Trade Federation
FTA	Free Trade Agreement
FTAA	Free Trade Areas of Americas
FTAs	Free Trade Agreements
GDP	Gross Domestic Product
GNP	Gross Nation Product
GRAIN	Genetic Resources Action International
GSP	Generalized System of Preferences
ICTSD	International Centre for Trade and Sustainable Development
IPRs	Intellectual Property Rights
ISF	International Seed Federation
LDCs	Least-Developed Countries
MFN	Most Favoured Nations
MDGs	Millennium Development Goals
MOAC	Ministry of Agriculture and Cooperatives of Thailand
MOC	Ministry of Commerce of Thailand
NAFTA	North American Free Trade Agreement
NGOs	Non-Governmental Organizations
NIA	National Innovation Agency of Thailand
NICs	New Industrializing Countries
OECD	Organization for Economic Co-operation and Development
PFC	Priority Foreign Country

Short title	Full citation
PVP	Plant Variety Protection
PVP Commission	Plant Variety Protection Commission of Thailand
PVP Division	Plant Variety Protection Division of Thailand
PWC	Priority Watch Country
QMIPRI	Queen Mary Intellectual Property Research Institute
R&D	Research and Development
S&D	Special and Differential treatment
THB	The Thai Bath
TNCs	Transnational Corporations
UN	The United Nations
UNCED	United Nations Conference on Environment and Development
UNCHE	United Nations Conference on the Human Environment
UNDP	United Nations Development Programme
UN-OHRLLS	United Nations Office of the High Representative for the Least Developed Countries
UPOV	International Union for the Protection of New Varieties of plants
UR	The Uruguay Round
US	The United States of America
USD	United States Dollar
USTR	The United State Trade Representative
WCED	World Commission on Environment and Development
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

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Chapter 1

Introduction

1.1 BACKGROUND TO THE RESEARCH

When Thailand ratified the World Trade Organization (WTO) in 1994, it was required to adopt a package of trade obligations arising from an agreement signed in 1994 by various nations to establish and create a membership of the WTO.¹ As part of the WTO's objective to promote trade,² a minimum standard for the protection of intellectual property rights (IPRs) was introduced into a multilateral trading system under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement)³ as a means to reduce the barriers to international trade.⁴

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1. *Marrakesh Agreement Establishing the World Trade Organization*, open for signature 15 April 1994, 1869 UNTS 3 (entered into force 1 January 1995) (WTO Agreement).
 2. See Preamble to the WTO Agreement, *Ibid.*
 3. *Agreement on Trade-Related Aspects of Intellectual Property Rights in Marrakesh Agreement Establishing the World Trade Organization*, open for signature 15 April 1994, 1869 UNTS 229 (entered into force 1 January 1995) annex 1C, (TRIPS Agreement).
 4. In the relevant part of the preamble, it mentions “*desiring*” to reduce distortions and impediments to international trade, taking into account the need to promote the effective and adequate protection of intellectual property rights, and ensuring that measures and procedures to enforce intellectual property rights do not themselves become barriers to legitimate trade,” *Ibid.*

The adoption of the TRIPS Agreement, as part of the trade obligations, raised important issues that were critical to the development of Thailand. Specifically, the introduction of IPRs in agriculture as a means to protect a variety of plants, as stipulated in Article 27.3(b) of the TRIPS Agreement,⁵ was extremely significant to Thailand's agricultural development, enhancement of food security, and promotion of sustainable agricultural practices.⁶ Article 27.3(b) of the TRIPS Agreement offers each member a choice of regimes by deviating from the norm of harmonising IPRs by stating that '[m]embers shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination [thereof]'.⁷ Without setting any substantive standards of protection, Article 27.3(b) of the TRIPS Agreement narrows members' choice of regime to one of three systems: (1) a patents system, (2) an effective *sui generis* system, or (3) a combination of both a patents system and a *sui generis* system to protect the plant varieties in their jurisdiction.⁸ The wording of this article specifically creates a flexible standard of protection to respond to individual members' socio-economic priorities.⁹

Thailand passed the *Plant Variety Protection Act B.E.2542 (AD1999)* (PVP Act of Thailand) with a view to fulfilling its TRIPS obligations.¹⁰ This Act represents a *sui generis* system of protection for plant varieties, which is

5. Ibid, art 27.3(b).

6. See, Tanit Changtavorn, 'Law on Plant Variety Protection in Thailand' in the Thai Bar Association (ed), *Textbook on Intellectual Property Law in Thailand* (Bangkok, the Thai Bar Association, 2011) 290, 294 (in Thai); and Jade Donavanik, *The Implications of Compliance with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) For Thailand's Development: Focusing on Plant Protection* (JSM Thesis, Stanford University, 1997) at 4-7 (arguing that the author believe that the issue of plant protection would greatly benefit Thailand).

7. The TRIPS Agreement, above n 3, art 27.3(b).

8. See, Srividhya Ragavan and Jamie Mayer, 'Has India Addressed Its Farmers' Woes? A Story of Plant Protection Issues' (2007) 20 *Georgetown International Environmental Law Review*, 97, 100; see also, (stating that TRIPS implies effective protection of all plant varieties).

9. See Claudio Chiarolla, 'Commodifying Agricultural Biodiversity and Development Relate-Issues' (2009) 54(1) *Journal of World Intellectual Property*, 25, at 28; Doris Estelle Long, 'The Impact of Foreign Investment on Indigenous Culture: An Intellectual Property Perspective' (1998) 23 *North Carolina Journal of International Law and Commercial Regulation*, 229, 263-64; see also Srividhya Ragavan, 'To Sow or Not to Sow: Dilemmas in Creating New Rights in Food' in Jay Kesan (ed), *Agricultural Biotechnology and Intellectual Property: Seeds of Change* (Oxfordshire: Cromwell Press, 2007) 320, 326.

10. *The Plant Variety Protection Act B.E.2542* (Thailand) (PVP Act of Thailand).

different from the *sui generis* model available under the *International Convention for the Protection of New Varieties of plants* (UPOV Convention).¹¹ Like other developing member countries, Thailand construed the term ‘*sui generis* system’ in TRIPS Article 27.3(b) as allowing it some discretion to determine the type and design of plant protection regime it adopted.¹² In implementing the PVP Act, Thailand took advantage of the flexibility of Article 27.3(b) to establish a ‘self-serving’ *sui generis* regime that took a balanced approach to plant protection.¹³ Considering the country’s huge farming population,¹⁴ the central tenet of the Thai PVP Act specifically addressed Thailand’s major concern to protect local farming communities; at the same time, it promoted the breeding of innovative plants by establishing intellectual property protection.¹⁵ Thus, the Thai PVP Act divided plant varieties into two main protectable categories: (1) new plant varieties, and (2) existing varieties (local domestic plants, general domestic plants, and wild plant varieties) as a means to promote agricultural development.¹⁶

As a result of fulfilling its TRIPS obligations, the introduction of Thailand’s PVP Act was noted by the rest of the world.¹⁷ Firstly, the Act

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11. *International Convention for the Protection of New Varieties of plants*, 33 UST 2703, 815 UNTS 109 (1961); revised by 33 UST 2703 (1978); revised by 815 UNTS 89 (1991), (UPOV Convention).
 12. Genetic Resources Action International, ‘For a Full Review of TRIPS 27.3(b): An Update on Where Developing Countries Stand with the Push to Patent Life at WTO’ (2000) (indicating that as of March 2000, twenty-one out of forty-seven developing member countries of the WTO, including Thailand, had introduced a *sui generis* system of plant variety protection).
 13. The PVP Act of Thailand, above n 10.
 14. The government of Thailand estimated that more than one-third of the 60 million Thai people (21,778,677) were farmers in 2007, as reported by the Centre for Agricultural Information, Report on Agricultural Economics, 2006-7 (Bangkok, Ministry of Agriculture and Cooperatives, Government of Thailand, 2008).
 15. The PVP Act of Thailand, above n 10.
 16. Ibid.
 17. A large body of literature addresses the implementation of the PVP Act in Thailand including Changtavorn, above n 6, 290; Donavanik, above n 6, 24; Pawarit Lertdhamtewe, ‘Thailand’s plant protection regime: a case study in implementing TRIPS’ (2012) 7(3) *Journal of Intellectual Property Law and Practice*, 186-193; Adam Masarek, ‘Treetop View of the Cathedral: Plant Variety Protection in South and Southeast Asia Least Developed Countries’ (2010) 24 *Emory International Law Review*, 433; Daniel Robinson, ‘Exploring Components and Elements of Sui Generis System for Plant Variety Protection and Traditional Knowledge in Asia’ (ICTSD Programme on IPRs and Sustainable Development, 2007) 22; Rajeswari Kanniah, ‘Plant Variety Protection in Indonesia, Malaysia, the Philippines and Thailand’ (2005) 8 *Journal of World Intellectual Property*, 283, and also, Jakkrit Kuanpoth, ‘Protection of Traditional Knowledge in the Face of Globalisation: Balancing

highlighted the complexity of the country's farming in terms of balancing the benefits of farmers and breeders.¹⁸ Secondly, the Thai PVP Act emerged as a *sui generis* regime of plant protection for poorer nations.¹⁹ This Act was mainly implemented because Thailand hoped to benefit by structuring a plant protection regime that best served its local needs.²⁰ However, the Thai PVP Act was not without flaws. The current Thai PVP Act has attracted some criticisms,²¹ and whether or not farmers and breeders actually benefit from the system remains in doubt. The questions this situation raises are: has Thailand adopted clear, coherent, and workable rules for plant variety protection in response to the needs of the nation? Is the introduction of IPR in agriculture via a PVP regime a desirable and contributory factor to the development of Thailand? More precisely, how might such an IPR regime be made compatible with Thailand's development needs, bearing in mind the obligations the country has accepted through its membership of the WTO and adherence to the TRIPS Agreement? This thesis attempts to address these questions.

1.2 SIGNIFICANCE AND SCOPE OF THIS STUDY

The significance and originality of this research lies in amalgamating the normative and empirical scholarship in relation to PVP in order to forge a major guideline for developing countries. Firstly, the thesis examines

Mechanism between CBD and TRIPS' (2009) 12(1) *Thailand Journal of Law and Policy*, available from <<http://www.thailawforum.com/articles/Legal-Protection-Of-Traditional-Knowledge.html>>.

18. Changtavorn, above n 6, 293; Kuanpoth, above n 17; Lertdhamtewe, above n 17, 193; and Jakkrit Kuanpoth, 'Sui Generis Regime of Plant Variety Protection for Developing Countries' (2002) 28(1) *Thammasat Law Journal*, 5, 5 (in Thai).
19. See e.g., Kerstin Mechlem, 'Agricultural Biotechnologies, Transgenic Crops and the Poor: Opportunities and Challenges' (2010) 10(4) *Human Rights Law Review*, 749, 756.
20. Jakkrit Kuanpoth, 'TRIPS-Plus Rules under Free Trade Agreements' in Christopher Health and Anselm Kamperman Sanders (eds), *Intellectual Property & Free Trade Agreements* (International Intellectual Property Law Series, Hart Publishing, New York 2007) 27, 40.
21. This view is shared by many scholars, see, for instances, Changtavorn, above n 6, 290; Jade Donovanik, *Plant Variety Protection Law in Thailand* (Bangkok: Nititham Publishing, 2013) 21 (in Thai); Jade Donovanik, 'A Critique of the Thai Plant Variety Protection Act B.E.2542' (2010) 63(1) *Thai Bar Journal*, article 1 (in Thai); Sun Thathong, 'Rethinking Strategies in Legal Protection of Traditional Knowledge – A Case Study of Thailand' (2009) 2(2) *Journal of the Thai Justice System*, 97; Daniel Robinson, 'Sui Generis plant variety protection systems: liability rules and non-UPOV systems of protection' (2008) 3(10) *Journal of Intellectual Property Law and Practice*, 659, 663; and Nanthana Inthanon, 'Plant Variety Protection Law: Concepts and Critiques' (2004) 60(4) *Thai Bar Journal*, 199, 199 (in Thai).

Thailand's plant protection regime, which have been the subject of many debates and proposals for statutory reform.²² While work on legislative reform is continuing at the time of writing this thesis, its fate and the deliverables emerging from the on-going discussions remain somewhat uncertain, partly because of the frequent bouts of political instability in Thailand.²³ Thus, the findings of this study will be useful in terms of understanding how policy discourse can be realised in a practical manner.

Secondly, the ambit of Article 27.3(b) of the TRIPS concerning the protection of plant varieties has become the subject of a fierce debate among WTO Members, who have markedly different views of an appropriate system of the IPR protection of plant varieties.²⁴ Developed nations believe that the system provided by the UPOV Convention should be the minimum standard for compliance with the TRIPS.²⁵ Conversely, developing nations, such as India and Thailand,²⁶ refuse to accept this approach on the grounds that it does not adequately recognise the rights of farmers.²⁷ Therefore, this thesis analyses the requirements under international law to identify any flexibility in terms of plant protection within the accepted legal norms and mechanisms.

Lastly, since it is likely that several developing countries are facing a similar situation as Thailand, the Thai PVP law may serve as a model for them

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22. See Cabinet Resolution, *Draft of Plant Variety Protection Act (Issues No ...) Year ...* (The Cabinet of Thailand Meeting on Tuesday 16 November 2010) (calling for the need to adjust several provisions contained in the Thai PVP Act).
 23. See Lertdhamtewe, above n 17, 192.
 24. See Laurence R. Helfer, 'Intellectual Property Rights in Plant Varieties: An Overview with Option for National Governments' (2002) 31 *FAO Legal Paper Online*, 12.
 25. Developed nations, such as the European Union, the United States and Japan, construe a model codified as the UPOV as the minimum standard for compliance with the TRIPS. See the *Plant Variety Protection Act* (1970) (USC) §§ 2321-2582; and *Plant Variety Protection – No.41/29 The Seeds and Seedlings Law* (1947) (Japan). For discussion, see Gert Wurtenberger, Bart Kiewiet and Paul van der Kooij, *European Community Plant Variety Protection* (Oxford: Oxford University Press, 2006); Daniel Gervais, *The TRIPS Agreement: Drafting History and Analysis* (London: Sweet and Maxwell, 1998) 147-152; and Nuno Pires de Carvalho, *The TRIPS Regime of Patent Rights* (The Hague: Kluwer Law International, 2002) at 178-79.
 26. See the *Protection of Plant Varieties and Farmers' Rights Act* (2001) (India); the *Plant Variety Protection Act* (1999) (Thailand). Other developing nations include Indonesia, the Philippines, Bhutan, Malaysia, Laos and Cambodia. See footnote 27.
 27. See Ragavan and Mayer, above n 8, 98; Kuanpoth, above n 20, 41; and Pawarit Lertdhamtewe, 'Asian approaches to International Law: focusing on plant protection issues' (2013) 8(5) *Journal of Intellectual Property Law and Practice*, 388-398.

to enact a PVP system.²⁸ In addition, a successful study of this issue will enable the formation of a model that embeds critical socio-economic and developmental goals, including the right to food, and biodiversity management and conservation.

It should be noted that there are other issues related to the discussion of IPR in agriculture and the introduction of the PVP law in Thailand. These include the impact of plant variety protection on the protection of traditional knowledge, the promotion and protection of such knowledge under an IPR regime, and the protection of geographical indications in Thailand. However, in view of the broad nature of these topics and the desire to discuss a number of points in depth, these two areas will not be covered in this thesis.

1.3 HYPOTHESIS AND RESEARCH QUESTIONS

The aim of this thesis is to test the proposition that the current statutory regime governing the protection of plant varieties in Thailand is insufficient, and in some respects, it is inappropriate to promote agricultural development in terms of the way in which the rights of breeders and farmers are protected, how agricultural research is conducted, and how the benefits are shared among all players in agricultural management. It poses the following questions:

- (i) Is the introduction of IPR in agriculture via a PVP regime a desirable and contributory factor to the development of Thailand?
- (ii) To what extent has Thailand adopted a clear, coherent, and workable legislative framework for plant variety protection in response to the unique needs of the nation?

28. Several developing nations have introduced a *sui generis* form of plant variety protection, including Indonesia in 2000, India in 2001, the Philippines in 2002, Bhutan in 2003, Malaysia in 2004, Laos in 2007, and Cambodia in 2008. See the *Laws of Republic of Indonesia No. 29 of 2000 on Plant Variety Protection* (2000) (Indonesia) §§ 7(1) and 10; the *Protection of Plant Varieties and Farmers' Rights Act* (2001) (India), §§ 2, 14(b), 18(e), 24, 39(1) (iv); *Republic Act No.9168 – An Act to Provide Protection to New Plant Varieties, Establishing a National Plant Variety Protection Board and For Other Purposes* (2002) (The Philippines) § 43(d); the *Biodiversity Act of Bhutan, Water Sheep year 2003* (2003) (Bhutan) § 18(a), 32 to 42; the *Protection of New Plant Varieties Act* (2004) (Malaysia) §§ 31(d) and 32; *Intellectual Property Laws* (2008) (Lao People's Democratic Republic) §§ 10, 70 and 72(4); also, *Seed Management and Rights Holders of Seed Production* (2008) (Kingdom of Cambodia).

- (iii) How may such a law be made compatible with Thailand's development needs, bearing in mind the obligations the country accepted when it joined the WTO and its adherence to the TRIPS Agreement?

1.4 RESEARCH METHODOLOGY

The methodology adopted for this research is a mixed interdisciplinary approach consisting of both qualitative and quantitative research techniques. This thesis predominately employs qualitative research techniques, which are part of the conventional legal methodology of analysis of both primary and secondary sources of law. Specifically, the study involves a review of relevant existing literature and a textual analysis of legislative provisions and underlying policy rationale, as well as considering several key aspects of international agreements pertaining to the issue, including an examination of the provisions of the WTO/TRIPS Agreement.

Adopting a qualitative method is one way of analysing the complex issue of the protection of plant varieties in Thailand. However, to accurately understand the underlying problems of Thailand's PVP framework and produce the ultimate solution to the problem, this thesis also employs the quantitative research method, which is empirically based and adapted from social sciences, to address the legal issues. This primarily involves an investigation of the empirical evidence, a statistical analysis, and interviews with key players.

This thesis follows a conventional pattern to respond to the aforementioned research questions by reviewing the relevant statutory provisions of the Thai PVP Act to determine its adequacy, statutory problems and limitations, and proposes alternative views where it is deemed to be necessary. In addressing the second question, this thesis considers several key aspects of international documents and relevant literature related to intellectual property and development in order to justify the need for a new coherent framework for plant IP protection in Thailand. The methodology utilised to examine the final question is a focused study of plant variety protection under

international law. This principally includes an examination of the TRIPS Agreement and its key provisions, and a consideration of the provision of Article 27.3(b) with reference to plant variety protection, rules of treaty interpretation, WTO case law, and other major international agreements that govern plant protection issues.

1.5 STRUCTURE OF THIS THESIS

This research proceeds by way of six steps to prove the hypothesis, which correspond with the six main chapters of the thesis. The relevant agreements, including the WTO/TRIPS Agreement, the text of the UPOV Convention, the CBD, the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and the International Undertaking for Plant Genetic Resources of the Food and Agriculture Organization (International Undertaking) are examined in the next chapter, Chapter 2, in order to provide a general background of international law for a subsequent discussion.

Chapter 3, entitled “Intellectual Property and Sustainable Development: A New Approach?” contains a critical analysis of the normative mainstream approaches to the introduction of IPR in agriculture and tests the assumption that the internalisation of externalities from plant breeding and biotechnology is the key to fostering private investment in agricultural research. The factual background used to justify the introduction of IPR in agriculture in Thailand is particularly examined in this chapter and the current debate about the optimum scope of plant variety protection is placed within a broader discussion of the way in which innovation can promote agricultural development. The nature of plant variety protection is also considered and the proposition that such IPR protection forms part of the technical infrastructure that underpins agricultural research and development is challenged.

Since a great deal of literature widely considers the interaction between IPRs and development from the perspective of international law and the interaction between international regimes, the legal and historical background is also presented in this chapter, which additionally contains a description of the evolution of the international regulatory framework applicable to IPRs and

development. The relevant international agreements are specifically introduced, particularly those that have been formed within four multilateral institutions, namely, the WTO, the International Union for the Protection of New Varieties of plants (UPOV), the Conference of the Parties (COP) of the United Nations Convention on Biological Diversity (CBD), and the Food and Agriculture Organization (FAO) of the United Nations. While the relevant international agreements discussed in detail in this thesis may differ in nature, scope and objectives, they can be broadly distinguished as being IPR-related and biodiversity-related instruments, according to their principal subject matter.

Thus, understanding the applicable international legal framework is a necessary and fundamental step toward appreciating its increasing effect on the acquisition and management of science and technology related to plant breeding and agriculture, including the use of plant genetic materials. Such an understanding is important to avoid neglecting crucial equity issues that may be associated with such use. It is also essential to assess an effective margin for manoeuvre a developing country, such as Thailand, may have when complying with the WTO/TRIPS obligations and standards, while promoting its national interests in terms of agriculture and crop improvement.

The current statutory framework for plant variety protection in Thailand, as represented by the PVP Act of Thailand, is analysed in Chapter 4, with a short description of its drafting legislation. The rules and provisions of the Thai PVP Act are specifically considered in this chapter in order to analyse the major problems that underlie the limitations of Thailand's plant variety protection framework. The statutory problems under Thai PVP law are examined and the socio-economic impact of plant variety protection on Thailand's development is also explored. It is concluded in this chapter that the ability of Thailand's PVP Act to meet the specific needs of all actors involved in agricultural management in Thailand is uncertain, and that this uncertainty may result in Thailand's legal regime of plant IP protection being woefully inadequate.

The requirement for the IPR protection of plant varieties is addressed in Section V of Article 27.3(b) of the TRIPS Agreement, entitled “Patent”, and this provision is discussed in Chapter 5. Without setting substantive standards of protection, TRIPS Article 27.3(b) implies the effective protection of plant varieties by means of patents, plant breeders’ rights or other alternatives; therefore, the constituents of the requirement of this article are also analysed in this chapter. After introducing TRIPS Article 27.3(b) and explaining the coverage of its requirement, the chapter continues to focus on the provisions of the UPOV Convention, the CBD and the ITPGRFA. Consideration is also given in this chapter to examining the factors that can be drawn from these international regimes in terms of establishing a plant variety protection framework in accordance with the WTO/TRIPS obligations.

Chapter 6 seeks to identify and illustrate the components of the plant variety protection provisions Thailand should adopt to protect its plant varieties, while simultaneously promoting Thailand’s agricultural industry. The specific plant protection provisions are analysed in this chapter to ascertain their effectiveness in promoting the development of Thailand’s agriculture. Having detailed possible elements of the plant variety protection provisions, the remainder of this chapter is devoted to proposing some modification to the current provisions of the Thai plant protection system, where it is deemed necessary, to provide adequate IPR protection for plant varieties and effectively promote agricultural practices in Thailand. Lessons learnt, conclusions, and recommendations are also presented in this chapter.

It is concluded in the final chapter, Chapter 7, that the current statutory regime governing the IPR protection of plant varieties in Thailand fails to fulfil its most important role; thus, it is inadequate, and in some respects, inappropriate to promote agricultural development in terms of protecting the rights of breeders and farmers, the way in which agricultural research is conducted, and the benefits shared among all players in agricultural management. Ways in which to improve the existing legal instruments and benefit-sharing mechanisms to facilitate access to agricultural knowledge, science and technology for sustainable agricultural development are also

suggested, and a final conclusion of the thesis is drawn based on the foregoing discussions.

This thesis is based on the law and materials available as of the 31st January 2013.

Chapter 2

Relevant Laws and Institutions: An Overview

2.1 BACKGROUND

Relevant international documents dealing with plant variety protection issues are examined in this chapter. A number of points are worth mentioning before turning to the main treaties that relate to these issues. Firstly, the legal regime is showcased by a number of documents with remarkably different subject matters.¹ Although the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement)² imposes the plant protection obligations of most countries on the rest of the world, the Agreement does not specify the minimum substantial standard for plant variety protection. Secondly, there are other instruments related to the protection of plant varieties, such as The United Nations Convention on Biological Diversity (CBD)³ and the International Treaty on Plant Genetic Resources for Food and Agriculture

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1. See Philippe Cullet, 'Plant Variety Protection in Africa: Towards Compliance with the TRIPS Agreement' (2001) 54(1) *Journal of African Law*, 97, at 98.
 2. *Agreement on Trade-Related Aspects of Intellectual Property Rights in Marrakesh Agreement Establishing the World Trade Organization*, open for signature 15 April 1994, 1869 UNTS 299 (entered into force 1 January 1995) annex 1C (TRIPS Agreement).
 3. *United Nations Convention on Biological Diversity*, open for signature 5 June 1992, 31 UNTS 818 (entered into force 29 December 1993) (CBD).

(ITPGRFA).⁴ While the CBD covers all biological resources, the ITPGRFA is only concerned with plant genetic resources. Thirdly, it is worth stating that the different treaties belong to different branches of international law, such as international trade, intellectual property, and environmental law. While there is no hierarchy between these various fields, it can be said that the WTO/TRIPS Agreement carries more weight than environmental treaties because of the benefits derived from membership and the threat of trade sanctions.⁵ Finally, the development of plant breeders' rights provided by the *International Convention for the Protection of New Varieties of plants* (UPOV Convention)⁶ is particularly important in this context. This especially needs to be considered because the UPOV treaty is the major international agreement governing the area of plant variety protection.

2.2 INTERNATIONAL OBLIGATIONS FOR THE PROTECTION OF PLANT VARIETIES UNDER THE WTO/TRIPS REGIME

The protection of plant varieties via an IPR regime has assumed significant importance in terms of judicial developments and economic diplomacy with its inclusion in the WTO/TRIPS Agreement. This has given a fillip to the protection and implementation of plant variety protection laws via an IPR

4. *International Treaty on Plant Genetic Resources for Food and Agriculture*, Rome 3 November 2001, Doc. Y3159/E (ITPGRFA).

5. Many scholars share this view, see for instance, Cullet, above n 1, 98; Claudio Chiarolla, 'Commodifying Agricultural Biodiversity and Development-Related Issues' (2006) 9(1) *Journal of World Intellectual Property*, 25-60; and Nadine Barron and Ed Couzens, 'Intellectual Property Rights and Plant Variety Protection in South Africa: An International Perspective' (2004) 16(1) *Journal of Environmental Law*, 19, 19. It is important to note that an agreement within the WTO framework facilitates recourse to cross-retaliation for non-fulfilment of specific obligations. This means that countries that fail to comply with the TRIPS standards could be subjected to trade retaliation if the dispute settlement mechanism of the WTO has determined the existence of non-compliance with the TRIPS Agreement. It is imperative to distinguish important prohibitions and sanctions. An important prohibition is a ban on a product that has a direct nexus to environmental harm; on the other hand, a trade sanction is a trade ban on unrelated products for the purpose of influencing a foreign country's policies or actions. Both instrument prohibitions and sanctions can be applied to other parties by treaty.

6. *International Convention for the Protection of New Varieties of plants*, 33 UST 2703, 815 UNTS 109 (1961); revised by 33 UST 2703 (1978); revised by 815 UNTS 89 (1991) (UPOV Convention).

system by different countries as per the TRIPS Agreement.⁷ Although a comprehensive set of discussions of the TRIPS Agreement is critically discussed in a subsequent chapter of this thesis, it is important to have a basic understanding of the Agreement in order to provide a general background for the subsequent discussion.

2.2.1 OVERVIEW OF THE TRIPS AGREEMENT

The TRIPS Agreement came into force in 1995,⁸ following negotiations in 1994 at the end of eight rounds of the General Agreement on Tariffs and Trade (GATT) negotiations.⁹ The TRIPS Agreement sets out the minimum

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7. See Philippe Cullet, 'Revision of the TRIPS Agreement concerning the Protection of Plant Varieties: Lessons from India concerning the Development of a Sui Generis System' (1999) 2(4) *Journal of World Intellectual Property*, 617, at 617 (arguing that the WTO/TRIPS Agreement is considered to be the most important international agreement, which has influenced the structure of plant variety protection laws in most countries of the world, since its ratification implies important changes to domestic legislation).
 8. The evolution of the TRIPS Agreement can be traced back to the growing realisation that the counterfeiting of products was having a considerably adverse impact upon trade revenue. The initiative started as early as the late 1970s when the government of the United States (U.S.) suggested that the GATT jurisdiction was to be extended to trademark counterfeiting. This proposition was argued by developing countries led by Brazil and India on the grounds that intellectual property issues were the exclusive territory of the World Intellectual Property Organization (WIPO). Eventually, after a series of negotiations and discussions, the TRIPS Agreement was introduced within the Uruguay Round as one of the many Annexes to the WTO Agreement. The fact that compliance with IPR provisions would be linked to trade rights was undoubtedly one of the driving forces of the negotiations. Before the TRIPS was concluded, many efforts failed to achieve what many governments, particularly the US and Japan, felt was becoming a necessity: a binding obligation to eliminate the trading of counterfeit and pirated goods. There was resistance to the establishment of new IP norms. Some countries believed that no traditional standards were necessary or that they would impede legitimate trade, while others held the view that the WIPO, not the GATT, was the appropriate forum for the treatment of IPR issues. For an overview of the TRIPS Agreement, see Mitsuo Matsushita, Thomas J. Schoenbaum, and Petros C. Mavroidis, *The World Trade Organization: Law, Practice and Policy* (New York: Oxford University Press, 2006) at 704; and Rafiqul Islam, *International Trade Law of the WTO* (Australia and New Zealand: Oxford University Press, 2006) at 381. Professor John H. Jackson observed that one of the most compelling reasons for moving the IPR interests into the international trading context was the admiration of the GATT dispute settlement system, which had evolved to a point where it appeared to be a reasonably effective protection mechanism for enforcing the establishment of international treaty norms; see John H. Jackson, *The World Trading system* (Cambridge: MIT Press, 1997) at 310–11.
 9. *General Agreement on Tariffs and Trade*, open for signature 30 October 1947, 58 UNTS 187 (entered into force 1 January 1948) was incorporated into the *General Agreement on Tariffs and Trade in Marrakesh Agreement Establishing the World Trade Organization*, open for signature 15 April 1994, 1867 UNTS 3 (entered into force 1995) annex 1A (GATT). There were eight multilateral trade negotiations or rounds during the GATT era (1947–1994).

standards of IPR protection, covering all categories of IPRs, and mandates all WTO members to institute or amend their national legislation to comply with the TRIPS obligations.¹⁰ The WTO initially imposed a 2000 deadline for developing countries and 2006 for least-developed countries (LDCs) to conform to all of the TRIPS requirements. These transitional periods were subsequently extended, with LDCs currently facing a new deadline of the 2021, to fully comply with the TRIPS obligations.¹¹

A significant feature of the TRIPS Agreement is the application of IPRs of the two major principles of the GATT. These principles are the national treatment principle found in Article 3 of the TRIPS Agreement, and the Most-Favoured-Nation (MFN) principle found in Article 4.¹² The national treaty principle is essentially a requirement for reciprocity, obliging all WTO members to confer on foreign nationals the same protection as they would their own nationals. In other words, the laws of a member state should not be less favourable to foreigners than to nationals.¹³ Under the MFN principle, a member state is also obliged to immediately and unconditionally extend any advantage, favour, privilege, or immunity it has granted to the national of one member state to the nationals of all the others.¹⁴ The TRIPS Agreement also obliges WTO Members to provide effective enforcement procedures under their domestic laws.¹⁵ The rules of the previous IPR conventions are also incorporated by reference in the relevant provisions of the TRIPS Agreement.¹⁶

10. The TRIPS Agreement, above n 2, art. 1.2. The TRIPS Agreement calls for the protection of various IPRs, including copyrights and related rights, trademarks, geographical indications, industrial designs, patents, layout-designs of integrated circuits and trade secrets.

11. Ibid, arts. 65 and 66.

12. Ibid, arts. 3 and 4.

13. Ibid, art. 3. The principle of national treatment has also been a cornerstone and common feature of the pre-TRIPS international conventions on IPR protection.

14. Ibid, art. 4 [emphasis added].

15. Ibid, art. 41.

16. The Paris Convention (1967), the Berne Convention (1971), the Rome Convention (1961), and the Treaty on Intellectual Property in Respect of Integrated Circuits (1989) are incorporated by reference; Ibid.

2.2.2 BACKGROUND TO THE DRAFT OF THE TRIPS ARTICLE 27.3(B)

Article 27.3(b) of the TRIPS Agreement, which relates to the requirement for the IPR protection of plant varieties, was one of the major areas of controversy in the TRIPS negotiations. It specifically reflects the wide range of differences that existed among industrialised (developed) countries themselves, and between them and developing countries, during the TRIPS negotiations.¹⁷ The problem with negotiating the TRIPS Article 27.3(b) was that the United States initially wanted full patent protection for all fields of technology, but European countries prohibit patents on plant varieties under the *European Patent Convention* (EPC).¹⁸ The language of Article 53(b) of the EPC, which excludes the patentability of plant varieties, was later incorporated into the text of Article 27.3(b) of the TRIPS Agreement. Article 53(b) of the EPC reads as follows:

European patents shall not be granted in respect of:

[...]

(b) plant or animal varieties or essentially biological processes for the production of plants or animals; this provision does not apply to microbiological processes or the products thereof.¹⁹

It should be noted that the distinction between Article 27.3(b) of the TRIPS Agreement and Article 53(b) of the EPC is only that, under the TRIPS Agreement, plant varieties may be patentable subject matter while their patentability is expressly excluded under the EPC. Another problem involved with TRIPS Article 27.3(b) negotiations was the possibility of establishing a link between the sui generis system of protection for plant varieties and the legal mechanism of the plant variety regime provided by the UPOV Convention.²⁰ There was a strong reaction from developing countries against

17. Daniel Gervais, *the TRIPS Agreement: Drafting History and Analysis* (1998) 147–152.

18. Genetic Resources Action International, ‘For a Full Review of TRIPS 27.3(b): An Update on Where Developing Countries Stand with the Push to Patent Life at WTO’ (2000).

19. *Convention on the Grant of European Patents*, of 5 October 1973, Article 53(b).

20. The UPOV Convention above n 6.

the inclusion of a reference to the UPOV Convention in the TRIPS Agreement for two main reasons. Firstly, it was argued that, since the UPOV Convention had a small number of members, it could be deemed to lack international acceptance. Secondly, a number of members, particularly developing countries, hesitated to include a reference to the UPOV Convention on the grounds that it failed to adequately protect farmers' rights.²¹

A compromise was finally reached when the TRIPS Agreement imposed the obligation on WTO members to provide IPR protection for plant varieties, but did not force them to introduce patents. The TRIPS Agreement generally imposed the patentability of an invention, whether products or processes, on all fields of technology and specifically mandated the requirement of a form of legal protection of plant varieties by deviating from the norm of harmonisation of IPRs.²² Thus, it offered flexibility to all WTO members with regard to the form of protection of plant varieties, i.e. through patents, by an effective *sui generis* system, or a combination of both patent and *sui generis* system, and this open-ended language is now embodied in Article 27.3(b) of the TRIPS Agreement.²³

2.2.3 PLANT VARIETY PROTECTION AT THE WTO

TRIPS Article 27.3(b) is specifically of interest in the area of plant variety protection. As mentioned, the provision of Article 27.3(b) of the TRIPS Agreement states that WTO Members must provide for the protection of plant varieties, either by means of 'patents or by an effective *sui generis* system or by any combination thereof'.²⁴ Interestingly, while the TRIPS Agreement requires WTO members to provide some form of legal IPR protection for plant varieties, the provision of the TRIPS Article 27.3(b) allows each member to choose its own type of protection. The wording of this Article does not

21. See Nuno Pires de Carvalho, *The TRIPS Regime of Patent Rights* (2002) 178 – 179.

22. Cullet, above n 1, 97; Srividhya Ragavan and Jamie Mayer; 'Has India Addressed Its Farmers' Woes? A Story of Plant Protection Issues' (2007) 20 *Georgetown International Environmental Law Review*, 97, 98.

23. The TRIPS Agreement above n 2, art 27.3(b).

24. *Ibid*, art. 27.3(b).

generally oblige members to introduce patents.²⁵ The reference to the *sui generis* system in this Article relaxes the requirement of IPR protection by authorising members to develop any form of plant variety protection.²⁶ Commentators argue that this provision of the TRIPS Agreement is somewhat complex as a result of the substantial challenges faced by negotiators in achieving their goal of drafting a comprehensive set of disciplines governing multilateral trade-related IP rights.²⁷ As a result, the TRIPS Article 27.3(b) vis-à-vis plant variety protection is a mixture of mandatory and voluntary obligations, which, at times, makes it extremely difficult to interpret.²⁸ The provision of the TRIPS Article 27.3(b) related to plant variety protection, which is of special interest to this thesis, is discussed in more detail in a subsequent chapter.

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25. Cullet, P, above n 1 at 99; and Carlos M. Correa, *Trade-Related Aspects of Intellectual Property Rights: A Commentary on the TRIPS Agreement* (New York: Oxford University Press, 2007) at 293–4.
26. Cullet, P, above n 1 at 99 (arguing that the TRIPS Article 27.3(b) allows WTO members to devise an alternative property rights system to implement their obligations in this field); see also Ragavan and Mayer, above n 22, 97 (indicating that the provision of the TRIPS Article 27.3(b) offers a certain degree of flexibility with regard to the system of plant IP protection and asserting that this TRIPS provision allows each member to adopt its own individualised system of plant protection tailored to its development needs and priorities).
27. Two major concerns of the TRIPS Article 27.3(b) related to the requirement of the IPR protection of plant varieties were raised during the negotiation of the TRIPS Agreement. The first was that the U.S. wanted full patent protection for all fields of technology, but European nations prohibited patents on plant varieties under the European Patent Convention. Another problem was the possibility of establishing a link between the *sui generis* system of plant variety protection and the legal mechanism of the plant protection regime provided by the UPOV treaty. Developing countries reacted strongly to the inclusion of a reference to the UPOV in the TRIPS provision for two main reasons. Firstly, it was argued that, since UPOV only had a small number of members, it could be deemed to lack international acceptance. Secondly, a number of members, particularly developing countries, hesitated to accept the inclusion of a reference to UPOV on the grounds that the Convention did not adequately protect farmers' rights; see Gervais, above n 17, 147–152; see also Carvalho, above n 21, 178–79.
28. The meaning of the TRIPS Article 27.3(b) with respect to plant variety protection has been the subject of significant debates among WTO members, as well as scholars with different views of the appropriate system of IPR protection for plant varieties. For such a discussion, see Laurence R. Helfer, 'Intellectual Property Rights in Plant Varieties: An Overview With Option for National Governments' (2002) 31 *FAO Legal Paper Online*, 12; Olena V. Antonyuk and William A. Kerr, 'Meeting TRIPS Commitments in Ukraine: An Important Challenge in the Quest for WTO Accession' (2005) 8(3) *Journal of World Intellectual Property*, 271; and Eliana Torelly de Carvalho, 'Protection of Traditional Biodiversity-Related Knowledge: Analysis of Proposals for the Adoption of a Sui Generis System' (2003) 11 *Missouri Environmental Law and Policy Review*, 38.

As mentioned earlier, a number of international agreements related to the protection of plant varieties have the potential to impact the establishment of a plant variety protection framework. These include the UPOV and the CBD, as well as the ITPGRFA. Thus, the remaining international treaties with respect to plant variety protection issues are identified and discussed in the following sections.

2.3 THE UPOV REGIME

Prior to the WTO/TRIPS Agreement, the legal development in the area of plant variety protection evolved through a series of documents administered by the UPOV. In a general sense, the overall objective of the UPOV was to protect the results of breeding agricultural plants in the form of crop varieties. Since its adoption in 1961 in Paris, it has been one of the most important international instruments to provide legal protection for the rights of plant breeders.

2.3.1 DEVELOPMENT OF THE UPOV REGIME

Historically, the genesis of the UPOV can be traced to the 1950s, when discussions emphasised the importance of protecting the results of agricultural plant breeding in view of the opinion that this work should not be treated as industrial property, protectable by the type of rights envisaged by the *Paris Convention for the Protection of Industrial Property* (Paris Convention).²⁹ Interestingly, this rationale was based on the belief that, while the Paris Convention established the principle that plant products (in the form of grain, flowers and flour) could be described as industrial property, the application of the principle did not extend to the plant varieties that produced these products. The reasons behind this rationale related to the capacity to meet the criteria for protection, as well as the need to protect the public interest, which was vested

29. *Paris Convention for the Protection of Industrial Property*, 20 March 1883, last revised at Stockholm, 14 July 1967, 21 UST 1538. For a brief review, see Michael Blakeney, 'Plant Variety Protection, International Agricultural Research, and Exchange of Germplasm: Legal Aspects of Sui Generis and Patent Regimes' in Anatole Krattiger et al (eds), *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices* (Oxford: MIHR, 2007) 401 at 402.

in the production of new varieties of crops.³⁰ A close reading of academic writers and the courts' decisions in Europe, for example, in Belgium, Germany and The Netherlands shows that several arguments were raised to deny plants patent protection between 1950 and 1970. The largest category of objections focused on non-compliance with the legal requirements of patentability, namely, invention conception, novelty, inventive steps, industrial applicability and adequate disclosure. For example, a major objection to plant patents was that breeders of new plant varieties lacked industrial applicability.³¹

In the 1950s, as far as the general scenario in Europe and the United Kingdom was concerned, despite the fact that the Paris Convention provided for the possibility of protecting plant products via patents, there was no political or legal will at that point in time to provide patent protection for plant varieties. Hence, it was decided that a more appropriate response to the demands of plant breeders would be to introduce a new form of right specifically designed to protect plant materials, and this led to the creation of the *International Union for the Protection of New Varieties of plants* (UPOV)³² and the adoption of the first text of the UPOV Convention.³³ It is worth mentioning that part of the reason for the development of the UPOV Convention was the involvement of plant breeding societies that had come

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30. Margaret Llewelyn and Mike Adcock, *European Plant Intellectual Property* (Oxford: Hart Publishing, 2006) at 136 (describing how Europe witnessed a strong sentiment against plant variety protection for fear of creating a monopoly of food at that period in time).
 31. See e.g., Geertrui Van Overwalle, *The Legal Protection of Biotechnological Inventions in Europe and in the United States* (Belgium: Leuven University Press, 1997); and also see Geertrui Van Overwalle, 'Patent Protection for Plants: A Comparison of American and European Approaches' (1999) 39 *IDEA-Journal of Law and Technology*, 143, at 148.
 32. The International Union for the Protection of New Varieties of plants or UPOV was established by the UPOV Convention, above n 6.
 33. In 1957, the French government held a conference concerning the protection of new plant varieties and furthered some ideas of plant breeders' rights. The result was the adoption of the UPOV Convention. For an overview of the historical development of the plant breeders' rights regime under the UPOV Convention, see Andre Heitz, *The History of the UPOV Convention and the Rationale for Plant Breeders' Rights*, in 1991 Seminar on the Nature and Rationale for the Protection of Plant Varieties under the UPOV Convention, 25–27 (1994); Makoto Tabata, *An Overview of Plant Variety Protection in the World* (The Department of UPOV: The Forum of Protection; Implementation at the National Level) (1994).

into being during the 1930s and 1940s.³⁴ Specifically, the International Association of Plant Breeders for the Protection of Plant Varieties (ASSINSEL),³⁵ which was founded in 1936, played a significant role in promoting the need for the protection of plant breeders' rights.³⁶

2.3.2 THE UPOV CONVENTION(S)

There were three important versions of the UPOV Convention, including (a) the 1961 UPOV Convention, (b) the 1978 UPOV Convention, and (c) the 1991 UPOV Convention, each of which is briefly discussed *below*.

A. The 1961 UPOV Convention

The first UPOV Convention was signed in 1961 by a few European nations. The purpose of the Convention, which entered into force in 1968, was generally to ensure that Members acknowledged the achievement of breeders of new varieties of plants by granting them IP protection on a set of clearly defined principles.³⁷ The Convention specifically recognised the rights of individual plant breeders who develop or discover new, distinct, uniform and stable plant varieties.³⁸ The UPOV viewed itself as being a mechanism via

34. See Graham Dutfield and Uma Suthersanen, *Global Intellectual Property Law* (Cheltenham: Edward Elgar, 2007) at 186 (providing comprehensive discussions of the historical development of UPOV).

35. The International Association of Plant Breeders for the Protection of Plant Varieties or ASSINSEL is commonly referred to as the International Seed Federation (ISF) that merged with the International Seed Trade Federation (FIS) in 2002.

36. The most important contribution of the ASSINSEL in relation to the creation of the UPOV is the 1957 ASSINSEL Conference in which twelve European nations were involved; Australia, Belgium, Denmark, France, Germany, The Netherlands, Italy, Norway, Sweden, Switzerland and the United Kingdom. It is important to note that the Conference delegates finally decided that, because of the scant use made of patent protection where that possibility existed, it would be more appropriate to provide a specifically designed *sui generis* regime. They generally felt that plant material could not meet the patent law requirement of novelty, and plant breeding programmes could rarely be shown to be inventive or industrially applicable; Dutfield and Suthersanen, above n 34, at 186–87.

37. UPOV, *International Union for the Protection of New Varieties of Plants: What It Is, What It Does* (October 22, 2009) UPOV Publication No 437(E), available at <<http://www.upov.int/export/sites/upov/en/about/pdf/pub437.pdf>>; and Remigius N. Nwabueze, 'Ethnopharmacology, Patents and the Politics of Plants' Genetic Resources' (2003) 11 *Cardozo Journal of International and Comparative Law*, 585, 610.

38. The 1978 UPOV Convention, above n 6.

which Members could engage and enjoy a number of benefits, including investment, the transfer of technology, and development.³⁹

The original UPOV Convention was revised in 1978, and 1991,⁴⁰ and these subsequent revisions also increased the scope of breeders' rights to retain the original quality as a mechanism of breeders.⁴¹ Specifically, in the last revision, breeders' rights over the propagating material of the plant variety were extended to the harvest, as well as a spectrum of the application of plant breeders' rights.⁴² The overall objective of the revision was especially to strengthen the rights of plant breeders.⁴³

B. The 1978 UPOV Convention

To be eligible for protection under the 1978 Act, the plant variety must be “clearly distinguishable” (e.g. distinct from other varieties of common knowledge), “sufficiency homogenous” with regard to the features of sexual reproduction and vegetative propagation.⁴⁴ The rights of breeders are extended. Under the UPOV 1978 Act, the scope of protection of breeders' rights is for the protection of commercial marketing; the offering for sale; and the marketing of the reproductive or vegetative propagating material from, as such, of the variety.⁴⁵ More importantly, the Convention recognises what is famously known as “farmers' privileges”. Farmers are permitted to reuse the material propagated from the previous year's harvest and can freely exchange seeds of protected varieties with other farmers. Plant breeders are also allowed to use the protected variety to breed and commercialise other new varieties.⁴⁶

39. See UPOV, *Report on the Impact of Plant Variety Protection* (2005) at 12. It has been a contention of UPOV that a number of benefits can be derived from the protection of plant varieties under the UPOV regime.

40. The UPOV Convention, above n 6.

41. Ragavan and Mayer, above n 22, at 103–04.

42. Lee Ann Jackson, ‘Agricultural Biotechnology and the Privatization of Genetic Information’ (2000) 3(6) *Journal of World Intellectual Property*, 825, 837.

43. The UPOV Convention, above n 6.

44. *Ibid.*

45. *Ibid.*, art 6.

46. *Ibid.*, art. 5.

C. The 1991 UPOV Convention

According to the 1991 UPOV Convention, the plant variety must be novel, distinct, uniform and stable.⁴⁷ Leading scholars, such as Professors Dutfield, Suthersanen and Ragavan have criticised the 1991 UPOV version for changing the eligibility standards to favour more technologically-advanced breeders over other farmers, which results in awkward incentives to grow genetically-modified crops.⁴⁸ In addition, the 1991 UPOV text strengthens the scope of protection by widening the array of subject matter. Generally, the protection not only covers the material propagated from the protected variety, but also the material harvested from protected and “essentially derived varieties”.⁴⁹ Furthermore, the 1991 version extended the scope of breeders’ rights by increasing the number of acts that require the prior authorisation of the breeder, including production or reproduction; conditioning for the purposes of propagation, offering for sale, selling or other marketing; exporting; importing; and stocking for any of the above purposes.⁵⁰ The UPOV 1991 version also extended protection from at least 15 years to a minimum of 20 years.⁵¹

Crucially, the latest version of the UPOV Convention conversely restricts farmers’ rights and privileges. For instance, it extends breeders’ rights to all production and reproduction of varieties and to species, as well as general and specific plant varieties.⁵² The remaining exceptions to these rights are acts privately performed and for non-commercial purposes, experiments, and the breeding and exploitation of other varieties.⁵³ In effect, farmers no longer have the right to save and exchange seeds under the 1991 Act.

47. The 1991 UPOV Convention, above n 6, arts. 6 – 9.

48. Dutfield and Suthersanen, above n 34, 189-191; and Srividhya Ragavan, ‘To Sow or Not to Sow: Dilemmas in Creating new Rights in Food’ in Jay Kesan (ed), *Agricultural Biotechnology and Intellectual Property: Seeds of Change* (Oxfordshire: CABI, 2007) 318, 328-9.

49. Ragavan and Mayer, above n 22, 106-109; and Ragavan above n 48.

50. The 1991 UPOV Convention, above n 6, art. 14.

51. *Ibid*, art. 19.

52. *Ibid*, art. 14.

53. *Ibid*, art. 15.

The UPOV Convention is currently the only international agreement that provides for the legal protection of plant varieties. It tends to reflect its status as a European club, since its membership mainly consists of European nations, and only a few developing countries, principally from Latin America, have joined the UPOV.⁵⁴ There has been significant pressure on developing countries over the past few years to adopt the UPOV as a standard for the legal protection of plant varieties.⁵⁵ Supporters of the UPOV argue that the Convention would fit the effective *sui generis* requirement in TRIPS Article 27.3(b).⁵⁶ However, nothing in the TRIPS provisions indicate that the UPOV Convention is the minimum substantial standard for the establishment of a plant variety protection framework. Countries can currently only join the 1991 version of the UPOV Convention, which significantly increases the scope of breeders' rights and treat the rights of other players in agricultural practices (farmers and local communities) as exceptions to plant breeders.⁵⁷ Given that

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54. For a list of membership of the UPOV, see <<http://www.upov.int/en/about/members/pdf/pub423.pdf>>.
55. Jakkrit Kuanpoth, 'TRIPS-Plus Rules under Free Trade Agreements' in Christopher Health and Anselm K. Sanders (eds), *Intellectual Property & Free Trade Agreements: International Intellectual Property Law Series* (Oxford: Hart Publishing, 2007) at 27; and Kerstin Mechlem, 'Agricultural Biotechnologies, Transgenic Crops and the Poor: Opportunities and Challenges' (2010) 10(4) *Human Rights Law Review*, 749, at 756. For examples, developing countries, such as Bangladesh, Cambodia and Nepal, have been under political pressures by developed nations, particularly the United States and the European Union through bilateral trade agreements, to accede to the 1991 UPOV Convention.
56. *Review of the Provisions of Article 27.3(b) Summary of Issues Raised and Point Made*, WTO Doc. IP/C/W/369/Rev. 1 (9 March 2006) (Note by the Secretariat) [61]; The arguments in favour of the UPOV Convention are discussed in large body of works including: Gervais, above n 17, at 151; Carvalho, N, above n 21, at 219; Barry Greengrass, *Plant Variety Protection and the Protection of Traditional Knowledge*, UNCTAD Expert Meeting on Systems and National Experiences for Protecting Traditional Knowledge, Innovation and Practices (Geneva, 2000) at 4 available at <http://www.unctad.org/trade_env/docs/upov.pdf>; Michael Halewood, 'Indigenous and Local Knowledge in International Law: A Preface to Sui Generis Intellectual Property Protection' (1999) 44 *McGill Law Review*, 953 at 962; Geoff Tansey, *Trade, Intellectual Property, Food and Biodiversity* (London: Quaker Peace & Services, 1999); and Jade Donovanik, *The Implications of Compliance with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) For Thailand's Development: Focusing on Plant Protection* (JSM Thesis, Stanford University, 1997) at 4-7 (arguing that the UPOV Convention would enjoy the presumption of the effectiveness requirement of TRIPS Article 27.3(b) with respect to the sui generis system for plant variety protection).
57. See e.g., Ragavan, S, and Mayer, J, above n 22 at 104; see also Cullet, P, above n 1 at 100; Prabhash Ranjan, 'Recent Developments in India's Plant Variety Protection, Seed Regulation and Linkages with UPOV's Proposed Membership' (2009) 12(3) *J. World Intell. Prop.* 219; Kanchana Kariyawasam, 'The Recent Law Reforms and Plant Intellectual Property Law in Sri Lanka: Compliance with the TRIPS and CBD' (2005) 7 *The Australian Journal of Asian Law*, 169, 173-74; and Genetic Resources

the effectiveness of the UPOV is open to question since it does not adequately recognise the rights of farmers and local farming communities and, because of its importance to the subject of this study, the UPOV Convention is considered in depth in the next chapter of this thesis.

2.4 THE UNITED NATIONS CONVENTION ON BIOLOGICAL DIVERSITY

2.4.1 THE RELATIONSHIP BETWEEN THE CBD AND THE WTO/TRIPS REGIME

The introduction of plant variety protection in the context of the TRIPS Agreement cannot be dissociated from the CBD.⁵⁸ This was generally stated in paragraph 19 of the Doha Ministerial Declaration (Doha Declaration),⁵⁹ which directed the TRIPS Council to consider the interaction between the TRIPS Agreement and the CBD in its general review of Article 27.3(b) with respect to plant variety protection. The Doha Declaration specifically provided that:

We instruct the Council for TRIPS, in pursuing its work programme including under the review of Article 27.3(b), [...] to examine, *inter alia*, the relationship between the TRIPS Agreement and the Convention on Biological Diversity, the protection of traditional knowledge and other relevant new developments [...]⁶⁰

Thus, the set of provisions of the CBD is relevant to the establishment of legal regimes for plant variety protection.

Action International, *Ten Reasons Not to Join UPOV: Global Trade and Biodiversity in Conflict* (GRAIN Public Issue No. 2, May 1998) available from <<http://www.grain.org/seedling/?id+10>>.

58. The CBD was opened for signature in 1992 and entered into force in 1993. 188 states have ratified this Convention so far. Generally, the birth of the CBD can be traced back to the origin of sustainable development when the 1992 United Nations Conference on Environment and Development, held in Rio de Janeiro, addressed the urgent problems of economic development, social development, and environmental protection. The UNCED adopted five key documents, one of which was the Convention on Biological Diversity.

59. *Declaration on the TRIPS Agreement and Public Health*, Ministerial Conference, Fourth Session, Doha 9 – 14 November 2001, WTO Doc. WT/MIN (01)/DEC/W/2, dated 14 November 2001.

60. *Ibid.*, [emphasis added].

2.4.2 MAJOR PRINCIPLES AND CORE PROVISIONS

Basically, the Convention sets out the legal instrument concerning the management of biodiversity at an international level. In this context, it generally restricts the rights of member states and other relevant actors over all biological resources, including plant materials. The Convention reaffirms the sovereign right of states to exploit their own resources pursuant to their own environmental policies, a reflection of the principle of the permanent sovereignty of states over natural resources.⁶¹ The sovereign right of states over their biological resources are limited by the recognition that these resources are a common concern of all humankind.⁶²

Furthermore, the Convention provides a set of rules regulating member states' policies concerning access, development, and the transfer of technology related to biological resources.⁶³ It calls for the need for member states to recognise and protect IP rights in the field of plant genetic resources. At the same time, the Convention recognises both the dependence of local communities on biological resources and the role that those communities play in the conservation and sustainable use of the resources. It also specifies the need for the equitable sharing of benefits arising from the use of their knowledge, innovation and practices, relevant to the conservation of biodiversity and the sustainable use of its components.⁶⁴

Overall, the CBD provides an international regulatory framework within which rights over plant varieties must also fit. Thus, the Convention is of great

61. Its preamble provides in the relevant part, “*Reaffirming* that States have sovereign rights over their own biological resources see the CBD, above n 3. The principle of permanent sovereignty over natural resources is discussed in the context of Office of the United Nations High Commissioner for Human Rights see, *General Assembly Resolution* 1803 (XVII) of 14 December 1962, “Permanent Sovereignty over natural resources”.

62. Its preamble provides in the relevant part, “*Affirming* that conservation of biological diversity is a common concern of humankind, the CBD, above n 3.

63. Ibid, art. 1 of the CBD.

64. Its preamble provides in the relevant part, “*Conscious* of the intrinsic value of biological diversity and of the ecological, genetic, social, economic, scientific, educational, cultural recreational and aesthetic values of biological diversity and its components, Ibid.

importance to the creation of an IPR regime for plant variety protection. The CBD's main provisions are analysed in depth in the next chapter of this thesis.

2.5 THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

The international framework for plant genetic resources has evolved and developed in the context of the Food and Agriculture Organization (FAO). The two major instruments that relate to these issues are the documents adopted under the auspices of the FAO. Each of these two instruments contains a comprehensive set of rules for the member states regarding the management of plant genetic resources.

2.5.1 INTERNATIONAL UNDERTAKING ON PLANT GENETIC RESOURCES

The first instrument is the International Undertaking,⁶⁵ which was adopted in 1983 by the FAO as a non-binding instrument.⁶⁶ For many years, the International Undertaking functioned as the fundamental regulatory instrument in the FAO's global system for plant genetic resources, which includes a fund for the equitable sharing of benefits and a mechanism to provide an early warning about threats to plant genetic resources. The International Undertaking's main objectives were to ensure that the need for conservation was globally recognised and that sufficient funds were made available for this purpose to assist farmers and farming communities in the protection and conservation of plant genetic resources, which were input for food and agriculture, and of the natural biosphere; and too enable farmers, their

65. *International Undertaking for Plant Genetic Resources*, Res. 8/83, Report of the Conference of FAO, 22nd Session, 5 – 23 November 1983, Doc. C83/REP (International Undertaking).

66. 113 States were signatories to the International Undertaking, and were thus obliged to comply with the recommendations it contained.

communities and countries to participate fully in the benefits derived from the improved use of plant genetic resources, including via plant breeders.⁶⁷

In its initial interpretation, the International Undertaking challenged a private property rights (IP rights) approach to plant genetic resources by declaring that all such resources, whether cultivated by farmers in the field or modified through breeder innovation, were part of the common heritage of humankind and, as such, should be available without restriction. Indeed, an interpretation issued and adopted by the FAO in 1989 further clarified that plant breeders' rights were not inconsistent with the International Undertaking.⁶⁸ It specifically recognised the interrelationship between the rights of traditional farmers (whose practice of saving seeds provided the raw genetic materials for innovation) and the rights of plant breeders (who used technology to achieve that innovation).

2.5.2 THE ADOPTION OF THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

The second instrument relates to the revision of the International Undertaking, following the adoption of the ITPGRFA.⁶⁹ Specifically, the revision of the International Undertaking was promoted by the growing importance of biological resources at the international level, partly because of the following into force of the CBD, which raised the need to harmonise relevant provisions of the International Undertaking and the CBD.⁷⁰ One of the most contentious issues in the negotiations was the drafting of the provision on access to biological resources and farmers' rights. Specifically, on the 3rd November

67. The International Undertaking, above n 47. For a discussion, see Helfer, L, above n 21, at 14–5.

68. *Agreed Interpretation of the International Undertaking*, 25th Sess., Doc C89/REP (11–29 November 1989) (Report of the Conference of the FAO); see also Helfer, L, above n 21, at 14–5; and Cullet, P, above n 1, at 100–01.

69. For an overview of the ITPGRFA see, Claudio Chiarolla, 'Plant Patenting, Benefit Sharing and the Law Applicable to the Food and Agricultural Organisation Standard Material Transfer Agreement' (2008) 11(1) *Journal of World Intellectual Property*, 1–28.

70. *Revision of the International Undertaking on Plant Genetic Resources*, 27th Session., Res. 7/93, Doc. C93/REP. (6 – 24 November, 1993) (Report of the Conference of the FAO).

2001, a conference held by the FAO adopted the text of a legally binding international agreement on plant genetic resources (ITPGRFA), compromising the relevant provisions of these two regimes.⁷¹ When it entered into force on the 29th June 2004, the ITPGRFA had been ratified by 55 states and signed by an additional 50 nations.⁷² The ITPGRFA not only updated the non-binding documents set forth in the International Undertaking, but also contained provisions relevant to IPRs in plant genetic resources and plant variety rights.

In short, the ITPGRFA focused on the protection of traditional knowledge, the equitable sharing of benefits arising from the exploitation of biological resources, and the right to participate in decision-making. It further emphasised farmers' contribution to agricultural management and not their entitlements. The treaty also introduced a multilateral system to facilitate access to genetic resources and foster the sharing of the benefits arising from their utilisation.⁷³ Again, because of its significant relevance to the subject of this thesis, an extended discussion of the ITPGRFA appears in later chapter of this thesis.

It should be noted that there are also various regional, multilateral and bilateral trade agreements that require the imposition of IPRs protection on plant varieties and are likely to have an impact on developing countries, such as Thailand. These documents include the Free Trade Areas of the Americas Draft Agreement, the Free Trade Agreements of the European Union, Australia-Thailand Free Trade Agreement, and the Agreement of China-ASEAN Free Trade Area.⁷⁴ However, in the light of the broad nature of this topic and the desire to discuss a number of issues in some depth, this thesis will generally be limited to the operation of the TRIPS Agreement, the UPOV treaty, the CBD and ITPGRFA in respect of these issues.

71. ITPGRFA, above n 4.

72. For a list of ITPGRFA's membership, see <<http://www.fao.org/Legal/treaties/003se.htm>>. Thailand is not a member of the ITPGRFA.

73. See ITPGRFA, above n 4, see Preamble to the ITPGRFA.

74. *Free Trade Area of the Americas: Third Draft Agreement*, FTAA.TNC/w/133/Rev.3 (dated 21 November 2003); and *Australia-Thailand Free Trade Agreement*, 5 July 2004 [2005] ATS 2 (entered into force 1 January 2005).

Chapter 3

Intellectual Property, Plant Variety Rights and Sustainable Development

3.1 INTRODUCTION

This thesis has initially posed the theoretical proposition that the protection of plant varieties requires special attention within the IPR debates, given its essential role in promoting development. This chapter assesses this proposition by firstly addressing the concept of ‘development’. It then places the current debate about the optimum scope of plant variety protection, especially patent and plant variety rights, within a broader discussion of how such IPR regimes can promote development. A remarkable amount of academic literature directly related to agricultural innovation and management has been produced. This review analyses the core literature on law and economics, particularly the elaboration of property rights theories relevant to intellectual property policy-making in the field of biotechnology, as well as agricultural research, and plant breeders’ rights.¹ Scientific literature on

1. A number of academic literature discussed the interaction between IPRs and development from the standpoint of public international law and between international regimes, see for instances, Carlos A. Primo Braga, Carsten Fink, and Claudio Paz Sepulveda, *Intellectual Property Rights and Economic Development* (World Bank Discussion Paper WDP412, March 2000); Daniel Gervais (ed),

sustainable agriculture, food security, crop biodiversity conservation and development, and their relationship with IPR protection, especially patent and plant variety rights, is also considered in this chapter. The purpose of this review is to establish a necessary backdrop from which to analyse the relevant international agreements, which have different objectives and overlapping jurisdictions. Later sections present certain factual elements relating to IPR in agriculture in Thailand to set the context for the discussion in subsequent chapters. The final section draws a conclusion based on the foregoing discussions.

3.2 WHAT IS DEVELOPMENT?

3.2.1 GENERAL IDEA

There are several meanings of ‘development’ depending on the context of the situation and the view of the person providing the definition.² A common

Intellectual Property, Trade and Development: Strategies to Optimize Economic Development in a TRIPS-Plus Era (New York: Oxford University Press, 2007); Graham Dutfield and Uma Suthersanen, *Global Intellectual Property Law* (Oxford: Edward Elgar, 2008); Joseph Straus, ‘The Impact of the new World Order on Economic Development – the Role of Intellectual Property Rights’ (2006) 6(1) *John Marshall Review of Intellectual Property Law*, 1; Keith E. Maskus, ‘The Role of Intellectual Property Rights in Encouraging Foreign Direct Investment and Technology Transfer in Intellectual Property and Development’ (1998) 9(1) *Duke Journal of Comparative and International Law*, 109; Lee G. Branstetter, ‘Do Stronger Patents Induce More Local Innovation?’ (2004) 7(2) *Journal of International Economic Law*, 359; Patricia H. Schneider, ‘International Trade, Economic Growth and Intellectual Property Rights: A Panel Data Study of Developed and Developing Countries’ (2005) 78(2) *Journal of Development Economics*, 529; Smith J. Pamela et al, ‘How Do Copyrights Affect Economic Development and International Trade’ (2009) 12(3) *Journal of World Intellectual Property*, 198.

2. For a discussion concerning the definition and interpretation of ‘development,’ see, for example, Graham Dutfield and Uma Suthersanen, *Global Intellectual Property Law* (Cheltenham: Edward Elgar, 2008) at Chapter 11 “Intellectual property and development” 272-281 (explaining development); Adam Szirmai, *The Dynamics of Socio-Economic Development: An Introduction* (New York: Cambridge University Press, 2005); Alan Thomas, ‘Development as practice in a liberal capitalist world’ (2000) 12(6) *Journal of International Development*, 773; Amartya Sen, ‘The Concept of Development’ in Hollis Chanery T.N. Srinivasan (eds), *Handbook of Development Economics Volume 1* (Elsevier Science Publishers B.V., 1998) Chapter 1, at 10; Ha-Joon Chang, *Kicking Away the Ladder: Development Strategy in Historical Perspective* (Anthem Press, London, 2002); Philippe Cullet, *Water Law, Poverty, and Development – Water Sectors Reforms in India* (Oxford: Oxford University Press, 2009); Olivier de Schutter, ‘TNCs as Instruments of Human Development’ in Philip Alston and Mary Robinson (eds), *Human Rights and Development* (Oxford: Oxford University Press, 2005) 28-44; Peter T. Leeson and Claudia R. Williamson,

theme of most definitions of ‘development’ is that ‘development’ encompasses ‘change’ in a variety of aspects of the human condition.³ One of the simplest definitions of ‘development’ is probably Chambers’ notion of ‘good change,’ although this raises all sorts of questions about what is good and what sort of change matters, about the role of values, and whether or not ‘bad change’ is also viewed as a form of development.⁴ More specifically, the term ‘development’ can refer to three distinctive disciplines of development studies, the first of which is economic development, which is described as a process of structural transformation.⁵ The second is a concept which is embraced by international development donor agencies. This is a definition of development that directly relates to people-centred policies and of the United Nations.⁶ There is a third perspective from a group of writers who are broadly identified as “environmentalists”. Their position is that ‘development’ is seen to be a normative process which combines conservation and development to improve human welfare while practising what the strategy refers to as ‘living resource conservation’.⁷

Given the wide range of different views of ‘development’ it is not surprising that the term ‘development’ has become controversial and unstable

‘Anarchy and Development: An Application of the Theory of Second Best’ (2009) 2(1) *Law and Development Review*, Article 4.

3. Robert Chambers, ‘Ideas for Development’ (IDS Working Paper 238, 2004) at 2-3.
4. Ibid, at 3; see also, Mike Moore, *A World Without Wall – Freedom, Development, Free Trade and Global Governance* (New York: Cambridge University Press, 2003) at the opening quote of the book.
5. For instance, see Alan Thomas, ‘The Study of Development’ (Paper prepared for DSA Annual Conference, 6 November, Church House, London, 2004) 1 at 2; and Alan Thomas, ‘Development as practice in a liberal capitalist world’ (2000) 12(6) *Journal of International Development*, 773, at 773 (referring to the meaning of development as a process of historical change); and Yong-Shik Lee, *Reclaiming Development through World Trading System* (New York: Cambridge University Press, 2006) 2-3 (describing economic development as the process of a structural transformation of an economy from being primarily based on the production of primary products generating low levels of income to being based on modern industries that provide higher levels of income).
6. Charles Gore, ‘The rise and fall of the Washington consensus as a paradigm for developing countries’ (2000) 28(5) *World Development*, 789, 794-95.
7. See, for instances, Philippe Sands, *Principles of International Environmental Law* (New York: Cambridge University Press, 2003) at 3, 9-11; Graham Dutfield and Uma Suthersanen, ‘Innovation and development’ in Uma Suthersanen, Graham Dutfield, and Kit Boey Chow (eds), *Innovation Without Patents: Harnessing the Creative Spirit in a Diverse World* (Cheltenham: Edward Elgar, 2007) 3-5; and David Hunter, James Salzman, and Durwood Zaelke, *International Environmental Law and Policy* (Washington D.C.: Foundation Press, 2002) at 166.

over time. As Thomas argues, ‘development’ is a concept contested both theoretically and politically, and is inherently both complex and ambiguous.⁸ This section discusses the fundamental theoretical question, namely – what is development?

3.2.2 HISTORY, CATEGORIES, AND CONCEPTS OF DEVELOPMENT

Today, it is common to talk of ‘economic development’, which focuses on the development of countries’ economic wealth for the wellbeing of their populations; of ‘human development’, which is much more than the rise or fall in national income; and of ‘sustainable development’, which emphasises the welfare of human beings by incorporating economic development, human development, and environmental protection. The following sections critically review the different concepts of ‘development’ and seek to accommodate its diverse meanings and interpretations with a brief account of its historical development.

A. Economic Development

The concept of economic development has existed in the human world for centuries, and although no-one can ascertain when this concept originated, most people agree that development is closely tied with the evolution of capitalism.⁹ Adam Smith was relatively the first person to criticise the concept of mercantilism in 1776. Smith’s view of limited government intervention and free markets, better known as the “laissez faire” system, would become a key component of one school of development policy that continues to this day. In fact, Book V of his famous *An Inquiry into the Nature and Causes of Wealth of Nations* did not speak directly of economic development, but of England’s

8. For example, see Alan Thomas, ‘The Study of Development’ (Paper prepared for DSA Annual Conference, 6 November, Church House, London, 2004) 1 at 2; and Alan Thomas, ‘Development as practice in a liberal capitalist world’ (2000) 12(6) *Journal of International Development*, 773, at 773.

9. See H.W. Arndt, ‘Economic Development: A Semantic History’ (1981) 29(3) *Economic Development and Cultural Change*, 457-466 (providing the historical development of the concept of economic development, which came into existence in the English language).

progress toward opulence and improvement.¹⁰ “Material progress” was the expression invariably used by mainstream economists after Adam Smith until the Second World War (WWII) when they referred to what was called the economic development of the West throughout those two centuries.¹¹

All through the WWII period, the experience of the worldwide economic depression, commonly known as the “Great Depression”, raised the demand among the international community to rebuild an international economic system that could better promote economic development.¹² Lessons were learned from this experience, and efforts were made to create a new system of monetary management. This led to the creation of what is known as the Bretton Woods system, which involved the setting up of a system of rules, institutions, and procedures to regulate the international economic system, resulting in the establishment of the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development, which is part of the World Bank today. The United Nations was also established, replacing the League of Nations, to facilitate cooperation in international economic relations and become involved in supporting development agendas.¹³ More importantly, the Charter for the International Trade Organization (ITO) was also drawn up with the objective of establishing a new trading system that would promote open trade and economic growth.¹⁴ The ITO would have complemented the other two international bodies proposed by Bretton Woods, but it was not ratified by the United States, with whose participation, it could not come into existence. Instead, the GATT, a set of rather brief disciplines on the trade in goods, which was initially intended to be part of the ITO system, was adopted and began to function as a *de facto* international organisation of international trade. In 1995, during the Uruguay Round of the GATT negotiations, the

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10. Adam Smith, *An Inquiry Into the Nature and Causes of the Wealth of Nations* (1776) reprinted 1904 by Edwin Cannon (ed), London: Methuen & Co., Ltd. (present edition published 1976, University of Chicago Press) Book V, Chapter 1 at 367.
 11. Arndt, H.W., above n 9, 457; and see, H.W. Arndt, *The Rise and Fall of Economic Growth* (Melbourne, Longman Cheshire, 1978) at chapter 2.
 12. Cornelius Luca, *Trading in the Global Currency Markets* (New York: Prentice Hall Press, 2007) 14; and Yong-Shik Lee, *Reclaiming Development in the World Trading System* (New York: Cambridge University Press, 2006) at 14-15.
 13. Luca, above n 12, 16, Lee, above n 12, 14-15.
 14. See Douglas A. Irwin, Petros C. Mavroidis, and Alan O. Sykes, *The Genesis of the GATT* (New York: Cambridge University Press, 2008).

World Trade Organization was established as a replacement for GATT.¹⁵ The stated primary objective of the WTO was to facilitate economic development.¹⁶

A country's economic development can be measured by using certain indicators of income and output, such as the gross national product (GNP) per capita. In a general sense, the economic performance of countries can be compared by making a country league table, with the richest countries according to their GNP per capita at the top and the poorest with the lowest GNP per capita at the bottom. The World Bank, which publishes an annual World Development Report, ranks countries in this way.¹⁷

Furthermore, it is common to speak of developed and developing countries as if there are no other kinds. According to the 1980 report of the Independent Commission on International Development Issues chaired by former West German Chancellor, Willy Brandt, the developed world is referred to as 'the North' and the developing world is called 'the South'.¹⁸ In addition, the United Nations adopts the term 'least developed countries' (LDCs) to provide a sub-category of developing countries in an attempt to reflect the sheer diversity of the world.¹⁹ 48 countries have currently been designated as LDCs (33 African countries, 14 Asian countries, and 1 Latin America and Caribbean

15. See Mitsuo Matsushita, Thomas J. Schoenbaum, and Petros C. Mavroidis, *The World Trade Organization: Law, Practice and Policy* (New York: Oxford University Press, 2006) at 704.

16. In the relevant part, its preamble states that, "Recognising that their relations in the field of trade and economic endeavour should be conducted with a view to raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, and expanding the production of and trade in goods and services, while allowing for the optimal use of the world's resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment and to enhance the means for doing so in a manner consistent with their respective needs and concerns at different levels of economic development."

17. For the World Development Report, see, the World Bank's annual World Development Report, which can be accessed at <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTWDRS/0,,contentMDK:20227703~pagePK:478093~piPK:477627~theSitePK:477624,00.html>.

18. Willy Brandt, *North-South: A Programme for Survival* (London: Pan. 1980).

19. For historical background of the least developed countries, see, the United Nations, *The Least Developed Countries: Historical Background* can be accessed at <http://www.un.org/events/ldc3/prepcom/history.htm>.

country).²⁰ LDCs receive special and preferential treatment in terms of trade, finance, development and technical assistance. For instance, the WTO establishes modalities for special and differential (S&D) treatment for LDCs, such as market access, quotas, and subsidies. Some developed countries also offer greater S&D treatment to LDCs than that stipulated under the provisions of the WTO. However, many argue that, even with the inclusion of the LDCs, the economic development approach does not reflect the actual conditions and capabilities of individual people in a country.²¹

B. Human Development

The concept of human development arose in the light of the need to shift the focus of development economics from national income accounting to people-centred policies. This concept was advanced by many scholars, including Amartya Sen, Mahbub ul Haq, Martha Nussbaum, Sabina Alkire, Ingrid Robeyns, and others.²² Human development encompasses more than just the rise or fall of national incomes; it is about expanding the choices people have to lead valuable lives, and improving the human condition so that they have the chance to lead full lives.²³ Thus, human development is about much more than economic growth, which is only a means of enlarging people's choices.

Building human capabilities and expanding the range of things people can do or be in life is fundamental to enlarging these choices. Capabilities are the substantial freedoms people enjoy to lead the kind of life they value.²⁴ Human development disperses the concentration of the distribution of goods and

20. For a list of Least-Developed Countries, see, the UN Office of the High Representative for the Least Developed Countries (UN-OHRLLS) website at <www.unohrlls.org/en/ldc/related/62/>.

21. See the following section.

22. See Amartya Sen, *Development as Freedom* (Oxford: Oxford University Press, 1999) at 144; Mahbub ul Haq, *Reflections on Human Development* (Oxford: Oxford University Press, 1995); Martha C. Nussbaum, *Creating Capabilities – the Human Development Approach* (2011); Sabina Alkire, 'Dimensions of Human Development' (2002) 30(2) *World Development*, 181; Ingrid Robeyns, Bina Agarwal and Jane Humphries (eds), *Amartya Sen's Work and Ideas: A Gender Perspective* (London: Routledge, 2005).

23. See Paul Streeten, 'Human Development: Means and Ends' (1995) 34(4) *The Pakistan Development Review*, 333, 333-34.

24. Amartya Sen, 'The Concept of Development' in Hollis Chanery T.N. Srinivasan (eds), *Handbook of Development Economics Volume 1* (Elsevier Science Publishers B.V., 1998) 10, 12.

services underprivileged people need and centres its ideas on human decisions. By investing in people, they are able to grow and become empowered to pursue many different paths in life; thus, developing their capabilities. The most basic capabilities for human development are to lead a long and healthy life, to be knowledgeable (e.g., to be educated), to have access to the resources and social services needed for a decent standard of living, and to be able to participate in community life. Without these, many choices are simply not available, and many opportunities in life remain inaccessible.²⁵

One measure of human development is the Human Development Index (HDI), formulated by the United Nations Development Programme (UNDP).²⁶ The HDI encompasses statistics such as life expectancy at birth, an education index (calculated using the mean and expected years of schooling), and the gross national income per capita.²⁷ Although this index does not capture every aspect that contributes to human capability, it is a standardised way of quantifying human capability across nations and communities. Aspects that could be omitted from the calculations include income that is unable to be quantified, such as staying home to raise children or bartering for good/services, as well as individuals' perception of their own wellbeing. Other measures of human development include the Human Poverty Index (HPI) and the Global Empowerment Measure. Human development in general and HDI in particular, now play major roles in the thinking of international agencies such as the UNDP, the World Bank, the International Monetary Fund, or bilateral aid agencies.

C. Environment: the Rise of the Concept of Sustainable Development

Historically, economic growth and its ecological consequences have been separated from developmental thinking. Economic growth through trade,

25. T.N. Srinivasan, 'Human Development: A New Paradigm or Reinvention of the Wheel?' (1994) 84(2) *American Economic Review*, 238.

26. See the United Nations Development Programme, 'Human Development Index' can be accessed at <<http://www.undp.org/bz/human-development/what-is-human-development/>>.

27. Ibid.

investment, transfer of finance and capital is one of the major vehicles for development, particularly at the international level and in affluent nations.²⁸ However, rising world poverty, economic inequality, and the depletion of finite and natural resources have challenged the traditional development paradigm and shifted the focus to a need to integrate the economy and ecology.²⁹ It is recognised that the existing process of development, based on existing technologies, production, distribution and consumption patterns, is unsustainable for both the natural and human environment.

As one of the most influential development studies written in the late 1970s and early 1980s, the Brundtland Report emphasised the need for a new development path, pointing out that many present developmental trends are leaving an increasing number of people poor and vulnerable as a result of environmental degradation.³⁰ The Brundtland Report explicitly showed vital links between the state of the natural environment and economic growth. It says:

We have, in the more recent past, been forced to face up to a sharp increase in economic interdependence among nations. We are now forced to accustom ourselves to an accelerating ecological interdependence among nations. Ecology and economy are becoming even more interwoven – locally, regionally, nationally and globally – into a seamless knot of causes and effects.³¹

This raised the awareness of environmental concerns by addressing the need for mutually supportive interaction between economics and the environment in order to promote sustainable development.

In fact, the idea of sustainable development originated in 1972, when the United Nations Conference on the Human Environment (UNCHE), commonly

28. Paul Krugman and Maurice Obstfeld, *International Economics: Theory and Policy* (Pearson International Edition, 2000) at 11-13.

29. David Hunter, James Salzman, and Durwood Zaelke, *International Environmental Law and Policy*, (Washington D.C.: Foundation Press, 2002) at 151.

30. The World Commission on Environment and Development, *Our Common Future: The World Commission on Environment and Development* (Oxford: Oxford University Press, 1987) 4.

31. *Ibid*, 5.

known as the *Stockholm Declaration*,³² highlighted the link between the prevailing international economic system, environmental degradation and poverty.³³ Specifically, the Stockholm Declaration introduced the idea of sustainable development for the first time in international law by declaring twenty six principles to ensure that development would be sustained.³⁴ However, it was the release of *Our Common Future* (also known as the Brundtland Report, as mentioned above)³⁵ at the World Commission on Environment and Development (WCED) in 1987³⁶ that brought the idea of sustainable development into common usage. The report advocated an interpretation that has become the most well-known definition of sustainable development, i.e. it is ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’.³⁷ Evidently, sustainable development embodies two key notions:

- The concept of ‘needs’, particularly the essential needs of the world’s poor, to which overriding priority should be given;
- The idea of limitations imposed by the state on technology and society or organisations on the environment’s ability to meet present and future needs.

The concept of sustainable development was truly internationalised when the 1992 United Nations Conference on Environment and Development

32. *Stockholm Declaration on the Human Environment*, UN Doc. A/CONF.48/14/REV.1 (1972) (Stockholm Declaration).

33. For a comprehensive review of the concept of sustainable development, see, Philippe Sands, *Principles of International Environmental Law* (Cambridge: Cambridge University Press, 2003) see Chapter 1 and 2; James Connelly and Graham Smith, *Politics and the Environment: From Theory to Practice* (London and New York: Routledge, 2003) at 65-68; David Hunter, James Salzman, and Durwood Zaelke, *International Environmental Law and Policy* (New York: Foundation Press, 2002) see Chapter 3 and 4, at 166.

34. See *Stockholm Declaration on the Human Environment*, UN Doc. A/CONF.48/14/REV.1 (1972) (Stockholm Declaration).

35. Report of the World Commission on Environment and Development, *Development and International Economic Co-Operation: Environment*, GA Res 38/161 UN GAOR, 42nd session, Agenda Item 83, Supp No. 25, UN Doc. A/42/427 (1987).

36. The 1987 World Commission on Environment and Development was particularly chaired by former Norwegian Prime Minister *Gro Harlem Brundtland*.

37. *Report of the World Commission on Environment and Development*, GA Res 42/187 UN GAOR, 96th plenary meeting UN Doc. A/RES/42/187 (1987).

(UNCED),³⁸ held in Rio de Janeiro, addressed the urgent problems of economic development, social development, and environmental protection. The UNCED adopted three key documents: Agenda 21, a programme to promote sustainable and environmentally-sound development from then into the twenty-first century, the Rio Declaration on Environment and Development, and the United Nations Convention on Biological Diversity (CBD).

In 2000, the United Nations proposed a set of goals and targets for promoting and achieving development. These goals are commonly referred to as the Millennium Development Goals (MDGs)³⁹ and are as follows:

1. To eradicate poverty and hunger
2. To achieve universal primary education
3. To promote gender equality and empower women
4. To reduce child mortality
5. To improve maternal health
6. To combat HIV/AIDS, malaria and other diseases
7. To ensure environmental sustainability
8. To form a global partnership for development.⁴⁰

Clearly, these eight MDGs were established as a means to promote and achieve sustainable development,⁴¹ which is a sufficiently good reason for the term ‘development’ should also be understood as ‘sustainable development’ in this thesis.

3.3 DEVELOPMENT AND INTELLECTUAL PROPERTY RIGHTS

Apart from the subject matters considered in later chapters, the current legal debate about the optimum scope of IPR protection of plant varieties is placed

38. United Nations Conference on Environment and Development, Rio de Janeiro, 3 – 14 June 1992.

39. *United Nations Millennium Declaration*, Resolution adopted by the General Assembly, 55th session, Agenda Item 60(b) No. 55/2, UN Doc. A/RES/55/2 (2000) can be accessed at <<http://www.un.org/millennium/declaration/ares552e.pdf>>.

40. Ibid (MDGs) [emphasis in original].

41. Ibid (MDGs).

within the broader theoretical discussion in this section by considering the way in which IPRs can promote sustainable agricultural development.

A fair balance underlies the creation of IPRs and the regulations known as IP laws to protect and enforce these rights.⁴² On the one hand, IPRs are legal rights granted by the State for a period of time to control certain products of human intellectual efforts. Apart from a few “moral rights,” e.g. the author’s right and the right to integrity of the work,⁴³ IPRs are artificial, economical and can be market-orientated in nature. In essence, they represent the government’s desire to reward and encourage new inventions in society.⁴⁴ On the other hand, IPRs are also granted as a means of meeting certain public

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42. Many scholars share this view, for example, see Juan He, ‘Developing Countries’ Pursuit of an Intellectual Property Law Balance under the WTO TRIPS Agreement’ (2011) 10 *Chinese Journal of International Law*, 827, 828 (arguing that two broad approaches underlie the decision to grant IPRs for products of the human mind); also, see Daniel Gervais, ‘The changing landscape of International Intellectual Property’ (2006) 1(4) *Journal of Intellectual Property Law and Practice*, 249, at 249; Laurence R. Helfer, ‘Intellectual Property Rights in Plant Varieties: International Legal Regimes and Policy Options for National Governments’ (Rome: Food and Agriculture Organization of the United Nations Publication, 2004) Ch. 1, at 2-3 (Professor Helfer argues that two philosophical approaches underlie the decision to grant IPRs); William Fisher, ‘Theories of Intellectual Property’ in Stephen Munzer (ed), *New Essays in the Legal and Political Theory of Property* (New York: Cambridge University Press, 2001) 168, at 168-170; Peter S. Menell, ‘Intellectual Property: General Theories’ in Boudewijn Bouckaert and Gerrit de Geest (eds), *Intellectual Property: General Theories: Encyclopaedia of Law & Economics: Volume II* (Cheltenham, Edward Elgar, 2000) 129, at 129-131; and Adam D. Moore, ‘A Lockean Theory of Intellectual Property’ (1997) 21 *Hamline Law Review*, 65.
43. A vast array of literature discusses the moral rights, author rights and the right to integrity of work in the context of the IP framework, including: Jeremy Phillips, ‘Authorship, ownership, wikiship: copyright in the twenty-first century’ (2008) 3(12) *Journal of Intellectual Property Law and Practice*, 788; Iona Harding and Emily Sweetland, ‘Moral rights in the modern world: is it time for a change?’ (2012) 7(8) *Journal of Intellectual Property Law and Practice*, 565; Edouard Fortunet, ‘The author’s moral right to withdraw a work (*droit de repentir*): a French perspective’ (2011) 6(8) *Journal of Intellectual Property Law and Practice*, 535; David Vaver, ‘Moral Rights Yesterday, Today and Tomorrow’ (1999) 7(3) *International Journal of Law and Information Technology*, 270; and Emir Aly Crowne Mohammed, ‘Moral rights and mortal rights in Canada’ (2009) 4(4) *Journal of Intellectual Property Law and Practice*, 261.
44. Many scholars share this view, see footnote n 42. The classical theory by Adam Smith also supports this reward theory. Adam Smith was generally critical of monopolistic power as being detrimental to the operation of the ‘invisible hand,’ but still recognised that a limited monopoly can serve as an appropriate reward for costly and risky endeavours. In fact, Book V of his famous *An Inquiry into the Nature and Cause of Wealth of Nations* justified the need for limited monopolies to promote innovation and commerce that required substantial up-front investment and risk. See Adam Smith, *An Inquiry Into the Nature and Cause of the Wealth of Nations* (1776) reprinted in 1904 by Edwin Cannon (ed), London: Methuen & Co. Ltd. (present edition published 1976, University of Chicago Press), Book V, Chapter 1, Part III, at 388.

policy objectives.⁴⁵ A wide diffusion of superior works and ideas both enhances social welfare and provides an impetus for further improvement. The economic theories that have been elaborated to justify the social function and coverage of an IP system are examined in the next section, especially with respect to patents and plant breeders' rights, which are relevant to the subject of this thesis. The way in which such rights may be supplemented by other important and competing social considerations is discussed in later sections.

3.3.1 ECONOMIC THEORIES

In *The Economic Structure of Intellectual Property Law*, William M. Landes and Richard A. Posner argue that IPRs emerge when their net benefit to society exceeds their social costs, and they describe this phenomenon as the internalisation of externalities.⁴⁶ They contend that IPRs emerge in response to the desire of interactive people to adjust to the possibility of new cost benefits. In other words, IPRs are developed to internalise externalities when the gains of internalisation become larger than the costs. This may be the result of the development of new technologies and the opening up of new markets. In their view, this model has broad implications, including the emergence of copyrights and patents, and is applicable to corporations.

In terms of agriculture, technological change has enabled companies to increase the relative value of improved plant genetic resources, which has resulted in a growing demand for strong IPR protection.⁴⁷ However, can it really be assumed that the strengthening of such protection is desirable, just because patent protection for plant-related inventions is burgeoning in various parts of the developed and developing world? Gerd Winter argues that patent law should be discussed as a matter of economic policy, which means considering whether it furthers or impedes industrial progress. He adds that IPR protection is not a neutral device to enable social interaction but, as an

45. Many scholars share this view, see footnotes n 42.

46. See William M. Landes and Richard A. Posner, *The Economic Structure of Intellectual Property Law* (Cambridge, Massachusetts, and London, England: Harvard University Press, 2003)

47. Raustiala and Victor, 'The Regime Complex for Plant Genetic Resources' (2004) 58 *International Organization*, 277-309.

interventionist instrument of the state designed to foster progress [...], it has to constantly prove that it serves its goals.⁴⁸

Roberto Mazzoleni and Richard Nelson review various theories about the social function of patents and explore whether or not the recognition of this function justifies the current belief in the value of strong broad patents.⁴⁹ They compare four theories,⁵⁰ the first of which is the invention motivation theory, also known as the “reward theory,” which postulates that patents enable inventors to receive appropriate returns from their investment in research and provide firms with the requisite incentive to invent. Thus, they argue that improvements that would be external benefits to the community under an open-access regime are fully captured by the owner under a regime of property protection that underpins the reward theory of patents.⁵¹ A corollary of the perceived trade-off between the gains from patent incentives and the output constraints of existing patents is that a temporary monopoly should only be granted if the social benefits exceed the social costs.⁵²

Secondly, the induce commercialisation theory emphasises the distinction between inventive activities, which may culminate in the awarding of a patent for upstream technologies, and the follow-on work that needs to be done to develop and commercialise a product.⁵³ It is particularly suggested that patents play a vital role for small firms. These firms need to attract sufficient capital investment to cover development costs or simply to stay in the market, and their patent portfolio, including the licensing and sale of IP assets, may be extremely important to them.⁵⁴ Technical change and specialisation are the two factors of the origin of the high productivity of the modern capitalist

48. Gerd Winter, ‘Patent Law Policy in Biotechnology’ (1992) 4(2) *Journal of Environmental Law*, 167.

49. Roberto Mazzoleni and Richard R. Nelson, ‘The benefits and costs of strong patent protection: a contribution to the current debate’ (1998) 27 *Research Policy*, 273-84.

50. Roberto Mazzoleni and Richard R. Nelson, ‘Economic Theories about the Benefit and Costs of Patents’ (1998) 32(4) *Journal of Economic Issues*, 1031.

51. Thomas W. Merrill, ‘Introduction: the Demsetz Thesis and the Evolution of Property Rights’ (2002) 31(2) *Journal of Legal Studies*, 331-338.

52. Edmund W. Kitch, ‘The Nature and Function of the Patent System’ (1977) 20(1) *Journal of Law and Economics*, 265-90.

53. Mazzoleni and Nelson, above n 50

54. Rebecca Buckman, ‘Patent Firm Lays Global Plans’, *The Wall Street Journal*, (New York) 12 November 2007.

economy.⁵⁵ The most obvious example of this phenomenon is the spur of dedicated biotechnology firms in the US. DNA patents encourage such diverse business activities and may be important, both for new entrants who have no access to complementary production assets or the advantage of an established product market, and organisations outside any particular industry, such as universities.⁵⁶ In the latter case, the induce commercialisation theory would justify the need for patent protection when the invention motivation theory would fail, because publicly-funded research and the resulting inventions would occur regardless of granting any patent.⁵⁷

Thirdly, the information disclosure theory focuses on the role of patents as a means by which technological information is made available to the public, and assumes that the inventor cannot exploit all the uses of the invention.⁵⁸ Patents advertise the relevant information to interested parties through publication and enable its widespread diffusion. In contrast with the induce commercialisation theory, it emphasises the importance of liberal licensing practices in the technological diffusion process.

Lastly, the prospect theory of patents, which is considered to be a variant of the induce commercialisation theory, postulates that an initial invention may generate an array of different prospects. Edmund Kitch defines these prospects as opportunities to develop a technological possibility.⁵⁹ He argues that patents, especially broad patents that are issued in the early stage of the technical development of an invention with a scope that reaches well beyond the reward function, play the important role of ensuring that the inventive process is efficient. Because the development of a particular technological prospect competes with every other prospect, the patent system ensures the efficient allocation of resources between alternative technological possibilities. Moreover, it promotes coordinated management within each prospect and the transparent transmission of information. In doing so, the patent system can

55. Harold Demsetz, 'Toward a Theory of Property Rights II: The Competition between Private and Collective Ownership' (2002) 31(2) *Journal of Legal Studies*, 653-672.

56. Graham Dutfield, 'Literature Survey on Intellectual Property Rights and Sustainable Human Development' (UNCTAD, ICTSD, Geneva, 2003) Chapter 6.

57. Mazzoleni and Nelson, above n 49.

58. Ibid.

59. Kitch, above n 52.

resolve the classical common pool problem that arises in relation to innovative processes. The right to innovate is a common right and the principle first appropriation controls generate rent-dissipating races to invent.⁶⁰ For Kitch, the prospective feature of the patent system increases the efficiency of post-patent investment in developing technology by awarding the exclusive ownership of a technological prospect shortly after it has been discovered.⁶¹

The idea that patent rights curb the rent dissipation associated with the inefficient allocation of scarce resources is further elaborated in the context of the subsequent evolution of the prospect theory. John Duffy particularly emphasises that the role of patents is to coordinate the timing of innovation investment by reducing the negative rent-dissipating effects associated with patent races. He criticises the prospect theory for focusing on the role of rivalry within the patent system and describes two problems related to rivalry,⁶² the first of which is that rivalry always exists prior to the granting of a patent; thus, the prospective patent shifts rent-dissipating races to invent back in time but does not eliminate rivalry.⁶³ The second problem is that rivalry to invent persists within the patent's claim; therefore, other inventors may search for and patent improvements of the technology, a phenomenon that denotes the emergence of so-called blocking patents.

Duffy's contribution is to argue that the prospective features of the patent system have a socially-useful function, namely, to determine how rents are dissipated, rather than eliminating rivalry. He explains that races to invent can dissipate patent rents in three different ways. Firstly, investment to develop the technology may be made before the socially-optimal time to make such an investment and premature investment is inefficient and entails costs. Secondly, duplicate efforts are wasteful because, once a certain piece of information has

60. Yoram Barzel, 'Optimal Timing of Innovations' (1968) 50(3) *Review of Economics and Statistics*, 448-455.

61. Kitch, above n 52.

62. John Duffy, 'Rethinking the Prospect Theory of Patents' (2004) 71 *University of Chicago Law Review*, 439.

63. Douglas McFetridge and Douglas Smith, 'Patent, Prospects, and Economic Surplus: A Comment' (1980) 23 *Journal of Law and Economics*, 197.

been acquired there is no value in acquiring it again.⁶⁴ Thirdly, races to invent diminish the patentee's rent by dedicating the invention to the public sooner; thus, the commercial embodiment of the invention can also be exploited under patent protection sooner. However, the author argues that this is a socially-efficient way to dissipate patent rents. In his view, a policy that favours the granting of patents on embryonic research results should be endorsed, because it would curb the first two ways of dissipating rents, while promoting the third one. In his demonstration, he develops an analogy between the patent system and natural monopoly regulation. On the one hand, he observes that the provision of goods by a single firm is superior to the provision by multiple firms. This is because the research may be expensive, but the marginal cost of producing the knowledge is negligible. On the other hand, he shares a rather unjustified optimism that the rivalry to invent prior to the granting of the patent and within patent claims can constrain monopolistic behaviour in order to maximise social welfare.

Other commentators who have discussed the benefits and costs of patent protection completely disagree with the above conclusion, as is made clear by the following statement: the world economy will not benefit from a general broadening and strengthening of patent protection because, in many technology areas, strong patents entail major economic costs while generating insufficient additional social benefits.⁶⁵ In the next section, the creation of IPRs in agriculture, especially under the TRIPS Agreement, is shown to present mechanisms that may match the economic consideration of other development goals identified in the previous sections.

64. Partha Dasgupta, 'The Welfare Economics of Knowledge Production' (1988) 4(4) *Oxford Review of Economic Policy*, 1-12.

65. Yong-Shik Lee, 'Development and the World Trade Organization: Proposal for the Agreement on Development Facilitation and the Council for Trade and Development in the WTO' in Yong-Shik Lee (ed), *Economic Development through World Trade: A Developing World Perspective* (The Netherlands: Kluwer Law International BV, 2008) 3-32, at 24. Cumulative system technologies and science-based technologies prominently figure among these technological areas, see Claudio Chiarolla.

3.3.2 SOCIAL WELFARE

A. Elaboration of ‘Socio-Economic Welfare’ in the TRIPS Framework

In its objectives and principles, the WTO TRIPS Agreement recognises that the introduction of IPR in agriculture can and should be utilised as a mechanism to promote the social and economic welfare of WTO members.

Article 7 Objectives

The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.

Furthermore, Article 8 elaborates public policy interests as being the potential counterforce to high IP protectionism:

Article 8 Principles

Members may, in formulating or amending their laws and regulations, adopt measures necessary to protect public health and nutrition, and to promote the public interests in sectors of vital importance to their socio-economic and technological development, provided that such measures are consistent with the provisions of this Agreement.

The objective of creating equilibrium between rewarding IP inventors and enhancing public welfare is evident. Although the TRIPS preamble does not recognise “balance” as such, it emphasises the underlying public policy objectives of national systems for the protection of IP, including objectives for development. Therefore, IPRs and their enforcement cannot, in themselves, become barriers to legitimate trade. In this sense, the TRIPS Agreement embodies an unprecedented level of international will to achieve developmental goals via the IPR rules.

B. Right to Food

The notion of the human right to food is further explored in this section, as well as its link with development and IPRs in agriculture. Food is essential to human life, health and survival;⁶⁶ yet, approximately 800 million people currently lack access to food and up to 2 billion people lack food security.⁶⁷ Such food shortages and insecurities have a serious impact, not only on human life and health, but also human development in terms of physical well-being, economic development, education, and the reduction of poverty. The FAO estimates that more than 5 million people die annually as a consequence of starvation and under-nourishment.⁶⁸

The fundamental nature of food has led the international community to recognise food as a fundamental human right in a number of documents, including the *Universal Declaration of Human Rights*,⁶⁹ the *International Covenant on Economic, Social and Cultural Rights (ICESCR)*,⁷⁰ the *United*

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66. Food is usually of plant or animal origin, and contains essential nutrients, such as carbohydrates, fats, proteins, vitamins, or minerals. For a comprehensive discussion on the human right to food, see, Olivier De Schutter, Special Rapporteur, *Report submitted by the Special Rapporteur on the right to food*, UN Doc A/HRC/19/59 (26 December 2011); Olivier De Schutter, Special Rapporteur, *Promotion and Protection of All Human Rights, Civil, Political, Economic, Social and Cultural Rights, Including the Right to Development*, UN Doc A/HRC/9/23 (8 September 2008); *The Right to Food*, UN Doc A/63/278 (21 October 2008); Jacqueline Mowbray, 'The Right to Food and the International Economic System: An Assessment of the Rights-Based Approach to the Problem of World Hunger' (2007) 20(3) *Leiden Journal of International Law*, 545; Kerstin Mechlem, 'Harmonising Trade in Agriculture and Human Rights: Options for the Integration of the Right to Food into the Agreement on Agriculture' (2006) 10 *Max Planck Yearbook of United Nations Law*, 127; and Michael J. Dennis and David P. Stewart, 'Justifiability of Economic, Social, and Cultural Rights: Should There Be An International Complaints Mechanism to Adjudicate the Right to Food, Water, Housing and Health?' (2004) 98 *American Journal of International Law*, 462.
67. As of 2010, 852 million people were undernourished worldwide: 815 million in developing countries, 28 million in countries in transition, and 9 million in industrialised countries; see the United Nations Food and Agriculture Organization (FAO), *The State of Food Insecurity in the World* (2004), available at <http://www.fao.org/documents/show_cdr.asp?url_file=docrep/007/y565e/y5650e00.htm>.
68. Ibid, (FAO indicates that a child under ten years of age dies of hunger or malnutrition every five seconds – more than 5 million people per year).
69. *Universal Declaration of Human Rights*, art 25, GA Res 217A (III), GAOR 3rd session, UN Doc A/810 (1948).
70. *International Covenant on Economic, Social and Cultural Rights*, opened for signature 16 December 1966, 993 UNTS 3, art 11 (entered into forces 3 January 1976), (ICESCR).

Nations Declaration on the Right to Development,⁷¹ the *International Food Security Treaty*,⁷² the *1996 Rome Declaration on World Food Security*,⁷³ the *General Comment No. 12 of the United Nations Committee on Economic, Social and Cultural Rights*,⁷⁴ and the *African Charter on Human and Peoples' Rights*,⁷⁵ (see Annex 2: Timeline, which summarises how the right to food has emerged as a major policy priority in international law). Specifically, the ICESCR recognises 'the right to an adequate standard of living, including adequate food'.⁷⁶ Article 11 of the ICESCR provides that:

The States Parties to the present Covenant, recognising the fundamental right of everyone to be free from hunger, shall take, individually and through international co-operation, the measures, including specific programmes, which are needed: (a) To improve methods of production, conservation and distribution of food by making full use of technical and scientific knowledge of the principles of nutrition and by developing or reforming *agrarian systems* in such a way as to achieve the most efficient development and utilisation of natural resources; (b) Taking into account the problems of both food-importing and food-exporting countries; to ensure an equitable distribution of world food supplies in relation to need, [emphasis in original].⁷⁷

The existence of such a human right places an obligation on national governments to protect and promote this right for the benefit of their citizens.⁷⁸ Consequently, national governments, including that of Thailand, are obliged to ensure the attainment of universal basic food needs for the protection and promotion of the individual life, survival, and well-being of

71. *Declaration on the Right to Development*, art 8, GA Res 41/128, UN GAOR, 97th plenary meeting, UN Doc A/RES/41/128 (1986).

72. *International Food Security Treaty* (1993) can be accessed at <<http://www.treaty.org/Treaty.pdf>>.

73. *Rome Declaration on World Food Security*, Rome Italy, 13 -17 November 1996.

74. *Substantive Issues arising in the Implementation of the International Covenant on Economic, Social and Cultural Rights: General Comment No 12*, UN CESCR, 20th session, UN Doc E/C.12/1999/5 (1999).

75. *African Charter on Human and Peoples' Rights*, adopted 27 June 1981, 1520 UNTS 217 (entered into force 21 October 1986).

76. ICESCR, above n 70, art 11(1).

77. *Ibid*, art 11(2).

78. Kerstin Mechlem, 'Food Security and the Right to Food in the Discourse of the United Nations' (2004) 10(5) *European Law Journal*, 631, at 639 – 640.

their populations.⁷⁹ Bearing in mind the objectives of the United Nations MDGs, with the first goal being to reduce the proportion of people who suffer from hunger, meeting the food needs of each and every individual on the earth is also one of the basic requirements for achieving sustainable development.⁸⁰ Many argue that the introduction of plant variety protection is directly linked to meeting the need for food, or in other words, the realisation of the human right to food, since this constitutes one of the crucial elements of ensuring food security.⁸¹ While these arguments are discussed in more detail below, it is clear for the purposes of this paper that special care must be taken to ensure that plant variety protection via an IPR regime broadly contributes to reducing food insecurity. It is the position of this thesis that special consideration must also be given to the protection of plant varieties, given their essential role in enhancing food security, thereby satisfying the basic human right to food.

C. Intellectual Property Rights and Food Security

Before turning to the specific discussion, it would be helpful to clarify the nature of food security. Article 1 of the 1996 Rome Declaration on World Food Security defines ‘food security’ as follows:

Food security exists when all people, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.⁸²

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79. In Thailand, the Constitution does not specifically include a fundamental right to food. Yet, it can be persuasively argued that such a right exists under Thai law. In fact, every Thai Constitution has repeatedly derived a fundamental right to food from the right to life. It sees the unavailability of food to all citizens of Thailand as constituting a violation of the right to life under the Constitution. Thus, under Thai law, there is a clear recognition of the fundamental human right to food. See *Constitution of the Kingdom of Thailand B.E.2550* (2007) (Thailand), at § 32.
80. *United Nations Millennium Declaration*, Resolution adopted by the General Assembly, 55th session, Agenda Item 60(b) No. 55/2, UN Doc. A/RES/55/2 (2000).
81. Srividhya Ragavan and Jamie Mayer, ‘Has India Addressed Its Farmers’ Woes? A Story of Plant Protection Issues’ (2007) *Georgetown International Environmental Law Review*, 97 (arguing that the sui generis plant protection regime creates the ability to accommodate national food security issue); and Philippe Cullet, ‘Intellectual Property Rights and Food Security in the South’ (2004) 7(3) *Journal of World Intellectual Property*, 261, at 261–62.
82. *Rome Declaration on World Food Security*, Rome Italy, 13 -17 November 1996, art. 1.

The introduction of IPRs in agriculture is considered as one of the possible ways to ensure food security. Leading scholars, such as Philippe Cullet, have also studied the impact of plant variety protection and concluded that it has an important role to play in the enhancement of food security.⁸³ It should be noted that the actual implications of plant variety protection on food security are yet to be concluded, given that the legal framework is still in the process of being adopted and implemented; however, a number of points can be made in this context. In fact, the legal protection offered by the IPR protection of plant varieties is one of the most important incentives for the private sector to become involved in agro-genetic engineering. Plant variety protection is primordial in ensuring the participation of the private sector in the development of new plant varieties.⁸⁴ Improvements that can be generated by agro-genetic engineering include plant varieties that produce higher yields by enhancing the capacity of the plant to absorb more photosynthetic energy into the grain rather than the stem or leaf; varieties that have the capacity to combat pests and adverse climatic conditions, and varieties modified to grow faster because of the enhanced efficiency caused by the use of fertilizers, pesticides and water.⁸⁵ Thus, plant variety protection plays a positive role in promoting the development of new and improved plant varieties that provide better yields

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83. See, Philippe Cullet, 'Intellectual Property Rights and Food Security in the South' (2004) 7(3) *Journal of World Intellectual Property*, 261, at 261–62; Graham Dutfield, 'Food, Biological Diversity and Intellectual Property: The Role of the International Union for the Protection of New Varieties of plants (UPOV)' (Global Economic Issue Public – Intellectual Property Issue Paper Number 9, Quaker United Nations Office, 2011) at 5; Dwijen Rangnekar, 'Geneva Rhetoric, National Reality: Implementing TRIPS Obligations in Kenya' (CSGR Working Paper 241/08, March 2008); Dwijen Rangnekar, 'Can IPRs help promote agriculture and food security in developing countries?' (ODL Lunch-time Discussion Meeting Overseas Development Institute 19 February 2003); other scholars that discussed the relationship between IPR and food security include: Michael Blakeney, 'Plant Variety Protection, International Agricultural Research, and Exchange of Germplasm: Legal Aspects of Sui Generis and Patent Regime' in Anatole Krattiger et al. al. (eds), *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices* (Oxford: MIHR, 2007) chapter 4.7, at 417 – 418;
84. Philippe Cullet, and Radhika Koluru, 'Plant Variety Protection and Farmers' Rights: Towards a Broader Understanding' (2003) 24 *Delhi Law Review*, 41, at 42.
85. Sachin Chaturvedi, 'Agricultural Biotechnology and New Trends in IPR Regimes – Challenges before Developing Countries' (2002) 37 *Economic and Political Weekly*, 1212, at 1212.

and are more adaptable to changing environmental conditions, thereby contributing to long-term food security.⁸⁶

Furthermore, a study prepared on behalf of the Directorate General for Trade of the European Commission on the relationship between IPRs and food security also adds an interesting point to the subject of this study. In particular, it formulates recommendations for the European Commission on how to promote the eradication of food insecurity in developing countries by the adoption of IPR policies. It makes the following recommendations: (1) agricultural knowledge should be recognised as a category of protected property rights; (2) the exception from liability of research using protected varieties should be maintained; (3) the rights of farmers to save and exchange seeds should be preserved; and (4) the compatibility between systems for the protection of plant varieties and patents should be maintained by ensuring that the patenting of genetic components of plants does not extend to the patenting of the plants themselves, thereby compromising food security and undermining the research exemption in plant variety protection laws.

Food security also has an important link with an aspect of sustainable agriculture.⁸⁷ This aspect, which is implicit in the concept of sustainable agriculture, is the multi-functional role of farmers, who traditionally save, exchange, and sell their seeds informally. These practices are still widespread among poor farmers in developing countries, such as Thailand, where farmers' system of seed supply and crop improvement is, by far, the most important source of seeds, and plays a fundamental role in ensuring household food security.⁸⁸ The ITPGRFA is the first international legally-binding instrument

86. Dutfield, G, above n 83, at 3, and 5.

87. The idea of sustainable agriculture is rooted in the concept of sustainable development, which can be defined as development that not only takes economic performance into account, but also fundamental respect for human needs and the long-term preservation of the environment, as discussed above.

88. It is important to note that informal systems of seed provision are also important mechanisms by which farmers gain access to the stock of different genes which are necessary to select, improve and conserve traditional varieties that are well adapted to the local environment in which they live. Seed production in farming takes place outside the formal seed system because seed policies and regulatory mechanisms mainly focus on the commercial aspects of seed production. In formal seed systems, conservation, crop improvement and seed production are carried out by different specialised institutions: respectively, gene banks, plant breeders and seed producers.

that expressly mentions sustainable agriculture and food security among its objectives. The objectives of this Treaty, as stated in Article 1, are ‘the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use [...] for sustainable agriculture and food security’.⁸⁹ Specifically, the ITPGRFA reminds us that the protection of farmers’ rights and their participation in policy-making and decision-making are key elements to ensure food security by enabling farmers to retain their traditional rights to save and re-use the seeds from their harvests.⁹⁰ This seems to confirm that the introduction of the IPR protection of plant varieties could be an important contributor to the realisation of the fundamental human right to food, especially when implemented in conjunction with the ITPGRFA’s complementary food security policy.

D. Biological Diversity

The relationship between biological diversity, IPR protection, and sustainable development is examined in this section. ‘Biological diversity’ or ‘biodiversity’

On the contrary, in informal seed systems, the conservation, development and use of crop biodiversity and seed production are integrated components of complex farming systems. Indeed, farmers are not just growers, but have multiple interactions with the farming system of which they are part. Such interactions include activities as different as the selection, storage, production, diffusion and exchange of seeds. In these systems, seeds also play a multi-functional role, as opposed to the single function they perform in industrial agriculture – i.e. as primary inputs that are treated as commercial commodities. Such a multifunctional role may vary in accordance with the value of crop biodiversity within the local environment in which such diversity is created and preserved. It also depends on the agro-ecological, socio-economic, cultural and spiritual values that are attributed to it. Because of the inherent resource limitations in developing countries, small-scale farmers cannot afford many formal practices and the legal requirements concerning seed certification and plant variety protection do not apply to the varieties they use. However, these legal requirements may, in fact, limit the freedom of farmers to continue some traditional agricultural practices, such as the saving of seeds from consumption, as well as the subsequent exchange and use. At the national level, the restriction of the rights farmers currently enjoy and the lack of initiative to create appropriate incentives may negatively affect the conservation and development of plant genetic resources for food and agriculture, and increase food insecurity. For a discussion, see Claudio Chiarolla, *Intellectual Property, Agriculture and Global Food Security: The Privatisation of Crop Biodiversity* (Cheltenham: Edward Elgar, 2011) at 50-53.

89. *International Treaty on Plant Genetic Resources for Food and Agriculture*, Rome 3 November 2001, Doc. Y3159/E, art. 1.

90. This view is shared by many scholars, see, for instance, Daniel F. Robinson, ‘Exploring Components and Elements of *Sui Generis* Systems for Plant Variety Protection and Traditional Knowledge in Asia’ (ICTSD Programme on IPRs and Sustainable Development, March 2007) at 43-44.

can be defined as ‘the variability among living organism from all sources, including *inter alia*, terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems’.⁹¹ The importance of biodiversity is no longer questioned; in fact, the maintenance of biodiversity is important for long-term economic development and environmental sustainability, because it is a source of information and ideas for new products, particularly plant-based pharmaceuticals.⁹² Furthermore, the maintenance of a diverse range of agricultural crops and the preservation of the natural gene pool from which they are derived greatly reduces the likelihood of a single disease being able to destroy an entire crop.⁹³

It is often argued that protecting the knowledge developed by farmers and local communities can be the key to maintaining biological diversity⁹⁴ because they often have extensive experience and familiarity with the types of uses that can be made of plants (or animals).⁹⁵ Furthermore, the knowledge of farming practices can be used to inform resource management systems and therefore, reduce the likelihood of the extinction of a particular variety or species.⁹⁶ Local communities may sometimes actually develop or create their own plant varieties that are particularly suited to the area, and thus, actively contribute to increasing biodiversity.⁹⁷ Since the knowledge of farmers is intrinsically linked with biodiversity conservation, it can be persuasively

91. *United Nations Convention on Biological Diversity*, opened for signature 5 June 1992, 31 UNTS 818, art. 2 (entered into force 29 December 1993).

92. Michael D. Warren, ‘Indigenous Knowledge, Biodiversity Conservation and Development’ (speech delivered at the International Conference on Conservation of Biodiversity in Africa: Local Initiatives and Institutional Roles, Nairobi, Kenya, 30 August – 3 September 1992), at 1.

93. Rhys Manley, ‘Developmental Perspectives on the TRIPs and Traditional Knowledge Debate’ (2006) 3 *Macquarie Journal of International and Comparative Environmental Law*, 113, at 127.

94. *Ibid.*, at 127; Jakkrit Kuanpoth, ‘Protection of Traditional Knowledge in the Face of Globalisation: Balancing Mechanism between CBD and TRIPS’ (2009) 12(1) *Thailand Journal of Law and Policy*; and also see, Queen Mary Intellectual Property Research Institute (QMIPRI), ‘The Relationship Between Intellectual Property Rights (TRIPS) and Food Security’ (June 2004) at 67 can be accessed at <http://trade.ec.europa.eu/doclib/docs/2005/february/tradoc_121618.pdf>, (‘QMIPRI’).

95. QMIPRI, above n 94, at 67–8.

96. *Ibid.*

97. Warren D., M, above n 92.

argued that the protection of such knowledge is vital to protect the environment and promote sustainable development.⁹⁸

E. Protecting Biodiversity through an IPR Regime

The CBD's policy framework is central in this regard since it constitutes the main instrument concerned with biodiversity management and the protection of knowledge developed by farmers.⁹⁹ It acknowledges the potential impact of IPRs on biodiversity management and even provides specific guidance to member states, stating that they should ensure that such IP rights support the objectives of the CBD rather than running contrary to them.¹⁰⁰ Based on the CBD framework, several provisions focus on the protection of agricultural knowledge rights, and the access and equitable sharing of the benefits arising from the exploitation of biological resources. The most prominent provision that requires the recognition and protection of knowledge relevant to biodiversity protection is CBD Article 8(j), which provides that:

Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilisation of such knowledge, innovations and practices.¹⁰¹

It is recommended that this recognition is implemented via national legislation to protect traditional knowledge relevant to plant genetic resources for the purpose of conserving biodiversity. At least four possible legal contexts have been identified within which traditional knowledge rights can be protected and promoted, as follows:

98. See Sun Thathong, 'Rethinking Strategies in Legal Protection of Traditional Knowledge – A Case Study of Thailand' (2009) 2(2) *Journal of Thai Justice System*, 97, at 101 (specifically noting that traditional knowledge protection objectives should incorporate sustainable development and environmental protection consideration).

99. *United Nations Convention on Biological Diversity*, opened for signature 5 June 1992, 31 UNTS 818 (entered into force 29 December 1993).

100. *Ibid.*, art. 1.

101. *Ibid.*, art 8(j).

- Biodiversity law
- Traditional knowledge law
- Human rights law
- Plant variety protection law

Plant variety protection law appears to be the most practical of all the various options for national legislation.¹⁰² In fact, in Article 27.3(b) of the TRIPS Agreement, the TRIPS Council also suggests that plant variety protection should be made to promote the protection of innovation and the rights of farmers and local communities in the developing world through the implementation of a more comprehensive legal system for plant variety protection, thereby incorporating some of the access principles of the CBD.¹⁰³

In summary, policy goals of granting IPRs in agriculture through a PVP regime should be made to promote sustainable development. It is important to bring the socio-economic consideration of sustainable development into the plant variety protection system and strike the correct balance between the two objectives of plant protection under the TRIPS and the promotion of sustainable development. It can be said that the introduction of IPR in agriculture through a PVP regime is crucial for the attainment of sustainable

102. See Philippe Cullet, 'Property Rights over Biological Resources – India's Proposed Legislative Framework' (2001) 4(2) *Journal of World Intellectual Property*, 211; Michael Blakeney, 'Access to Genetic Resources, Gene-based Inventions and Agriculture: Study Paper 3b' (Paper presented at Conference, entitled "How Intellectual Property Rights Could Work Better for Developing Countries and Poor People," London, 21 – 22 February 2002), at 14; David Downes, 'Using Intellectual Property as a Tool to Protect Traditional Knowledge: Recommendations for Next Steps' (CIEL Discussion Paper, prepared for the Convention on Biological Diversity Workshop on Traditional Knowledge, November 1997) at 7; and also see, Eliana Torelly de Carvalho, 'Protection of Traditional Biodiversity-Related Knowledge: Analysis of Proposals for the Adoption of a Sui Generis System' (2003) 11 *Missouri Environmental Law and Policy Review*, 38, at 63.

103. *Review of the Provisions of Article 27.3(b)*, IP/C/W/369, 8 August 2002, 13; Philippe Cullet, 'Plant Variety Protection in Africa: Towards Compliance with the TRIPS Agreement' (2001) 45 *Journal of African Law*, 97, at 118 (arguing that a *sui generis* plant variety protection system should not be developed in isolation. Plant varieties are only a subset of biological resources, and a single all-encompassing law should be drafted to take account of the CBD and TRIPS requirements); Pawarit Lertdhamtewe, 'Plant variety protection in Thailand: the need for a new coherent framework' (2013) 8(1) *Journal of Intellectual Property Law and Practice*, 33, 39 (suggesting a similar fashion in regard to the implementation of CBD into a *sui generis* plant protection option under TRIPS Article 27.3(b)).

development because of its potential contribution toward achieving major development goals.

3.3.2 IMPACTS OF PLANT BREEDERS' RIGHTS ON THE AGRICULTURAL SECTOR

The system of plant breeders' rights (PBR), which is one kind of IPR, is considered in this section. The PBR system is specifically designed for plant varieties and grants breeders exclusive rights to plant materials (such as seeds) of new plant varieties they have developed. Since the subject of PBR is directly relevant to the discussion of IPR in agriculture and to this thesis, it is helpful to consider the impacts of the PBR system on the agricultural sector. The purpose of this review is to provide a clear understanding of the treatment to adopt a PBR system and the implications on the agricultural sector and to place the approach and findings in terms of insights from the literature.

It should be noted at this point that scholarships on the implications of PBRs have primarily examined their impact on economic factors and biological diversity.¹⁰⁴ The more relevant studies, particularly in terms of the economic impact, have often been based on the experience of developed countries.¹⁰⁵ Thus, the subsequent discussion will focus on the experience of developing PBR systems in the North. However, since there are some

104. Notable examples of economic analysis of PBRs include Dwijen Rangnekar, 'Is More Less? An Evolutionary Economics Critique of the Economics of Plant Breeds' Rights' in Johanna Gibson (ed), *Patenting Lives: Life Patents, Culture and Development* (Hampshire, Ashgate, 2008) 179-194; Biswajit Dhar, 'Sui Generis Systems for Plant Variety Protection: Option under TRIPS' (A Discussion Paper, commissioned by the Quaker United Nations Office (QUNO), Geneva); Derek Byerlee, 'Modern Varieties, Productivity and Sustainability: Recent experiences and emerging challenges' (1996) 24(4) *World Development*, 697-718; and LJ Butler and B W Marion, 'The impacts of patent protection on the US seed industry and public plant breeding' (NC Project o117, Monograph No. 16, University of Wisconsin, Madison, 1985).

105. Scott D. Locke, 'Intellectual Property for Botanist and the Plant Breeders: An Overview of Protection Afforded by Plant Patents and Plant Variety Protection Certificates' (2007) 6 *Chicago-Kent Journal of Intellectual Property*, 198; Amy Nelson, 'Is There an International Solution to Intellectual Property Protection for Plants' (2005) 37 *George Washington International Law Review*, 997-1029; and Claudio Chiarolla, *Intellectual Property, Agriculture and Global Food Security: The Privatization of Crop Diversity* (Cheltenham: Edward Elgar, 2011); and Dhar, 104 n 66 (providing the USA and European experiences in relation to plant intellectual property rights).

empirical assessments of the experience of PBR systems in the South, particularly in Latin America, Africa and Asia,¹⁰⁶ they will also be covered in this section.

A. Economic Impact of PBRs

Supporters of the PBR regime often argue that its introduction provides the incentives needed by breeders to develop better planting materials, which, in turn benefits the agricultural sector by increasing productivity. According to this view, the productivity gains realised through the use of improved varieties of seeds contribute to the sustainability of agriculture.¹⁰⁷ Conversely, critics point to several negative impacts of PBRs,¹⁰⁸ which arise from the control over the market that large firms can bring to bear in the exercise of their rights. Obviously, such an issue is particularly significant for developing countries and their small farmers. The economic impact of PBRs on the agricultural sector is reviewed in the following sub-sections.

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106. Notable examples of these literatures include the followings: Philippe Cullet, 'Plant Variety Protection in Africa: Towards Compliance with the TRIPS Agreement' (2001) 45(1) *Journal of African Law*, 97-122 (discussing the development of PBRs in African countries); Philippe Cullet, 'Revision of the TRIPS Agreement concerning the Protection of Plant Varieties' (1999) 2(4) *Journal of World Intellectual Property*, 617-656 (describing the development of PVP in South Asia, such as India); Graham Dufield, 'The Role of the International Union for the Protection of New Varieties of Plants (UPOV)' (Global Economic Issue Publication, Intellectual Property Issue Paper Number 9) (providing example of development of PBRs in Latin America, like Argentina); and World Bank, 'Intellectual Property Rights: Designing Regimes to Support Plant Breeding in Developing Countries' (World Bank, Report No. 35517-GLB).
107. For instances see, Derek Byerlee, 'Modern Varieties, Productivity and Sustainability: Recent experiences and emerging challenges' (1996) 24(4) *World Development*, 697-718; Derek Byerlee and Ken Fischer, 'Accessing Modern Science: Policy and Institutional Options for Agricultural Biotechnology in Developing Countries' (AKIS Discussion Paper, World Bank, 2000); William H. Lesser and Robert T. Masson, *An Economic Analysis of the Plant Variety Protection Act* (American Seed Trade Association, Washington D.C. 1983); and also Neil D. Hamilton, 'Legal Issues Shaping Society's Acceptance of Biotechnology and Genetically Modified Organisms' (2001) 6 *Drake Journal of Agricultural Law*, 81.
108. For instances see, Srividhya Ragavan, 'Of Plant Variety Protection, Agricultural Subsidies and the WTO' in Peter K. Yu (ed), *Intellectual Property & Information Wealth Vol. 4* (2007) chapter 9;

(i) *Impact of PBRs on the Registration of New Crop varieties*

The UK and the US provide classic examples and some interesting evidence in relation to the economic implications of PBRs on the registration of new crop varieties. With regard to the UK's experience, there were 810 applications for PBRs for wheat between 1965 and 1995 and only 248 were granted PBR protection. The number of PBRs granted increased from 33 between 1965 and 1990 to 55 between 1990 and 1995.¹⁰⁹

As for the US, the number of PVP certificates issued for new crop varieties in the US is significantly different and even more massive. Specifically, between 1971 and 1991, almost a thousand (992) certificates were issued in the US, a more than six-fold increase from the 153 issued between 1971 and 1974.¹¹⁰ Almost a third of the total between 1971 and 1994 were for field crops and were issued between 1991 and 1994.¹¹¹

Studies of the early adoption of PBRs systems in the South prepared by the World Bank¹¹² seem to be varied. According to the World Bank's report, China received 1,150 applications for PVPs between 1999 and 2003 and 411 of these were granted protection, although many applications from as far back as 1999 have not yet been acted upon. The vast majority of the applications were for field crops; 45 percent for maize and 32 percent for rice.¹¹³ The second case study relates to Colombia where 785 applications for PVPs have

109. Dwijen Rangnekar, 'Intellectual Property Rights and Agriculture: An Analysis of the Economic Impact of Plant Breeders' Rights' (study prepared for Actionaid, UK 2000).

110. Keith Fuglie, Nicole Ballenger, Velly Day, 'Agricultural Research and Development: Public and Private Investments under Alternative Markets and Institutions' (Economic Research Service, USDA, 1996) 38.

111. A significant proportion of the Certificates were issued to a small number of crops almost 53 per cent for field crops from 1971-94 were for new soya bean and corn varieties. Another 28 per cent were for wheat and cotton varieties; thus 81 per cent of the total certificates were issued to just four crops, Ibid, 38.

112. The World Bank, 'Intellectual Property Rights: Designing Regimes to Support Plant Breeding in Developing Countries' (World Bank, Report No. 35517-GLB) 18-20.

113. More than three-quarter of the maize applications in the China's Ministry of Agriculture office are for hybrids, and more than three-quarters of the rice applications involve either hybrids or inbred lines. Wheat, soybean, and rapeseed are the other major examples of field crops seeking IP protection. Two-thirds of the applications come from public research institutions, Ibid, 18.

been made since 1996 and 448 had been granted protection by mid-2004. The vast majority of these applications were for ornamentals; roses alone account for 62 percent of all applications. The major examples of PVPs for agricultural crops were rice (12 applications to date; 6 granted) and cotton (25 applications; 8 granted).¹¹⁴ The third selected case study is Kenya, where more than 600 applications for PVPs were received between 1997 and 2003; however, only 108 certificates had been granted by mid-2004, 70 percent of which were for ornamentals, especially roses.¹¹⁵

Based on these economic reviews, it seems likely that there is a tendency for research activities to focus on a few crops.

(ii) *Impact of PBRs on Productivity Growth*

The productivity gains from new plant varieties have been estimated in some industrialised countries. For example, in the US, the yield increases in various crops before 1930 averaged less than 1 percent per year. Between 1942 and 1992, corn yields increased at an annual rate of 3 percent, wheat by 2 percent and soya beans by 1.3 percent, and a large part of this yield increase was attributed to plant breeding. Briefly, plant breeders developed new plant varieties, which used fertilisers more efficiently, increased pest resistance, and were better suited to local growing conditions.¹¹⁶

Since the Green Revolution, modern crop varieties have become widespread in both the developed and developing world. It is estimated that these new varieties have been planted in 60-70 percent of the combined rice,

114. Applications for other field crops include soybean, tobacco, and potato, all from the private sector. Although hybrid maize is an important crop in Colombia, sold by several local firms and MNCs, there are no PVP applications for maize. Other important agricultural crops, including beans and wheat are similarly unrepresented, Ibid, 18.

115. Among field crops, maize has the highest number of applications (accounting for 10 per cent of the total); all of these applications are for hybrids from either the public sector or the parastatal Kenya Seed Company, Ibid, 19.

116. Two other important studies have provided differing estimates of yields increases. Dhar estimates that yields increase in corns and sorghum from 1930-80 were 4.6 tonnes per hectare and 1.6 t/ha respectively. Thirtle finds that the yield increase in corn was a modest 1.7 per cent per year between 1939 and 1978 and those for wheat and soya beans were 1.5 and 1.1 per cent respectively. This study found that improved varieties of seed accounted for 50 per cent of the yield increase in corn, 85 per cent in soya beans and 75 per cent in wheat. See Dhar, above n 104.

maize and wheat areas in developing countries.¹¹⁷ Notably, these important incidents took place in the public sector where IPR played no role.¹¹⁸

(iii) *Impact of PBRs on Seed prices*

Another issue is whether or not the cost of seed could be affected with the introduction of PBRs. A large volume of scientific literature has been produced on the relationship between the rising prices of seed and PBRs. According to Lesser and Masson, a comparison can be made of prices before and after the enactment of the US PVPA by using price movement statistics for seed prices of crops dominated by non-hybrid varieties from 1967 to 1979.¹¹⁹ Furthermore, the prices of seeds of major crops increased nearly threefold between 1970 and 1979.¹²⁰ The price of corn seeds increased between 1967 and 1970, but this increase was modest compared to the subsequent three years. The increase in seed prices is even more prominent when compared to price trends in other inputs where the increase from 1970 to 1979 was less than 130 percent, while seed prices increased by more than 150 percent.¹²¹

Based on this review, it seems clear that seed prices tend to increase as PBRs are introduced in agriculture.

B. *Impact of PBRs on Biodiversity*

The more recent theoretical work has shifted the focus from the economic impact of PBRs to the impact on biodiversity.¹²² Concerns in this area tend to

117. This spread was not surprising given that almost half of the yield growth in the post-Green Revolution phase was found to have taken place on account of genetic gains in yield and improvements in other varietal traits.

118. UNCTAD, 'Intellectual Property Rights and Development' (UNCTAD/ICTSD Capacity Building Project on Intellectual Property Rights and Sustainable Development, 10 September 2002) 47.

119. William H. Lesser and Robert T. Masson, *An Economic Analysis of the Plant Variety Protection Act* (American Seed Trade Association, Washington D.C. 1983).

120. This increase took place after the prices of wheat and soya beans had decreased during the three years immediately before the US PVPA was enacted, *Ibid.*

121. *Ibid.*

122. Charles R. McManis, 'The Interface between International Intellectual Property and Environmental Protection: Biodiversity and Biotechnology' (1998) 76 *Washington*

focus on the fact that PBR rules (UPOV) require individual plant varieties to be genetically uniform. The mass cultivation of uniform varieties based on a narrow range of breeding material can result in outbreaks of devastating disease, according to Ragavan and Mayer.¹²³ Thus, in their view, the PBR system, which promotes centralised research, discourages the agro-ecological research of local breeding tailored to local conditions.¹²⁴

A more recent study, undertaken by Chiarolla, also provides an interesting point in relation to whether or not PBRs lead to the spread of monocultures and the loss of agricultural diversity.¹²⁵ It seems likely from the results that seed companies tend to focus their research on commonly-used high-value crops and develop varieties that can be grown as widely as possible.¹²⁶ Based on this review, it is likely that the introduction of PBRs tends to create a market for seeds and other plant material that is dominated by a few large companies.¹²⁷

In contrast, a neat study by Dwijen Rangnekar has pushed the discussion forward by taking a historical analysis of the relationship between PBRs and genetic uniformity. The interesting conclusion is that, in fact, this IP instrument encourages plant breeding based upon existing material already in scientific use, while providing what Rangnekar calls ‘juridical legitimisation to the breeding of genetically uniform varieties’.¹²⁸ Nevertheless, the erosion of biodiversity will not necessarily be the result of the spread of mono-cultural systems. If mono-cultural systems produce higher yields per harvest and/or more harvests per year compared to the more poly-cultural agro-ecosystems

University Law Quarterly, 255, 276 (discussing whether or not IPRs (PBRs in this case) lead to the spread of monocultures and loss of biodiversity).

123. Srividhya Ragavan and Jamie Mayer, ‘Has India Addressed Its Farmers’ Woes? A Story of Plant Protection Issues’ (2007) 20 *Georgetown International Environmental Law Review*, 97, 109-110. This situation is actually happened with the potato crop in Ireland in the 1840s, and the United States in the 1960s and 1970s with wheat and maize respectively.

124. *Ibid*, 109 (arguing that PBRs (UPOV in their case) promotes commercially profitable varieties, but the resulting loss of agricultural diversity affects socially valuable varieties).

125. Chiarolla, above n 105, 119-121.

126. *Ibid*, 120.

127. *Ibid*, 120; and Ragavan and Mayer, above n 123, 98.

128. Dwijen Rangnekar, ‘Plant Breeding, Biodiversity Loss and Intellectual Property Rights’ (Economic Discussion Paper 00/5, Kingston upon Thames: Kingston University, Faculty of Human Sciences, 2000).

they replace, pressure to open up biodiverse ecosystems to cultivation may be reduced, bearing in mind that this trend in crop breeding dates back to the beginning of the Green Revolution, and earlier still in some countries. The varieties most commonly associated with the Green Revolution were developed by public crop breeding institutions, not corporations, and this seems to suggest that it may not be an IPR-related problem at all.

3.4 FACTUAL BACKGROUND RELEVANT TO THAILAND'S DEVELOPMENT NEEDS AND OBJECTIVES

Having examined the concept of development and the subject of IPRs in agriculture, the factual background relevant to Thailand's development needs and objectives is described in this section to provide a clear understanding of the construction of development with which Thailand is aligned, as well as the core themes that constitute Thailand's development needs in relation to PVP law.

3.4.1 THAILAND'S DEVELOPMENT GOALS

In a general sense, the conceptualisation of Thailand's development needs and objectives can be found in Article 78(1) of the *Constitution of the Kingdom of Thailand B.E.2550 (AD2007)*,¹²⁹ which emphasises that the State should implement national policies as a means:

To govern the State affair to secure social and economic development and national security in a sustainable manner, to promote the implementation of the *Volksgeist* of Sufficiency Economy and to consider principally national interests as a whole.¹³⁰ [emphasis in original]

The concept of 'sustainable development' discussed earlier is evident; moreover, the Thai Constitution establishes a connection between sustainable development and the granting of national policies, as follows:

129. *Constitution of the Kingdom of Thailand (B.E.2550) (2007)* (Thailand).

130. *Ibid*, art. 78(1).

- (i) Article 84(1) declares that ‘The State shall implement policy to promote a free and equitable economy through market forces and sustainable development of economy ...’¹³¹
- (ii) Article 80(2) states that ‘The State shall implement policies to promote, support, and develop health system which emphasis the sustainable good health of the people ...’¹³²
- (iii) Article 85(5) provides that ‘The State shall implement policies to support, maintain and protect the equality of environment under a sustainable development ...’¹³³

Crucially, in 2001, the *Office of the National Economic and Social Development Board of Thailand* further stipulated the necessary development targets in order for Thailand to achieve its sustainable development goals. These development targets are commonly called “Thailand’s Development Goals” (Thailand’s DGs), and are as follows:

- (1) To eradicate problems of poverty and hunger;
- (2) To improve the literacy rate; and
- (3) To increase healthcare and sanitation.

It can be seen that the Thai DGs incorporate some of the MDG principles discussed above, thereby defining the way in which Thailand conceptualises development. Therefore, it is clear that the conceptualisation of development with which Thailand is aligned is by no means ‘sustainable development’. Hence, it is imperative that the implementation of national policies in Thailand (the IP law, particularly plant variety rights law in this case) must be designed to promote sustainable development.

Other factual elements relevant to a discussion of Thailand’s development needs also include a consideration of the socio-economic significance of agriculture in Thailand, the biological characteristics of the country, and the

131. Ibid, art. 84(1) [emphasis in original].

132. Ibid, art. 80(2) [emphasis in original].

133. Ibid, art. 85(5) [emphasis in original].

number of stakeholders engaged in agricultural management in Thailand. Each of these factual elements is discussed in detail below.

3.4.2 THAILAND'S SOCIO-ECONOMIC CONDITIONS

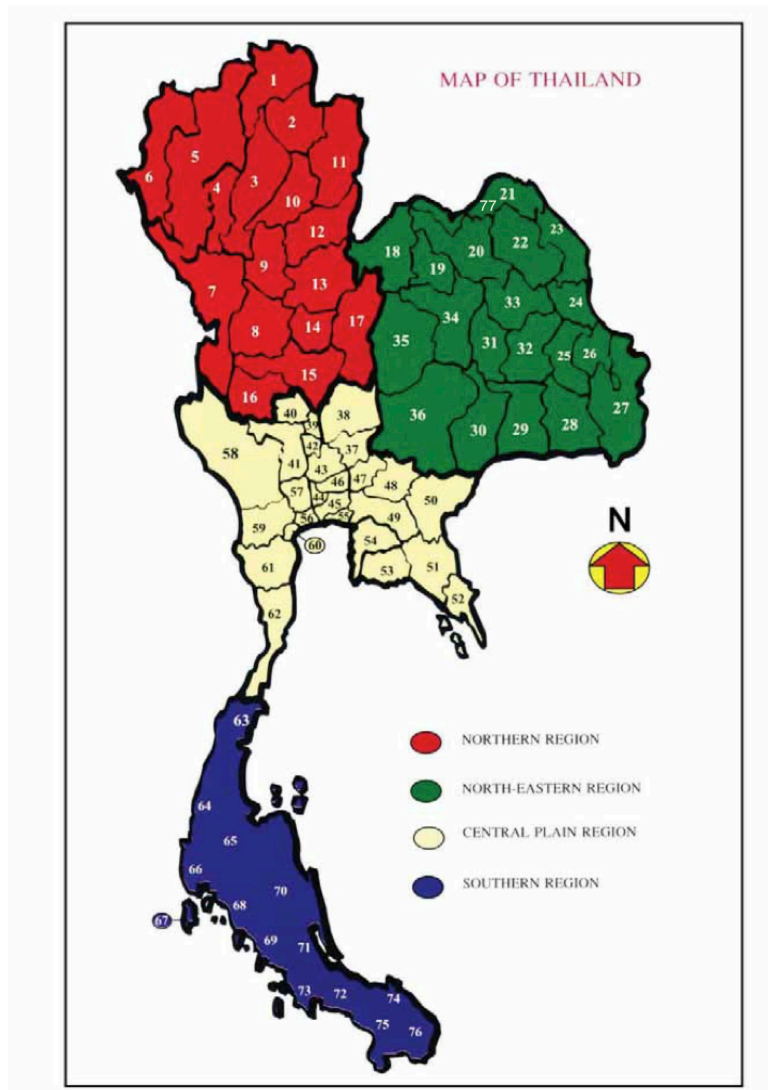
Geographically speaking, Thailand is one of the South East Asian countries. It can be divided into four main regions (see Figure 1: Map of Thailand). The altitude has a considerable effect on the temperature in the central, northern, north-eastern, and southern regions of the country. It is sufficiently cool in the northern region to produce temperate fruits and vegetables (also vegetable seeds), cool and dry in the north-eastern region, and modestly humid in the central region. These three regions have three seasons: rain from May to October, winter from November to February, and summer from March until April. There is no cool season and the climate is wet in the southern region, but with less solar radiation than necessary for maximum crop yields. Thailand's climate is tropical and monsoonal, influenced by the southwest monsoon except for the south of the country. The average annual rainfall and temperature vary, ranging from 998 – 4,603 mm. of precipitation and a temperature regime of 24.4–29.3° C (76-85° F). As a result of these geographical factors, Thailand is eminently suited to agriculture.

It can be seen from Figure 2 below that Thailand is divided into 77 provinces, each headed by a governor. There are 787 districts and district branches, 7404 sub-districts, and almost 66,604 villages within the 77 provinces.¹³⁴ The population was approximately 63 million in 2011, 64% of whom reside in rural areas. Approximately 90% of rural people, or 5.2 million farm families, earn their income through subsistence farming, particularly rice and other field crop cultivation.¹³⁵ About 41.5% of the total area consists of farm holdings, with some 17.5% currently under irrigation. This land, both irrigated and non-irrigated, is used by some of those 5.2 million farm families to produce agricultural goods for domestic consumption and export.

134. Chavalvut Chainuvati and Withaya Athipanan, 'Crop Diversification in Thailand' (FAO Corporate Document Repository, Crop Diversification in the Asia-Pacific Region, 2007).

135. Biothai, 'Agricultural household', *Biothai* (1 April 2011) (in Thai).

Figure 1: Map of Thailand



Source: FAO/Government Cooperative Programme, Country Report on the State of Plant Genetic Resources for Food and Agriculture in Thailand (2007).

Among the large number of crops of economic significance, rice is the most valuable. It is widely grown in all regions and covers about half of the country's cultivated area. Other major field crops are cassava, corn, sugarcane, oil crops and perennial trees, such as para-rubber, while fruit trees cover the remainder of the area. The utilisation of farm land is as follows: 51% paddy, 24% field crops, 17% fruit trees and other tree crops and 8% other. The selected crops in the major planted areas are rice, maize, cassava and rubber.

The planted area, yield, production and value of economic crops in 2009/2010 are illustrated in Table 1.

Table 1: Planted Area, Yield, Production and Value of Economic Crops

Crops	Area (1,000 ha.)	Yield (ton/ha.)	Production (1,000 tonnes)	Value (Million USD)
Major rice	9,113.28	2.14	18,978	3,275.39
Second rice	1,156.96	4.23	4,691	825.37
Maize	1,396.64	3.20	3,832	421.52
Cassava	1,071.04	14.93	15,591	491.12
Sugarcane	943.52	49.68	46,873	594.12
(Para) rubber	1,831.04	1.42	2,169	1,262.90

Source: Department of Agriculture, Report on Agricultural Economy in Thailand Year of 2009/2010 (Ministry of Agriculture and Cooperatives, Thailand 2011) (in Thai).

The agricultural sector has played an important role in contributing to the growth of the Thai economy since historical times. It has long been a major source of food supply and food security for the Thai population and greatly contributes to farms' workforce and industrial employment, as well as to the national income and foreign exchange earnings. As a result, the non-farm sector, namely the industrial sector, has grown at a rapid rate during the past decade, which means that the contribution from agriculture has gradually declined in terms of its importance to the share of economic growth. Nonetheless, agriculture still has a vital role to play in ensuring national food security and also contributes basic resources to the non-farm sector, particularly agro-industry. As a result, this industry currently contributes the most to the Gross Domestic Product (GDP). In spite of the value of agriculture, the contribution of agricultural production to the overall national GDP fell from 25.08% in 1980 to 10.30% in 2005, as shown in Table 2.

Table 2: Gross Domestic Product Value between 1980 and 2005

Sector	1980 – 1985	1986 – 1990	1991 – 1995	1996 – 2000	2001 – 2005
Agriculture	25.08	21.39	19.01	14.88	10.30
Non-Agriculture	74.92	78.61	80.99	85.12	89.70

Source: Department of Agriculture, Report on Agricultural Economy in Thailand Year of 2009/2010 (Ministry of Agriculture and Cooperatives, Thailand 2011) (in Thai).

Currently, Thailand's total GDP value is 7,042,000 million Baht with the main contribution generated by the industrial sector (44%), followed by sales and services (15%) and the agricultural sector (10%).¹³⁶ Although its share of GDP has declined to 10%, the socio-economic importance of agriculture to Thailand cannot be underestimated. Economically speaking, a number of industries, such as the cotton and jute textile industries and the sugar industry, are directly based on agricultural commodities. Exports of agricultural products are also an important source of foreign currency for Thailand. As illustrated in Table 1, agricultural products, such as rice, maize, cassava, sugarcane, or para rubber, constitute some of the main sources of exports and income.¹³⁷ In fact, agriculture has always been, and continues to be, an important source of Thailand's consumption. The already high annual agricultural consumption of products such as rice is estimated to increase from 10.2 million tons in 2010 by 4.5–5.5 million tons in 2015. Furthermore, agriculture has always been of great social importance to Thailand, creating jobs for a large portion of the population. It is estimated that more than one-third of the 60 million Thai people (21,778,677) are engaged in the agricultural sector.¹³⁸ The Thai diplomat and former UN Secretary-General candidate, Surakiat Sathirathai, also described agriculture as a commercial activity only undertaken in some small pockets, but the source of livelihood for a large section of the farming communities in Thailand.¹³⁹ There is no doubt that agriculture has been, and will continue to be, a driving force of the Thai economy.

136. Department of Agriculture, *Report of Agricultural Economy in Thailand during 1980 to 2005* (Ministry of Agriculture and Cooperatives, 2011) (in Thai).

137. See Pawarit Lertdhamtewe, 'Effective Plant Variety Protection as Development Policy: A Perspective for Thailand' (2011) 14(1) *Thailand Journal of Law & Policy*, available at <<http://www.thailawforum.com/articles/plant-variety-protection-as-development-policy-for-Thailand.html>>.

138. Centre for Agricultural Information, *Report on Agricultural Economics in 2006-07 Years* (Bangkok: Ministry of Agriculture and Cooperatives, government of Thailand, 2008). This report is the most recent report on agricultural information in Thailand, prepared by the government of Thailand.

139. See Surakiat Sathirathai and Ammar Siamwalla, 'GATT Law, Agricultural Trade, and Developing Countries: Lessons from Two Case Studies' (1987) 1(4) *The World Bank Economic Review*, 595 – 618.

3.4.3 BIOLOGICAL CHARACTERISTICS

Biologically speaking, Thailand is considered to be one of the world's most productive grounds of agricultural resources. It is worth noting that most of the agricultural resources are crops, plant varieties, and wild plants that produce high-value agricultural commodities.

A. Most Important Crops in Thailand

The country's most important crops are rice, maize, soybeans, cassava, sugarcane, palm oil, coconut, durian, mangosteen, pineapple, and rubber (see Table 3 for the most important crops in Thailand). The production of each of these is different in each province. Thailand is considered to be the world's largest rice exporter with a total rice production of 31.5 million tons in 2011.¹⁴⁰ Agricultural products accounted for 11.7% of exports in 2011 when Thailand's agricultural trade surplus was nearly 4.5 billion (10th in the world). Apart from rice, other agricultural commodities play an important role in terms of food security and socio-economic priorities with production rates varying directly with the area of production. The yield and production rates of major crops, as well as other commercial crops, are detailed in Annexes 4–5.

Table 3: Most Important Crops in Thailand

Crop	Growing Season
Rice	Year round/seasonal
Maize	Year round/seasonal
Soybean	Year round/seasonal
Cassava	Year round/seasonal
Sugarcane	Year round/seasonal
Pineapple	Year round/seasonal
Durian	Year round/seasonal
Mangosteen	Year round
Rubber	Year round
Palm oil	Year round
Coconut	Year round

Source: FAO/Government Cooperative Programme, Country Report on the State of Plant Genetic Resources for Food and Agriculture in Thailand (2007).

140. Wichar Thitiprasert et al, *Country Report on the State of Plant Genetic Resources for Food and Agriculture in Thailand (1997–2004)* (FAO/Government Cooperative Programme, 2007) at Chapter 2.

B. Wild Plant Varieties

Wild plant varieties are also a potential source of new economically-important crops, products, medicines, etc. In Thailand, wild plants are used for traditional foods, medicine and functional foods. A number of programmes and a recent study have been initiated to survey and inventory wild plants for food production. For instance, the Department of Agriculture (DOA) has undertaken some projects to survey wild rice, wild *Vigna*, wild sugarcane, mulberry, litchi, mango, wild relatives of tropical fruits and scented wood.

The number of edible plant species in different locations was determined by a survey of edible plants in 25 of Thailand's national parks and wildlife sanctuaries by the DOA, as illustrated in Table 4.¹⁴¹ In addition to this survey, the most recent DOA report has surveyed and identified 97 edible wild plant varieties in limestone areas, as shown in Annex 6. Some wild fruit tree species are related to economic fruit tree species in Thailand, namely *Mangifera* species, *Garcinia* species, and *Nephelium* species. Furthermore, it is reported that there are 18 species of *Mangifera*, 25 species of *Garcinia* and 7 species of *Nephelium*. The species and their distributions are summarised in Annex 7. Since there is a lack of information about the genetic resources of these wild plant varieties, a survey and study of their genetic structure is urgently required.

Table 4: Types and Locations of Edible Plants Found in 25 National Parks and Wildlife Sanctuaries in Thailand

Types and locations	Number of edible plant species
General local edible plants	169
Limestone mountains	97
Northeast	76
West and South	112
Southeast	85
Central	45
North	117
Total	701

Source: FAO/Government Cooperative Programme, Country Report on the State of Plant Genetic Resources for Food and Agriculture in Thailand (2007).

141. Ibid.

C. Landraces

In terms of plant genetic resources, a landrace is the local variety of a domesticated plant species, which has developed largely by natural processes. Landrace materials are an important source of crop improvement. However, data on landrace populations is rare because questions concerning genetic erosion arose after these populations had been affected by technological change. For instance, agricultural data on the extent of modern varieties in Thailand was virtually non-existent in the last decade, and remains patchy and unreliable. It is crucial to produce a better taxonomy of cultivated plants based on a species concept. The frequent turnover of varieties has always been an important part of traditional rice agriculture in Thailand, and indigenous rice varieties are regularly acquired from distant locations. Farmers sow 1.7 varieties per farm and replace them every three years on average.¹⁴² The use of rice diversity has been decreasing over the last four decades, driven by demand.

These limited examples do not represent the full extent of the plant genetic resource collection systems in Thailand, but serve to highlight the fact that Thailand is extremely rich in natural resources. When observing Thailand's plant genetic resources, it can be seen that there is a huge potential and scope for registration. It is possible that Thais will develop their own existing plants and wild plant varieties into economically-valuable crops. Thus, the IPR protection of plant varieties can benefit the users of plant varieties by protecting their knowledge, innovation and technologies, while enabling them to secure earnings from the sales of their products.

3.4.4 ACTORS IN AGRICULTURAL MANAGEMENT IN THAILAND

There are three main actors in Thailand's agricultural management, namely (1) farmers, (b) the seed industry (i.e. public/private plant breeders, as well as local/MNC breeding companies), and (c) the government.

142. Thitiprasert, W, above n 113, at 30; and Centre for Agricultural Information, above n 111.

A. Farmers

The Thai agricultural sector is mainly comprised of small farmers engaged in farming. As noted *above*, it is estimated that more than one-third of the 60 million Thai population are farmers. The country's farmers have also been able to achieve sufficiency in the production of food and staple substitutes, crops and agricultural commodities. Traditionally, farmers have been the main actors involved in saving seeds, selecting specific traits to produce varieties to suit their requirements, and generally maintaining biodiversity conservation and innovation at a local level. Their current importance in agricultural practices can be best described by considering figures related to the percentage of seeds sown, which are the seeds saved from the previous harvest. It is estimated by the Thai government that farmers' seed-sown figures are likely to be between 75% and 85%.¹⁴³ It is worth noting that the percentage of seeds supplied by the seed industry varies widely according to the crop. While the industry provides only about 12% of paddy and 8% of wheat seeds, it supplies about 29% of maize and 72% of pearl millet.¹⁴⁴ Thus, it is apparent that farmers still provide the overwhelming majority of seeds for some staple crops.

Empirical data also indicates that farmers' sales of seeds account for 89 percent of the seeds required for agriculture in Thailand.¹⁴⁵ This is partly due to the fact that open-pollinated crops, such as rice, paddy and wheat can less easily be hybridised. It is worth mentioning that one important characteristic of farmers in agricultural management is the practice of exchanging seeds with one other. This can take different forms, depending on the provinces; for instance, the transaction can involve obliging the recipient to give back an equivalent or higher quantity of seeds after the harvest.¹⁴⁶

Because of farmers' socio-economic status, it is considered that crop production is essentially a small-farm endeavour that benefits thousands of farming communities in urban and rural communities. Growing crops also

143. Biothai, 'Policy concerning Seed Managements and Plant Varieties in Thailand', *Biothai*, 4 January 2011 (in Thai) 1 – 4.

144. *Ibid.*

145. *Ibid.*

146. *Ibid.*

provides self-employment for families who are engaged in all aspects of the business: propagation, production, harvesting, preparation for the market, and even selling. However, production costs have increased by about 50-60 percent in recent years¹⁴⁷ so that most farmers are compelled to use family labour in order to cut costs and remain competitive in local markets. High costs compel resource-poor farmers to limit their inputs, such as fertilizers and agro-chemicals, and this often results in crop losses and lower output. Growers are also forced to use open pollinated varieties and traditional landraces, since they are unable to purchase hybrid seed that can give much higher yields and incomes. On the other hand, market gardeners and peri-urban growers use intensive production systems around the periphery of large cities to maximise the output from small plots of land. The main source of income in urban and irrigated areas, including *Nonthaburi*, *Pathumthani*, *Ratchaburi*, *Nakhonpathom*, *Nakhon Ratchasima*, etc., is crop cultivation.

This brief account of the role of farmers and its socio-economic conditions does not detail the full extent of the seed supply systems in Thailand, but tends to highlight the vital role of farmers and local farming communities as one of the main actors in Thailand's agricultural management.

B. The Seed Industry (Plant Breeders)

Traditionally, the seed sector began with the importation and marketing of vegetable seeds, principally by merchants in the main fresh vegetable market of *Pak Klong Talad*. The largest of these merchants developed specialised farms for testing imported cultivars. These developments took place between the 1920s and the early 1980s, and there has been a significant expansion of the private sector over the past decades. In 1975, the first seed corporation, the Charoen Pokphand or the CP Group, which collaborated with major transnational seed companies, was established under a Board of Investment promotion to produce and distribute maize seeds on a large scale. This led other private seed corporations to follow in maize and expand to other field crops.

147. Regional Office for Asia and the Pacific, 'The Vegetable Sector in Thailand: A Review' (FAO Corporate Document Repository, 1999) 38.

Today, the seed industry comprises about a hundred major seed companies.¹⁴⁸ This new strength has been matched by stronger calls for the development of a legal regime for the protection of plant varieties. Thus, the pressure put on the Thai government to introduce plant breeders' rights protection or a similar IP rights regime may be partly attributable to the TRIPS Agreement, but also to the domestic private industry, which sees the lack of legal protection as a major barrier to commercial hybrid production.¹⁴⁹

C. The Thai Government

The Thai government has historically played an important role in the development of new seeds. The public seed sector comprises various research stations within the DOA, which release and distribute seeds of improved cultivars of rice and field crops. The major government intervention in seed management began with the establishment of the Pitsanulok Seed Centre in 1974.¹⁵⁰ This was followed by the establishment of a section of the DOA responsible for coordinating research and educational activities in agriculture in 1975 in the form of the Ministry of Agriculture and Cooperatives. Within this Department, Plant Variety Protection Division has played a key role in developing agricultural research and technologies.¹⁵¹

However, the prominent role of the government in this field has tended to decline in the past decade. Indeed, the introduction of a new economic policy and, more generally, a new National Economic and Social Development policy in 1992, have had a significant impact on the seed sector.¹⁵² For instance, there have been attempts to stimulate the development of the seed

148. See Wichar Thitiprasert et al, *Country Report on the State of Plant Genetic Resources for Food and Agriculture in Thailand (1997–2004)* (FAO/Government Cooperative Programme, 2007) chapter 1, which describes the seed supply system in Thailand.

149. See Chapter 4 of this thesis for a further discussion on the development of plant variety protection in Thailand.

150. Thitiprasert, W, above n 147, at 13.

151. Ibid, at 13.

152. See the 7th National Economic and Social Development plan (1992-1996) of Thailand.

industry, and these have been accompanied by calls for sizeable cuts in agricultural input subsidies, such as fertiliser subsidies.¹⁵³

Overall, the involvement of the Thai government in agricultural matters is significant in the broader context of the introduction of a legal protection for plant varieties. Government intervention is fundamentally based on the principle that it is a service to the community at large, with the main aim of increasing food security for the country as a whole. Thus, the rationale is not for profit and this kind of intervention does not depend on monopolistic rights, such as the patents or plant breeders' rights stipulated in the 1991 UPOV Convention, since it is premised on the enhancement of people's overall welfare. Nonetheless, critics of government intervention argue that scientists working in agricultural research often see a strong division between research and extension, and research is not always primarily geared toward generating technologies that can be easily adopted by local farmers.¹⁵⁴

In summary, it can be said that the introduction of IPRs in agriculture must be made compatible with the socio-economic conditions of Thailand, where agriculture is regarded as being a fundamental economic activity and a source of livelihood for a large section of the population. This implies that the IPR protection of plant varieties in Thailand must be made to protect the rights of farmers and local communities, considering the huge farming population in the country. Further, it must be made to stimulate innovation in plant breeding as a means to promote agricultural research and development. Most importantly, plant variety protection via an IPR regime must protect the rights of both farmers and the private sector (plant breeders), thereby benefitting all the actors involved in Thailand's agricultural management.

3.5 CONCLUSION

Several theoretical questions related to the introduction of IPRs in Thailand's agriculture and development have been discussed in this chapter. The

153. For a discussion see Chainuvati, C and Athipanan, W, above 134, at 3.

154. For a discussion see, Lindsay Falvey, *Thai Agriculture: Golden Cradle of Millennia* (Bangkok: Kasetsart University Press, 2000) at 308–310.

foregoing questions, which are summarised above, are strictly interrelated and they all include one or more elements that are essential to draw the theoretical background of this thesis. Firstly, several notions of the concept of ‘development’, which is rooted in the notion of sustainable development, have been explored in this chapter. This can be defined as development that not only considers economic performance, but also fundamentally respects human needs and the long-term preservation of the environment.

Furthermore, the philosophical approaches and rationale behind the granting of IPRs in agriculture through the PVP policy have been described in this chapter in order to understand how IP law on plant variety protection should be implemented to promote sustainable development. The discussion has referred to a number of international documents, including the WTO/TRIPS Agreement, the CBD and the FAO documents. The above analysis has essentially shown that there is a process of interaction between IP and development. Specifically, the IP protection of plant varieties is particularly important in the context of IPRs in agriculture, because it touches on issues of poverty, rural development, food security, and environmental conservation and management.¹⁵⁵ All of these issues best capture the intention of the United Nations Millennium Development Goals, as well as Thailand’s own developmental goals, which include eradicating poverty, promoting freedom from hunger, and ensuring environmental sustainability.¹⁵⁶ Consequently, it can be said that the IP protection of plant varieties is important for the attainment of sustainable development.¹⁵⁷

Lastly, the factual background relevant to Thailand’s development needs has been explored in this chapter. It is clear that the protection of plant varieties is vital to Thailand, considering that agriculture is a fundamental economic activity that represents the livelihood of a large section of the total population; therefore the introduction of IPRs in agriculture via the PVP regime is critical to the development of agriculture in Thailand. With this conclusion, it has been emphasised in this chapter that the introduction of IPR

155. See Section 3.3.2.

156. See Sections 3.2 and 3.4.1.

157. See Section 3.3.

in agriculture in Thailand must broadly contribute to its sustainable development goals; therefore, it must be made to protect the interests of all the actors involved in agricultural practices. More specifically, plant variety protection through an IPR regime must be made to promote research into agricultural innovation and technology. Lastly, the IPR protection of plant varieties must be made compatible with the socio-economic background of Thailand, where agriculture is regarded as the source of livelihood for the majority of the Thai population, by recognising the rights of farmers and local farming communities. Thus, the policy goals of granting IPRs in agriculture through a PVP regime in Thailand should be made to promote sustainable development and be compatible with socio-economic conditions. Therefore, whether or not the Thai PVP framework promotes agricultural development in terms of the protecting the rights of farmers and breeders, how agricultural research is conducted, and how benefits are shared among players in agricultural management in Thailand are discussed in the next chapter.

Chapter 4

Contextualising Plant Variety Protection in Thailand

4.1 INTRODUCTION

The current statutory framework for plant variety protection in Thailand is examined in this chapter, as represented by the *Plant Variety Protection Act B.E.2542 (AD1999)* (PVP Act).¹ The examination involves an overview of Thailand's plant protection regime and a discussion of the key provisions of the Thai PVP Act. The main objective of this chapter is to address the central question related to the adequacy of the Thai PVP law in terms of promoting agricultural development in terms of protecting the rights of breeders and farmers, how agricultural research is conducted, and the way in which the benefits are shared among all the players involved in agricultural management in Thailand.

In order to achieve this objective, the question of whether or not Thailand adopts clear, coherent, and workable rules for the protection of plant varieties in response to the needs of all players in agricultural management is analysed

1. *The Plant Variety Protection Act B.E.2542 (1999)* (Thailand) (PVP Act of Thailand).

in this chapter.² It is the position of this thesis that the adequacy of the Thai PVP Act in terms of serving the interests of all actors in agricultural management is currently uncertain, and that this uncertainty may dilute the benefits of Thailand's plant protection regime.³ It is submitted for the purpose of this thesis that special attention must be paid to ensuring the clarity of Thailand's plant IP protection system, given the essential role of plant variety protection in promoting sustainable agricultural development.

The way in which the current PVP law came to be adopted in Thailand is explained in the next section, and this is followed by an examination of Thailand's plant variety protection. The legislative framework for plant variety protection in Thailand, currently represented by the PVP Act, is identified and discussed in this section in order to evaluate the statutory problems and limitations of its legal framework. The effect of the current PVP rules on Thailand's agricultural research and development is also considered and discussed. The institutional apparatus governing the area of plant variety protection in Thailand is addressed in a later section, while a conclusion of this chapter based on the foregoing discussions is drawn in the final section.

4.2 ENACTMENT OF THAILAND'S 1999 PLANT VARIETY PROTECTION ACT

4.2.1 COMPLIANCE WITH THE TRIPS AGREEMENT

Plant variety protection was only introduced in Thailand in the final round of the General Agreement on Tariffs and Trade (GATT) negotiations.⁴ Following the conclusion of the GATT in 1994, and later, the creation of the multilateral

2. The three players considered in this chapter are 1) farmers, 2) plant breeders, and 3) the government.

3. A recent study highlights the inadequacies of the legal framework for plant variety protection in Thailand. For a discussion see, Jade Donovanik, *Plant Variety Protection Law in Thailand* (Bangkok: Nititham Publishing, 2013) 21 (in Thai); Tanit Changtavorn, 'Law on Plant Variety Protection in Thailand' in the Thai Bar Association (ed), *Textbook on Intellectual Property Law in Thailand* (Bangkok, the Thai Bar Association, 2011) 290, 294 (in Thai); and Pawarit Lertdhamtewe, 'Plant variety protection in Thailand: the need for a new coherent framework' (2013) 8(1) *Journal of Intellectual Property Law and Practice*, 33-42.

4. There were eight multilateral trade negotiations during the GATT era (1947-1994). The final round is often referred to as the Uruguay Round.

trading system of the WTO in 1995, a minimum standard of protection of IPRs was established under the TRIPS Agreement. The TRIPS Agreement stipulates the requirements for many forms of IPRs protection, including the protection of plant varieties.⁵ Specifically, Article 27.3(b) of the TRIPS states that ‘members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof’.⁶ Therefore, as a member of the WTO, Thailand was required to establish laws and regulations that conformed to those of the WTO/TRIPS. In view of this commitment, Thailand embarked on a major campaign to revamp the legal framework of the protection of IPRs, pursuant to which outmoded laws were to be updated to meet the TRIPS standards. Specifically, new laws were to be enacted covering IPRs that had previously been unprotected, including plant variety rights. Thus, it can be said that the motivation for Thailand to embrace the framework for plant variety protection was the country’s commitment to the WTO/TRIPS regime.

4.2.2 DRAFTING HISTORY OF THAILAND’S PVP ACT

The process of drafting plant variety protection legislation was an ambitious one. With a view to fulfilling its TRIPS obligations, Thailand asked the relevant government agencies, namely, the Ministry of Commerce (MOC) and the Ministry of Agriculture and Cooperatives (MOAC), to study the impact and implication of introducing plant variety protection in Thailand.⁷ In 1994, the Thai government introduced two bills related to plant variety protection with similar contents. The only outstanding difference was that plant variety protection would be the responsibility of either the MOC or the MOAC, depending on which law was accepted.⁸

5. *Agreement on Trade-Related Aspects of Intellectual Property Rights in Marrakesh Agreement Establishing the World Trade Organization*, open for signature 15 April 1994, 1869 UNTS 229 (entered into force 1995) annex 1C (TRIPS Agreement).

6. *Ibid*, art. 27.3(b) [emphasis in original].

7. For a brief account of the historical background of Thailand’s PVP Act, see Jaroen Compeerapap, ‘The Thai Debate on Biotechnology and Regulations’ (1997) 32 *Biotechnology and Development Monitor*, 1315.

8. *Ibid*.

It is worth noting that the technical assistance to develop the PVP law in Thailand was directly provided by UPOV and a UPOV Member, Japan.⁹ Specifically, in 1994, UPOV organised a national workshop in Thailand to promote its model of PVP legislation with the financial assistance of Japan's Ministry of Agriculture, Forestry and Fisheries. Thus, the Thai government (i.e. MOAC and MOC) was advised by UPOV on the drafting and implementation of its PVP law. As a result, the contents of those two bills were based on the text of the 1978 UPOV Convention.¹⁰

4.2.3 PUBLIC CONSULTATION AND PASSING THE LAW

The introduction of the PVP Bills, which were modelled on the UPOV Convention, raised a substantial number of public debates and controversies.¹¹ Specifically, a number of domestic interest groups, including academics, farmers' representatives, research institutions, and non-governmental organisations (NGOs) protested against the inclusion of these two bills.¹² In order to find a compromise between the political dispute and local society, a Drafting Committee for Plant Variety Protection Bill was appointed by the government of Thailand in 1997. This Committee, which was composed of representatives from a broad spectrum of civil society, including plant breeders, farmers, academicians, NGOs and the private sector, was specifically established to redraft these two bills.¹³

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9. Rajeswari Kanniah, 'Plant Variety Protection in Indonesia, Malaysia, the Philippines and Thailand' (2005) 8(3) *Journal of World Intellectual Property*, 283, 285-7.
 10. *International Convention for the Protection of New Varieties of plants*, 33 UST 2703, 815 UNTS 109 (1961); revised by 33 UST 2703 (1978); revised by 815 UNTS 89 (1991) (UPOV Convention).
 11. For a brief overview discussion, see Supara Janchitfah, 'Patenting Mother Nature provokes outrage', *Bangkok Post* (Thailand) 4 January 1998.
 12. See e.g., Jakkrit Kuanpoth, 'Protection of Traditional Knowledge in the Face of Globalisation: Balancing Mechanism between CBD and TRIPS' (2009) 12(1) *Thailand Journal of Law and Policy*, available at <<http://www.thailawforum.com/articles/Legal-Protection-Of-Traditional-Knowledge.html>> (pointing out the two main arguments made by domestic interest groups against the inclusion of the PVP Bills. Firstly, he argues that the PVP Bill leans too much toward the demands made by foreign corporations. Secondly, he indicates that the draft PVP Bill especially failed to adequately recognise the rights of farmers, and that the law would have a detrimental effect on local plant breeders and the well-being of poor farmers in the country).
 13. Witoon Lianchamroon, 'Community Rights and Farmers' Rights in Thailand' (1998) 36 *Biotechnology and Development Monitor*, 9, 11. (noting that the government of

A compromise was finally reached toward the implementation of Thailand's plant protection regime and the response of the Drafting Committee toward the adoption of a plant variety protection law in Thailand was twofold. Firstly, the Drafting Committee decided to combine the two bills into a single bill rather than following the plant variety protection model available under the UPOV Convention. Secondly, the new draft of the Plant Variety Protection Act significantly included provisions that responded to the concept of farmers' rights by allowing individual farmers and local societies to hold farmers' rights over plant varieties.¹⁴ Specifically, the Thai PVP Bill was passed in 1999 as a result of a compromise between the concerns expressed by the NGO community and the pressure from local and foreign corporations to protect IPRs on plant varieties.¹⁵

Thailand formed a national committee composed of representatives from all sectors including plant breeders and farmers to redraft these two bills).

14. A large body of literature indicates that the *sui generis* system implies that all WTO Members can adopt any plant protection regimes suited to their particular needs and priorities including: Kuanpoth, above n 12; Victor Mosoti and Ambra Gobena, *International Trade Rules and the Agriculture Sector: Selected Implementation Issues* (FAO Legislative Study, 2007) at 107-66 available from <ftp://ftp.fao.org/docrep/fao/010/a1477e/a1477e00.pdf>; Srividhya Ragavan and Jamie Mayer, 'Has India Addressed Its Farmers' Woes?' (2007) 20 *Georgetown International Environmental Law Review*, 97, 100-01; Pawarit Lertdhamtewe, 'Asian approaches to international law: focusing on plant protection issues' (2013) 8(5) *Journal of Intellectual Property Law and Practice*, 388; Philippe Cullet, 'Intellectual Property Rights and Food Security in the South' (2004) 7(3) *Journal of World Intellectual Property*, 261, at 269; Thomas Cottier and Marion Panizzon, 'Legal Perspectives on Traditional Knowledge: The Case for Intellectual Property Protection' (2004) 7 *Journal of International Economic Law*, 371, at 375-76; Kal Raustialia, 'Compliance and Effectiveness in International Regulatory Cooperation' (2000) 32 *Case Western Reserve Journal of International Law*, 387, at 393-94; Graham Dutfield, *Intellectual Property Rights, Trade and Biodiversity: The Case of Seeds and Plant Varieties* (Inter-sessional Meeting on the Operation of the Convention, Background Paper, June 1999) at 50; Joseph Straus, 'Implications of the TRIPS Agreement in the Field of Patent Law' in Friedrich-Karl Beier and Gerhard Schrickler (eds), *From GATT to TRIPS-The Agreement on Trade-Related Aspects of Intellectual Property Rights* (Munich: Max Planck Institute for Foreign and International Patent, Copyrights and Competition Law, 1996) 160; Michael Blakeney, *Trade-Related Aspects of Intellectual Property Rights: A Concise Guide to the TRIPS Agreement* (London: Sweet & Maxwell, 1996) 83; and also, Carlos M. Correa, 'The GATT Agreement on Trade-Related Aspects of Intellectual Property Rights' (1994) 8 *European Intellectual Property Review*.
15. Kanniah, above n 9, 285; Compeerapap, above n 7, 1315; Changtavorn, above n 3, 294; Lertdhamtewe, above n 3, 34; Kuanpoth, above n 12; Janchifah, above n 11; Lianchamroon, above n 13, 11; and Witoon Lianchamroon, 'Intellectual Property Rights on Genetic Resources: Case Study of Thailand' (Paper presented at the Southeast Asian meeting of the Crucible Group, 7 to 9 May 1996) cited in Genetic Resources Action International, 'UPOV: Getting a Free TRIPS Ride?' (1996) available from <http://www.grain.org/seedling/?id+161>.

4.3 LEGAL PROBLEMS GOVERNING PLANT PROTECTION IN THAILAND

4.3.1 MAJOR CONCERNS ABOUT THE RIGHTS OF FARMERS AND LOCAL SOCIETIES

Thailand's PVP Act provides legal protection for existing varieties in an attempt to create 'special and differential' (S&D) treatment in favour of farmers and local communities by classifying existing varieties into two main categories: (A) local domestic plant varieties and (B) general domestic plant and wild plant varieties.

A. Controversy surrounding Local Domestic Plant Variety Protection

The protection of local domestic plant varieties was introduced in Thailand's PVP law as a means to provide farmers and local communities who take care of the existing plant varieties found within Thailand's territory with exclusive monopolistic rights.¹⁶ Since the objective is to balance plant breeders' rights with those of farmers and local communities, the Act recognises the vital role of farmers and indigenous local communities in protecting traditional knowledge and indigenous rights by enabling them to register local domestic plant varieties.¹⁷ Interestingly, there is no specific mention of the "rights of farmers" or "rights of local indigenous communities" in the Thai PVP Act; rather, the term "local domestic plant variety" is used as a way to refer to the recognition of those rights.

16. The PVP Act of Thailand, above n 1, § 47, which explicitly acknowledges that the local government organisation, farmers' group, or cooperative, as owners of the local domestic plant variety, can enjoy the exclusive rights to develop, study, conduct an experiment or research, produce, sell, export, or distribute the propagated material by any means.

17. Ibid, § 44(1), (2) and (3), which stipulates that the local domestic plant variety can be registered by an individual or a single community, which must provide the method of its conservation or development and the landscape, together with a concise map showing the boundary of the community and adjacent areas, as well as the list of members of the community.

However, there is currently some uncertainty as to whether farmers and local communities have actually benefited from this set of provisions.¹⁸ Although there is a statutory framework in place for the registration of local domestic plant varieties, no farmers and local communities have yet been able to register their varieties under the current Thai plant variety protection system. Some commentators suggest that a fundamental flaw exists in that these varieties generally fail to meet the eligibility requirements for the protection of local domestic plant varieties.¹⁹ According to the Act, the local domestic plant variety need not be novel,²⁰ but they must meet the other eligibility criteria of distinctiveness,²¹ uniformity,²² and stability.²³ The definitions of distinctiveness, uniformity, and stability (DUS) are based on the same premise as the new plant variety, given that the criteria of DUS in Thailand's PVP provisions exclude local varieties developed by farmers and local communities from protection because they are more heterogeneous genetically and less stable.²⁴ Nonetheless, the uncertainty about whether or not farmers and local communities can benefit from the PVP provisions is not only because their varieties do not meet the requirements of distinctiveness, uniformity and stability; the registration requirements may contain other problematic factors, such as culture and tradition, which could flow from one place to another. For instances, the Thai PVP Act indicates that a plant variety capable of being

18. See Lertdhamtewe, above n 3, at 33-42.

19. See Rohan Dang and Chandni Goel, 'Sui Generis Plant Variety Protection: The Indian Perspective' (2009) 1(4) *American Journal of Economics and Business Administration*, 303 at 307; and Pawarit Lertdhamtewe, 'Effective Plant Variety Protection as Development Policy: A Perspective for Thailand' (2011) 14(1) *Thailand Journal of Law and Policy*, available from <<http://www.thailawforum.com/articles/plant-variety-protection-as-development-policy-for-Thailand.html>>.

20. The PVP Act of Thailand, above n 1, § 3, which defines 'local domestic plant variety' as "a plant variety which exists only in a particular locality within Thailand and has never been registered as a new plant variety and which is registered as a local domestic plant variety under this Act".

21. Ibid, § 11(3), ("having the particular features distinct from other varieties in respect of shape or appearance, or having any characteristic resulting from the expression of the genotype distinct from other plants.").

22. Ibid, § 11(1), ("being of uniformity in the particular features of the variety in respect of shape and appearance or in respect of other characteristics resulting from the expression of the genotype specific to such plant variety.").

23. Ibid, § 11(2), ("being stable in the particular features of the variety which are capable of expressing such particular features in every cycle of the production of the propagating material of such plant.").

24. Claudio Chiarolla, 'Commodifying Agricultural Biodiversity and Development-Related Issues' (2006) 9(1) *Journal of World Intellectual Property*, 25, at 29.

registered as a local domestic plant variety must only exist in a particular locality within Thailand.²⁵ The Act further provides that:

When a plant variety exists in a particular locality and has been conserved or developed exclusively by a particular community, that community shall have the right to submit, to the local government organisation in whose jurisdiction such community fall ...²⁶

Obviously, a plant variety may relate to more than one community, so that no one can specifically claim the right to register and benefit from the PVP provisions.²⁷ Thus, since no-one is able to register local domestic plant varieties under the Thai current PVP regime, it is doubtful if farmers and local communities can benefit from it.

B. Core Concerns about the Protection of General Domestic Plants and Wild Plant Varieties

Another set of provisions that provide S&D treatment in favour of farmers and local communities relates to the protection of general domestic plants and wild plant varieties²⁸ and encompasses everything in the public domain, including materials traditionally cultivated by farmers or of which farmers possess common knowledge. Thus, it meant to emphasise common knowledge and strengthen the protection of traditional knowledge rights (prior art).²⁹ However, there is currently much debate about the capability of these provisions to protect the knowledge of farmers and local communities and its effectiveness

25. The PVP Act of Thailand, above n 1, § 3.

26. Ibid, § 45(1) [emphasis added].

27. Sun Thathong, 'Rethinking Strategies in Legal Protection of Traditional Knowledge – A Case Study of Thailand' (2009) 2(2) *Journal of the Thai Justice System*, 97 at 111 (arguing that it is impossible to define a suitable single definition for the concept of "local community" since people move from one community to another).

28. The PVP Act of Thailand, above n 1, § 52. The Thai PVP Act deems "general domestic plant" as 'a plant variety originating or existing in the country and commonly exploited and shall include a plant variety which is not a new plant variety, a local domestic plant variety or a wild plant variety,' while "wild plant varieties" is defined as 'a plant variety, which currently exists or used to exist in the natural habitat and has not been commonly cultivated'.

29. See Pawarit Lertdhantewe, 'Implementing the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement): A Case Study of Thailand's Plant Protection Issues' (Paper presented at the Research Symposium on International Economic Law, Australian and New Zealand Society of International Law, 25 February 2011) at 15-16.

remains open to question. Supporters of Thailand’s PVP Act argue that the provisions to provide protection for general domestic plant and wild plant varieties reflect a sense of consideration to capture all plant varieties within the sovereign domain.³⁰ However, critics propose that the adequacy of such protection is open to challenge, considering that such varieties are often subjected to broad distribution or belong to the public domain so that it may be difficult to distribute any profits among local custodians.³¹ Therefore, whether or not the legal protection of general domestic plants and wild plant varieties provided by the Thai PVP Act meets the needs of farmers and local communities remains questionable. It can be noted from the provisions in the Thai PVP law that the statute does not require general domestic plants and wild plant varieties to be registered; thus, in fact, it leaves all existing plants unprotected (see Box 1).

Box 1. Chapter V – Protection of General Domestic and Wild Plant Varieties

Section 52. A person who collects, procures, or gathers general domestic plant varieties, wild plant varieties or any part of such plant varieties for the purposes of variety development, education, experiment or research for commercial interest shall obtain permission from the competent official and make a profit-sharing agreement under which income accruing therefrom shall be remitted to the Plant Varieties Protection Fund in accordance with the rules, procedure and conditions prescribed in the Ministerial Regulation.

The profit-sharing agreement shall at least have the following particulars:

- (1) the purpose of the collection and gathering of the plant variety;
- (2) the amount or quantity of samples of the intended plant variety;
- (3) the obligations of the person to whom permission is granted;
- (4) the stipulation as to intellectual property rights in the products which result from the development, study, experiment or research of or into the plant variety and which are derived from the use of the plant variety under the agreement;
- (5) the stipulation as to the amount or rate of, or the term for, the profit-sharing under the profit-sharing agreement in respect of products derived from the use of the plant variety thereunder;
- (6) the term of the agreement;
- (7) the revocation of the agreement;
- (8) the stipulation as to the dispute settlement procedure;
- (9) other items of particular as prescribed in the Ministerial Regulation.

Source: the Plant Variety Protection Act B.E.2542 (1999) of Thailand

30. Daniel F. Robinson, ‘Exploring Components and Elements of Sui Generis Systems for Plant Variety Protection and Traditional Knowledge in Asia’ (ICTSD Programme on IPRs and Sustainable Development, March 2007) at 31 (arguing that the emphasis on the protection of general domestic plant and wild plant varieties in the Thai PVP law seeks to strengthen farmers and local communities’ rights and protect traditional knowledge rights); Jakkrit Kuanpoth, ‘Legal Protection of Traditional Knowledge: A Thai Perspective’ (2007) 34 *Tech Monitor*, 38; and Kuanpoth, above n 12.
31. Lertdhamtewe, above n 3, at 17.

As a result, materials traditionally cultivated by farmers, or of which farmers possess common knowledge, are open to illegitimate appropriation. The appropriation of such knowledge is not new in Thailand,³² and the registration of the Thai traditional fruit named *Papaya* is a good example of this.³³ Native Thai fruit (*Papaya*) has long been cultivated by Thai farmers, communities and households, and recorded in Thailand's traditional palm leaf book; yet it was registered as a new plant variety right in 2008. Potentially, other Thai farmers may have benefitted from the free cultivation of *Papaya*, but the existence of a new plant variety right limited other Thais from conducting further research and making the best use of what is distinctly Thai traditional fruit (national public domain property). It appears that, in the examination process, the Registry Office had insufficient knowledge about the documents establishing prior art, which would have made the claimed variety fail the novelty test.

C. Disputes over Permit Licences for the Use of Existing Varieties and Benefit-Sharing through the Plant Variety Protection Fund

The Thai PVP Act essentially details access and benefit-sharing rules for general domestic plants and wild plant varieties. A range of stipulations needs to be made with regards to IP rights, including the intention of those seeking

32. There were a number of incidents concerning the expropriation and patenting of Thai traditional knowledge, even before the enactment of the Thai PVP law. The patenting of medicinal extract of plants from *Plao Noi* by a Japanese corporation is a classic example. A more famous example relates to a number of incidents concerning the expropriation and patenting of a Thai medicinal herb named *Kwao Krua* (*Pueraria Mirifica*), which has been well known for its cosmetic and revitalising qualities for more than a century by Thai healers, communities and households. See Daniel Robinson and Jakkrit Kuanpoth, 'The Traditional Medicines Predicament: A Case Study of Thailand' (2009) 11(5) *Journal of World Intellectual Property*, 375; Rhys Manley, 'Developmental Perspectives on the TRIPs and Traditional Knowledge Debate' (2006) 3 *Macquarie Journal of International and Comparative Environmental Law*, 113; Michael Woods, 'Food for Thought: the Biopiracy of Jasmine and Basmati Rice' (2002) 13 *Albany Law Journal of Science and Technology*, 123, 139; and Michael Blakeney, 'Bioprospecting and Biopiracy' in Burton Ong (ed), *Intellectual Property and Biological Resources* (Singapore: Marshall-Cavendish, 2005) 393; Thathong, above n 27, 100

33. *Papaya* has been granted protection under the PVP Act of Thailand, see, Plant Variety Protection Division, *Report on Protected Plant Varieties* (Bangkok, Ministry of Agriculture and Cooperatives, Thailand) available from <<http://m.doa.go.th/pvp/newpvp.htm>>.

access. Currently, the law requires permission to be granted by government officials for collection, use, development, and research for commercial interests.³⁴ In other words, a permit licence is required when activities are conducted for commercial interests, and questions can be raised about the type of such requirements. The statute provides the same level of treatment to users of general domestic plants and wild plant varieties who have widely different levels of income, including subsistence farmers who sell existing varieties for their survival rather than profit. The absence of an exemption to licence seems to create regulatory ambiguity; more importantly, non-compliance with this procedural rule could lead to severe punishment. The PVP law tries to deter infringement by providing stringent penalties of THB 400,000 (about US\$14,000) or imprisonment for a term not exceeding two years, or both.³⁵ In a country like Thailand where literacy among the farming community is limited, this can result in farmers forfeiting more commitments than they intended. Unfortunately, forfeiting rights are important to enable farmers and farming communities to continue their livelihood and maintain agro-biodiversity conservation and innovation at local levels.

Furthermore, the Thai PVP Act establishes a Plant Variety Protection Fund (PVP Fund), which accrues income from the profit-sharing agreements, collection, use, research, or commercialisation of general domestic plants or wild plant varieties, registration fees, and other sources.³⁶ The PVP Fund is intended to assist the conservation and development of domestic and wild relatives of plant varieties by local farming societies.³⁷ However, a recent study indicates that local farmers' groups are hesitant about the prospect of benefits arising from the PVP Fund, and they are also sceptical that the government can adequately deliver benefits in a timely, fair and equitable manner.³⁸ A range of Thai farmers' organisations, such as the Alternative Agriculture Network, prominent NGO activists, academics, and even

34. The PVP Act of Thailand, above n 1, § 52.

35. Ibid, § 66.

36. Ibid, § 54 and 59.

37. Ibid, § 55, which indicates that only citizens of Thailand or firms or organisations formed or established in Thailand are eligible to claim such benefits.

38. Daniel Robinson, 'Sui Generis plant variety protection systems: liability rules and non-UPOV systems of protection' (2008) 3(10) *Journal of Intellectual Property Law and Practice*, 659, at 663.

government officials, have also expressed an opinion that the monetary rewards from the PVP Fund are disconnected from the farmers. Moreover, the dearth of regional offices among local communities in Thailand could also pose procedural and technical complications for farmers, requiring them to apply to remote offices. Consequently, it is argued that local farming communities are generally left uncompensated.

4.3.2 PROBLEMS CONCERNING PLANT BREEDERS' RIGHTS PROTECTION

Chapter III of the Thai PVP Act, entitled "Protection of New Plant Varieties," provides a comprehensive set of provisions that attempt to protect the rights of plant breeders. While the Thai PVP law deviates from certain aspects of UPOV, the fact remains that many provisions for breeders' rights in Thailand's PVP law are taken from the UPOV system.³⁹ Some current issues of the protection of breeders' rights in the Thai PVP law are analysed in the following four parts:

- (a) Eligibility Standards for Protection
- (b) Duration of Protection
- (c) Scope of Breeders' Rights
- (d) Compulsory Licensing provision

A. Low Eligibility Standards for Protection

Thailand's PVP Act confers breeders with rights over new, distinctive, uniform, and stable varieties.⁴⁰ The standard of novelty is defined in terms of commercial novelty, which means that the application material is the standard for determining novelty prior to sale.⁴¹ No other conditions are required, since neither the equivalent inventive step nor the industrial application applies.

39. See Section 4.2; and also see, Kuanpoth, above n 12; and Robinson, above n 30, 17.

40. See the PVP Act of Thailand, above n 1, § 11 and 12.

41. Ibid, § 12(1) ("A plant variety capable of registration as a new plant variety under this Act shall be of the following descriptions: (1) being a plant variety the propagating material of which has not been exploited, whether by means of sale or distribution in any manner whatsoever, in or outside the Kingdom by the breeder or with the breeder's consent for more than one year prior to the date of filing the application [...].").

Obviously, the exact scope of the novelty requirement in the Thai PVP law is similar to the criteria of novelty under the UPOV Convention. Thus, no specific degree of human intervention is necessary in order to qualify for protection.⁴² As a result, plant varieties, including commonly-known varieties and plants growing in the wild, may be eligible for protection as new, provided that they have not been sold or otherwise distributed for more than one year. This holds true in the case of *Papaya*, which, as previously mentioned, is prominently regarded as a common and well-known fruit in Thailand.⁴³ This was specifically granted protection because no previous application had been successful.

A more classic example relates to the registration of a Thai herbal plant named “*Prik*” or “Chilli.” Like *Papaya*, *Prik* is a common well-known variety (herb) in Thailand.⁴⁴ *Prik* is rarely sold because it is commonly found in most backyards.⁴⁵ However, under the Thai PVP Act, *Prik* can be deemed as being “new,” provided that it has not been previously sold or discovered, and the species is still not classified.⁴⁶ Following the registration of the first “Chilli” in 2004, four more versions were registered as new plant varieties under the Thai PVP law (all in 2011),⁴⁷ and at the time of writing, 11 more applications are currently under review for the registration of “Chilli” as new plant varieties in Thailand. This emphasises that the novelty standard under the Thai law may not exclude well-known plants that are commonly found in Thailand; thus, rather than stimulating innovative plant breeding activities, the low novelty

42. See Donovanik, above n 3, 21; Changtavorn, above n 3, 294-5; and Lertdhamtewe, above n 3, 35.

43. Registration Number 11/2551 (2008).

44. Registration Number 30/2547 (2004).

45. See A. Apichartsrangkoon, P. Chaikham, S. Srisajjalertwaja, P. Chunthanom, and K. Dajanta, ‘Aroma volatile profiles of Thai green chilli paste (*Nam Prig Noom*) preserved by ultra-high pressure, pasteurization and sterilization’ (2013) 20(4) *International Food Research Journal*, 1739, 1739; and Simon Robinson, ‘Chilli Peppers: Global Warming’, *India’s Time* (June 14, 2007) (providing a brief overview of chilli peppers in Thailand).

46. *Prik* or Chilli has been granted legal protection under the PVP Act of Thailand, see, Plant Variety Protection Division, *Report on Registered Plant Varieties* (Bangkok, Ministry of Agriculture and Cooperatives, Thailand 2012) also available online from <<http://w.doa.go.th/pvp/newpvp.htm>>.

47. Registration Number 78/2554; Registration Number 79/2554; Registration Number 80/2554; and Registration Number 81/2554, see, Plant Variety Protection Division, *Report on Registered Plant Varieties* (Bangkok, Ministry of Agriculture and Cooperatives, Thailand 2012) also available online from <<http://w.doa.go.th/pvp/newpvp.htm>>.

standard set by the Thai PVP Act results in common and well-known plants, like *Prik*, passing the novelty requirements. A plant variety that fulfils the novelty requirements must also be distinctive to be eligible for protection.⁴⁸

Under the UPOV Convention, a plant variety is considered to be distinctive if it is ‘clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of the filing of the application’.⁴⁹ Unlike the UPOV, distinctiveness in the Thai PVP law is determined by distinguishing the application material from other existing plant varieties related to cultivation, consumption, pharmacy, production or transformation.⁵⁰ This is clearly a higher standard than UPOV requires. Yet, even here, distinguishing the application material from other existing plant varieties is inconsequential for finding distinctiveness because the application materials have to be compared with other existing varieties in order to pass the distinctiveness test. Thus, the application material can pass the requirement of distinctiveness under the Act as long as it is distinguishable from any other existing variety. In other words, the application material can still qualify as being “distinctive” even if it is indistinguishable from common and well-known varieties that are not officially registered under Thai law. Again, *Prik* and *Papaya* can be used as examples, since they have been granted protection because no application for protecting these plants has been successfully made in Thailand. When read alongside the low standard of novelty, a common and well-known variety can be novel and distinctive under the Thai PVP Act, provided that it has not been sold or disposed of for more than one year and is distinguishable from other registered plant varieties. This seems to imply that

48. The PVP Act of Thailand, above n 1, § 12.

49. UPOV Convention, art. 7. The provision of UPOV Article 7 continues (“the filing of an application for the granting of a breeder’s rights ... shall be deemed to render that other variety a matter of common knowledge from the date of the application, provided that the application leads to the granting of a breeder’s right or to the entering of the said other variety in official register of variety.”).

50. The PVP Act of Thailand, above n 1, § 12 (“being distinctive from other plant varieties existing on the date of filing the application, provided that such distinctiveness is related to a feature beneficial to the cultivation, consumption, pharmacy, production or transformation, including the distinctness from the following plant varieties: (a) plant varieties already registered and protected, whether in or outside the Kingdom, prior to the date of filing the application; (b) plant varieties in respect of which application for registration has been made in the Kingdom and which will subsequently have been registered.”).

Thailand's plant protection regime promotes non-innovation to the level of an invention by using a combination of a low distinctiveness requirement and diluted standards of novelty.

A new plant variety that is novel and distinctive must also be "uniform" and "stable" in order for breeders to receive intellectual property protection under the Thai PVP Act.⁵¹ Generally speaking, a plant variety should be the same or extremely similar with the certain degree of similarity depending on the nature of the propagating method.⁵² Stability is achieved if plants remain unchanged during the successive production or propagation.⁵³ Obviously, the uniformity and stability standards are not hard to meet because breeders can generally be crafted to accommodate the peculiar needs of plant breeding. This version of eligibility standards has resulted in encouraging the appropriation of genetic material in Thailand's public domain and its protection as an invention. Again, the registrations of *Prik* and *Papaya* serve as outstanding examples.

Overall, breeders of new plant varieties can be eligible for protection if their varieties meet four distinctive criteria: they must be novel, distinctive, uniform and stable. However, the overall low eligibility standards set by Thailand's PVP Act can result in encouraging the appropriation of plant genetic materials and protecting them as premium inventions. Thus, if the Thai PVP Act is to create a *sui generis* regime that can stimulate innovative plant breeding activities, the criteria for protectability need to be more clearly defined.

B. Short Term of Protection

The duration of protection under the Thai PVP Act also questions the adequacy of the Thai law to support the rights of breeders because it seems to

51. See the PVP Act of Thailand, above n 1, § 11.

52. Ibid, § 11(1) ("Being of uniformity in the particular features of the variety in respect of shape and appearance or in respect of other characteristics resulting from the expression of the genotype specific to such plant variety.").

53. Ibid, § 11(2) ("Being stable in the particular features of the variety which are capable of expressing such particular features in every cycle of the production of the propagating material of such plant.").

be too narrow.⁵⁴ Under the Thai PVP Act, new plant variety rights have a specific term of 12 or 17 years, depending on the type, i.e. shorter than that of the UPOV, which provides a minimum 20-year term of protection.⁵⁵ While the Thai PVP law provides various durations of protection in line with critics who disapprove of affording the same duration of protection to different types of technology,⁵⁶ the shorter term of protection provided for new plant varieties raises the question of whether it is adequate to protect breeders who have to undergo an enormous amount of costly breeding work.

Breeding a new commercial plant variety is, in fact, an extremely laborious and time-consuming process.⁵⁷ It takes about seven to ten years from the first cross to producing a marketable variety. The first task is to determine the objective of the breeding programme. One obvious goal is to produce varieties with higher yields, but there are many other possible objectives, such as the development of varieties with added or improved characteristics, such as resistance to pests or diseases, tolerance to drought, compatibility with inputs such as fertilisers and pesticides, and improved consumption or food-processing characteristics. A major challenge for breeders is to respond to the requirements of various farming conditions on the one hand, and to the need to

54. This view is shared by many scholars, including the following: Donovanik, above n 3, 29; Changtavorn, above n 3, 294; Adam Masarek, 'Treetop View of the Cathedral: Plant Variety Protection in South and Southeast Asian Least-Developed Countries' (2010) 24 *Emory International Law Review*, 433; and Pawarit Lertdhamtewe, 'Thailand's plant protection regime: a case study in implementing TRIPS' (2012) 7(3) *Journal of Intellectual Property Law and Practice*, 186, 191 (arguing that the term of protection in the Thai *sui generis* PVP law appears to provide a shorter term than that offered by the UPOV Convention).

55. See the PVP Act of Thailand, above n 1, § 31, ("The certificate of registration of a new plant variety shall be valid for the following: (1) In respect of the plant which is capable of giving such fruits as expected of the specific features of the variety after the cultivation of its propagating material within the period of not over two years; twelve year; (2) In respect of the plant which is capable of giving such fruits as expected of the specific features of the variety after the cultivation of its propagating material within the period of over two years; seventeen years. [...]").

56. Many scholars share this view, see for instance, Masarek, above 54, 463-4; Philippe Cullet, 'Plant Variety Protection in Africa: Towards Compliance with the TRIPS Agreement' (2001) 45(1) *Journal of African Law*, 97, 121 (arguing that it is important to allocate different durations to different rights); Dan L. Burk and Mark L. Lemley, *The Patent Crisis and How the Courts Can Solve It* (Chicago, University of Chicago Press, 2009) 32-33; and Robinson, above n 30, 22 (also suggesting that countries should shorten the term of protection for new plant varieties to limit the breeders' exclusive rights).

57. See Graham Dutfield and Uma Suthersanen, *Global Intellectual Property Law* (Cheltenham: Edward Elgar, 2008) 182.

develop varieties that can be widely sold on the other. Furthermore, they increasingly have to respond to the ever-changing demands of conglomerate seed and chemical companies, food-processing companies, and supermarket chains.⁵⁸ One of the most important roles of a PVP system is to provide breeders with exclusive monopolistic rights over their seeds (varieties). This is to enable breeders to generate profits, thereby rewarding them and providing an incentive for further research and development.⁵⁹ More importantly, recent scholarships, which conduct empirical studies on the term of protection (mainly in the field of patent law),⁶⁰ indicate that offering protection for longer than the other IPR system will increase creators' incentive to apply for protection because the reward will be greater, i.e. monopoly for an extended period. At the same time, offering protection for a shorter period will dilute creators' incentive to apply for protection because the reward will be relatively smaller than it is in other countries.⁶¹ It is clear that the shorter term in the

58. Ibid, 183.

59. This view is shared by many scholars, see for example, Dutfield and Suthersanen, above n 57, 184 (describing that with no law to prevent them, there is nothing to stop any parties from replanting harvested seed, or even multiplying seed for the purpose of selling it in competition with the owner (breeder). This is where IPRs come into play); Philippe Cullet, 'Intellectual Property Rights and Food Security in the South' (2004) 7(3) *Journal of World Intellectual Property*, 261, 264 (suggesting that the legal protection offered by IPRs is one of the most important incentives for private sector involvement in agro-biotechnology. Thus, PVP plays a vital role in ensuring the participation of the private-sector in the development of improved plant varieties); Neil D. Hamilton, 'Legal Issues Shaping Society's Acceptance of Biotechnology and Genetically Modified Organisms' (2001) 6 *Drake Journal of Agricultural Law*, 81; and Surinder Kauer Verma, 'Fitting Plant Variety Protection and Biotechnological Inventions in Agriculture Within the Intellectual Property Framework: Challenges for Developing Countries' (UNCTAD/ICTSD Regional Dialogue, 8–10 November, Hong Kong, 2004) 10.

60. A great deal of academic literature provides empirical evidence of the term of IPR protection, see for instance, Nancy T. Gallini, 'The Economics of Patents: Lessons from Recent U.S. Patent Reform' (2002) 16(2) *Journal of Economic Perspectives*, 131-154 (providing an excellent essay with a comprehensive review of the recent theoretical literature on economic studies of patent policy in the US); Richard Posner, 'Intellectual Property: The Law and Economic Approach' (2005) 19(2) *Journal of Economic Perspectives*, 57, 60 (discussing the duration of copyright protection under US law); Andrew F. Christie and Fiona Rotstein, 'Duration of patent protection: does one size fit all?' (2008) 3(6) *Journal of Intellectual Property Law and Practice*, 402, 408 (analysing the optimum duration of patent protection, including patenting on plant-related inventions); Ryan Lampe and Anthony Biblett, 'The Economics of Patent Design: A Select Survey' (IPRIA Working Paper No. 06/03, 2003) (providing theoretical work on the design of patent protection); Michael Berkowitz and Yehuda Kotowitz, 'Patent Policy in an open economy' (1982) 15(1) *Canadian Journal of Economics*, 1 (examining the optimal patent term in the case of competitive inventors).

61. This view is shared by many scholars, see for instance, Gallini, above n 60, 139; Christie and Rotstein, above n 60, 408; Masarek, above n 54, 464; Verma, above 59,

existing Thai PVP Act appears to provide little incentive for breeders to apply for protection. According to the registration figures, 525 applications were made for new plant variety protection, but there were only a total of 101 plant variety rights in force at the end of 2012 (see Figure 2).⁶² This number in force can be considered to be minimal, given that the PVP Act has been in force for more than a decade.⁶³ As discussed in Chapter 3, there are more than a thousand plants with the potential for registration when considering the biological materials in Thailand.

Figure 2: Plant Varieties Registered in Thailand

Type of Crop Varieties	Numbers of Crops with Registered Plant Varieties	Type of Registrants	Numbers of Registration
Field Crops	28	Local plant breeders and farmers	13
Fruit Crops	13	The Thai government	17
Vegetables	31	Academic and research institution	1
Ornamentals	16	Transnational seed corporations	70
Trees	13	-	-
Total	101	Total	101

Source: Plant Variety Protection Division, Report on Plant Varieties (Bangkok, Ministry of Agriculture and Cooperatives, Thailand 2012).

The only impressive term of protection in the Thai PVP law is the sub-categorisation of the protection term that applies to trees (27-year term of protection).⁶⁴ This additional duration of protection is provided for trees because these types of plant varieties typically do not become obsolete in the sense that the breeding of a new and better tree is a relatively rare

10; and Alan O. Sykes, 'TRIPs, Pharmaceuticals, Developing Countries, and the Doha "Solution"' (John M. Olin Law & Economics Working Paper 140, The Law School, The University of Chicago, 2002) 16-7.

62. Detailed registrations of new plant varieties in Thailand are listed in Annex VII.

63. Significant numbers of plant variety rights can be seen to have been granted in other nations, such as The Netherlands, Germany, France, Denmark, the United Kingdom, Italy, Belgium and Spain, see, Paul van der Kooij, 'Towards an EC directive on plant breeder's rights?' (2008) 8(2) *Journal of Intellectual Property Law and Practice*, 97 (providing empirical data concerning plant variety rights granted and applications).

64. The PVP Act of Thailand, above n 1, § 31, ("The certificate of registration of a new plant variety shall be valid for the following: [...] (3) In respect of the plant which it of tree-based utilisation and capable of giving fruits in accordance with the specific features of the variety after the cultivation of its propagating material within the period of over two years; twenty seven years.").

occurrence.⁶⁵ This term of protection is longer than that prescribed in the UPOV. Yet, even here, there has been no thorough economic analysis to determine the optimum duration of protection, and it still remains to be seen whether this longer period of protection will create an unnecessary burden on society or provide unreasonably large profits for the holders of such plant varieties.⁶⁶

The short term of protection is coupled with a delay in the application process. Empirical evidence shows that part of the term of protection is automatically consumed by the typical delay in the process and prosecution of the application. Specifically, the average time for examining and inspecting an application is approximately 12 to 24 months,⁶⁷ and as a result of this delay, plant breeders' rights are certain to receive less than the full term of protection for their varieties. Thus, the short term of protection and the reduction in the protection term for plant varieties can be viewed as reducing the incentive to invest in new plant varieties, and further diluting the benefits of Thailand's PVP law.⁶⁸

C. Debates over the Scope of Breeders' Rights

While the Thai PVP Act grants exclusive monopolistic rights to plant breeders, these exclusive rights are subject to certain exceptions,⁶⁹ and this also raises

65. Masarek, above n 54, 464; Lertdhamtewe, above n 3, 38.

66. Donavanik, above n 3, 29; Changtavorn, above n 3, 294; and Lertdhamtewe, above n 5, 38.

67. Interview with Dr Tanit Changtavorn, Ministry of National Resources and Environment, Thailand; Associate Judge of the Central Intellectual Property and International Trade Court of Thailand and current member of the Plant Variety Protection Commission. See Plant Variety Protection Division, *Procedure and Guideline for the Examination of New Plant Variety Protection Application* (Bangkok, Ministry of Agriculture and Cooperatives, Thailand) available from <<http://m.doa.go.th/pvp/newpvp.htm>> (in Thai).

68. This is discussed in more detail in Section 3.4.

69. See the PVP Act of Thailand, above n 1, § 33 (“(1) the act relates protecting a new plant variety without the intention to use it as propagating material; (2) the education, study, experiment or research related to a protected new plant variety for the purpose of breeding or developing plant varieties; (3) the act relates to a protected new plant variety committed in good faith; (4) the cultivation or propagation by a farmer of a protected new plant variety from the propagating material made by himself, provided that in a case where the Minister, with the approval of the Commission, publishes that new plant variety as a promoted plant variety, its cultivation or propagation by a farmer may be made in the quantity not exceeding three times the quantity obtained; (5) the act relating to a protected new plant variety for non-commercial purposes; and

the question of the clarity of text of the PVP Act. Based on this provision, no authorisation is required from breeders of new protected plant varieties in cases where the protected variety is sought for breeding or other research activities for the purpose of obtaining a second-generation variety. The clause of experimental exemption is also unclearly defined.⁷⁰ The issue of concern here relates to the use of the protected variety as a source of initial variation, which is considered to be problematic. Apparently, the statute does not indicate who holds the ownership rights of new varieties resulting from a protected variety.⁷¹ Imagine that a farmer uses his personal experimental allowance under the Thai PVP law to derive Berry *Y*, whether or not it is clearly distinguishable from the protected variety, say Fruit *X*, the farmer derives Pea *Z* from Berry *Y*. Even if Pea *Z* is clearly distinguishable from Berry *Y*, the question arises as to who will have the legal rights over Berry *Y* and Pea *Z* (the farmer or the breeder of the initial variety?). In such circumstances, the lack of clarity of the statute seems to have the potential to cause a dispute between breeders and other actors. From the perspective of a country concerned with exploiting new varieties for the purpose of stimulating innovation in plant breeding, little is gained from defining the scope of plant breeders' rights and the extent of its limitations. Therefore, this provision needs to be reconsidered to enable the system to effectively protect plant breeders' rights.

D. Problems related to Compulsory Licensing provision

Out of concerns related to the fear of creating the monopolisation of food brought about by the IPR regime, Thailand's PVP Act contains a specific provision that provides another exception to the rights of plant breeders. This provision is often referred to as "compulsory licensing". Interestingly, the compulsory licensing provision in Thailand's plant protection regime provides a venue for persons other than plant breeders to use the protected new plant

(6) the sale or distributed by any means, importation or exportation of, or having in possession for the purpose of any of the aforesaid activities, the propagating material of the protected new plant variety which has been distributed by the right holder or with the right holder's consent.").

70. Ibid, § 33.

71. Ibid.

variety.⁷² The Director-General of the Department of Agriculture has the power to authorise a third party to use such a protected variety without the authorisation of the plant breeder.⁷³

Similar to the exceptions to breeders' rights, the compulsory licensing provision in the Thai PVP Act seems to create potential problems. While there is no case law that relates to compulsory licensing, a number of points are worth noting. To begin with, the Thai PVP Act does not limit the scope of the licensees, which means that the licensees may include competitors of the holder of the plant variety.⁷⁴ Another problem with the compulsory exception provision is that no time limit is imposed on the duration of licence use. Apparently, there is no provision in the Thai PVP Act that would lead to the termination of the compulsory licence if the circumstances that led to its issuance cease to exist.⁷⁵ More importantly, the breeder does not have the right to appeal against an order to issue a compulsory licence before an independent administrative body or court, which means that breeders are systematically denied access to justice under the Thai PVP law. In failing to provide adequate protection, the Thai PVP law can be identified as being the basic reason why there are only 101 registered plant variety rights in the whole of Thailand.

72. The PVP Act of Thailand, above n 1, § 37, para. 1 (“Upon the expiration of three years as from the date of the registration of a new plant variety, other persons may file an application with the Director-General for authorisation of the use of the protected plant variety if it appears at the time of such application that there has been no sale of the propagating material of that new plant variety or the sale thereof has been made in the quantity insufficient for the need of the people within the Kingdom or at exorbitant prices unless the right holder can prove that the lack of sale or the sale in the quantity insufficient for the need of the people within the Kingdom or at exorbitant prices is caused by the circumstance beyond his control or that the new plant variety is a derivative intended to be utilised for the sole production of hybrid seeds provided that the hybrid seeds have been produced in such quantity sufficient to the need of the people within the Kingdom and sold at the prices which are not exorbitant.”).

73. *Ibid.*, § 37, para. 2 (“The Director-General, with the approval of the Commission, has the power to authorise the use of the rights under Section 33 paragraph one upon payment by the applicant of reasonable remuneration to the right holder of the new plant variety.”).

74. *Ibid.*

75. *Ibid.*

4.4 PROBLEMS WITH INSTITUTIONAL GOVERNANCE IN THAILAND

In terms of whether Thailand has an adequate organisational structure to oversee plant variety protection issues, the institutional body, the Plant Variety Protection Commission (PVP Commission) and the Plant Variety Protection Division (PVP Division) were both established under the Thai PVP Act.⁷⁶

4.4.1 THAILAND'S PLANT VARIETY PROTECTION COMMISSION

The PVP Commission is the major organisational body that governs the area of plant variety protection. This Commission was specifically established to handle issues related to plant variety protection. Its mandate includes the following authority and duties:

- (1) To submit recommendations to the Minister on the issuance of Ministerial Regulations and Notifications under this Act;
- (2) To consider and decide appeals against orders of the Director-General related to the registration of new plant variety protection;
- (3) To give opinions or advice to the Minister with regard to the execution of this Act;
- (4) To prescribe regulations with regard to the studies, experimentation, research, breeding or development of or into plant varieties from local domestic plant varieties, general domestic plant varieties and wild plant varieties or any part thereof;
- (5) To prescribe regulations with regard to the management of the Plant Variety Protection Fund;
- (6) To lay down rules and procedures for giving special remuneration to State employees or officials who have bred new plant varieties for the agencies to which they are attached;
- (7) To determine the agencies or institutions to be authorised to examine and appraise biological and environmental safety impacts; and
- (8) To perform such other acts as prescribed by law to be under the responsibility of the Commission.⁷⁷

76. The PVP Act of Thailand, above n 1, § 5.

77. Ibid, § 6 [emphasis in original].

In this respect, the authority of the current PVP Commission mainly focuses on the enforcement of the law under the Thai PVP Act; however, does it have an adequate organisational structure and mandate to oversee plant IP protection issues? Obviously, the effectiveness of the current organisational body to address plant variety protection issues is questionable because the mandate of the Thai PVP Commission is limited in scope. Furthermore, its function to assist Thai farmers and domestic interest groups has also been rather limited in scope, since its focus is on law enforcement.⁷⁸ Other essential issues also need to be addressed; for example, the policy implementation of provisions related to existing varieties as a means to promote the rights of farmers and local farming communities, the increased participation of farmers and local breeders in agricultural research and innovation, as well as the regulatory monitoring of the compliance with policies, and cooperation with other government agencies. However, the Thai PVP Commission does not currently have a mandate to address these essential issues. Therefore, the scope of the PVP Commission's role and obligations needs to be expanded to incorporate these important functions.

4.4.2 PLANT VARIETY PROTECTION DIVISION

The Thai PVP Division is currently organised under the Thai PVP Act. Specifically, the Thai PVP Division is established under the auspices of the Department of Agriculture in the MOAC with a mandate to assist the PVP Commission as staff, and to handle issues related to IPRs in agriculture.⁷⁹ Its mandate is to oversee administrative matters and related issues, such as the registration of new plant varieties, the examination of plant variety rights applications, and the enforcement of the law under the Thai PVP Act.⁸⁰

The assistance of the Thai PVP Division to local farmers and breeders currently focuses on capacity building, and in this respect, it offers assistance

78. See Lertdhamtewe, above n 3 (highlighting the inadequacies of the PVP Commission's role in overseeing issues on plant variety protection in Thailand).

79. The PVP Division of Thailand's official website can be accessed at <<http://m.doa.go.th/pvp/main.html>>.

80. Ibid. The mandate of Thailand's PVP Division is prescribed by Ministerial Regulations.

through a series of training and technical cooperation programmes. This assistance includes providing regular training sessions on technical matters, such as developing and registering new plant varieties, and the benefits of Thailand's PVP Act. Approximately 100 technical cooperation activities are organised annually, including seminars and workshops in various regional areas and provinces in Thailand, and legal assistance is offered to local farmers' groups and representatives.⁸¹ These capacity-building activities are undoubtedly helpful to local farmers and breeders, but the scope of assistance is rather limited, since it focuses on building technical capacity. The PVP Division should also address other essential areas related to plant IP protection, such as the transfer of technology, financial mechanisms, and debt relief. Thus, the ineffective way in which plant IP protection issues are addressed is primarily due to the major institutional problems within the Thai PVP Division, which are reflected in a lack of due organisational status, a shortage of resources to support the institutional capacity, and the resulting appearance of insufficient institutional attention.

4.5 CONCLUSION

The current framework for plant variety protection in Thailand, as represented by the PVP Act, has been discussed in this chapter, with an analysis of the key provisions of Thailand's plant protection regime. The examination undertaken in this chapter has revealed the existence of significant uncertainty in the current Thai rules on plant variety protection, which dilutes the benefits of Thailand's PVP Act to the extent that the Act has several shortcomings. Such fundamental flaws of Thailand's PVP Act contravene the ordinary objective of the Act, i.e. to build the country's competitive advantage in the global agricultural industry.

So, what is wrong with the current treatment for the protection of plant varieties in Thailand? It can be said that Thailand's legal regime of plant variety protection, currently represented by the PVP Act, is the result of Thailand's membership of the WTO and its adherence to the TRIPS

81. Ibid.

Agreement.⁸² Concrete examples have been provided of instances where the national implementation of the WTO/TRIPS Agreement has proven to be problematic because of its disconnection with the domestic reality, both in terms of research and farming. It is also worth noting that part of the reason is because Thailand was under political pressure to strengthen its IPR regime from its main trading partners, particularly the United States (US).⁸³

Thailand's problem with the U.S. initially began in 1989 when the United States Trade Representative (USTR) designated it as a Priority Watch Country (PWC).⁸⁴ Specifically, the USTR cited Thailand for its failure to provide adequate IPR protection.⁸⁵ As a PWC, although Thailand was not suddenly in danger of facing retaliatory action under Section 301 of the U.S. Trade Act of 1974,⁸⁶ it became a primary target of continued monitoring and investigation by the USTR.⁸⁷ Following several investigations, the USTR then placed Thailand on the Priority Foreign Country (PFC) List for failure to provide adequate protection for IPRs.⁸⁸

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82. See Donavanik, above n 3, 15; Changtavorn, above n 3, 293; Lertdhamtewe, above n 3, 2; Lertdhamtewe, above n 54, 193; Lertdhamtewe, above n 14, 396 (arguing that the adoption of Thailand's PVP Act was a precondition for Thailand's joining the WTO, but any benefits Thailand may accrue remains questionable until it can address the functionality of its current plant variety protection framework).
83. For an overview of the debate between Thailand and the United States concerning intellectual property protection, see Terence P. Steward, *The GATT Uruguay Round: a Negotiating History (1986-1994) The End Game (Part I)* (Kluwer Law International, The Netherlands, 1999) at 499-500.
84. See Office of the U.S. Trade Representative, *Report to Congress on Section 301 Development Required by Section 309(A) (3) of the Trade Act of 1974* (1993) at 15 (pointing out that, at that time, Thailand did not effectively and adequately enforce its intellectual property laws).
85. *Ibid.*, at 15 (highlights the fact that Thailand's intellectual property law, including copyrights, patents, and trademarks, contain serious deficiencies, such as the lack of effective protection for pharmaceutical patents, the short term of protection provided by existing patent laws, and compulsory licensing provisions); see e.g., Kim Newby, 'The Effectiveness of Special 301 in Creating Long Term Copyright Protection for U.S. Companies Overseas' (1995) 21 *Syracuse Journal of International Law and Commerce*, 29 at 45.
86. The United States International Trade Commission, *The Year in Trade: Operation of the Trade Agreement Program* (1992), USITC Pub. No. 2640, at 95 (July 1993).
87. Office of the U.S. Trade Representative, *Report to Congress on Section 301 Developments Required by Section 309(A) (3) of the Trade Act of 1974*, at 15 (1993); For an overview of discussion see, Anek Srisanit, 'Thailand's Trade and Laws in the New Asia-Pacific Country' (1993) 6 *Chulalongkorn Law Review*, 164, at 166.
88. See Howard A. Kwon, 'Patent Protection and Technology Transfer in the Developing World: The Thailand Experience' (1995) 28 *George Washington Journal of International Law and Economics*, 567, at 568-588 (outlining the historical

On the 13th March 1992, the USTR determined that Thailand's law related to the protection of IPRs was unjustified and restricted U.S. business.⁸⁹ Thus, the U.S. used its procedures under Section 301 of the Trade Act of 1974 and the Generalised System of Preferences (GSP) to pressure Thailand as a PFC into passing laws on intellectual property protection, including copyrights and related rights, trademarks, and patents.⁹⁰ Similar pressure was also exerted in the field of plant varieties with the intention of ensuring that the rights of U.S. corporations would be protected in Thailand.⁹¹

In addition to direct pressure from its trading partner, prior to the enactment of Thailand's PVP Act, the country's economic situation appeared to be subjected to the likelihood of the establishment of a multilateral trading system of the WTO, as well as the creation of regional free trade areas. In view of such trends, Thailand embarked on a major campaign to revamp and expand its legal framework related to the protection of IPRs, pursuant to which outmoded laws and regulations were to be brought into conformity with international standards, particularly the WTO/TRIPS regime.⁹² Specifically, new laws were to be enacted to cover IPRs that had previously been unprotected, including those of plant varieties.

In summary, it can be concluded that Thailand's PVP law was adopted as a result of a compromise without the careful examination of its consistency with domestic conditions, needs, and legal principles; therefore, it can be criticised as simply being a patchwork solution, which means that the current regime of plant variety protection is inadequate to promote agricultural

development of intellectual property laws regime in Thailand under the political pressure from the United States).

89. Ibid, 587.

90. See Laura Sallstrom, 'U.S. Withdrawal of Thailand's GSP Benefits: Real or imagined?' (1994) 9 *TDRI Quarterly Review*, 15 at 18; Preeti Sinha, 'Special 301: An Effective Tool against Thailand's Intellectual Property Violation' (1992) 1 *Pacific Rim Law and Policy Journal*, 281 at 288-298; and also see Ted L. McDorman, 'U.S.-Thailand Trade Disputes: Applying Section 301 to Cigarettes and Intellectual Property' (1992) 14 *Michigan Journal of International Law*, 90 at 188. Another reason that led Thailand to appear on the Special 301 Watch List due to lack of enforcement.

91. Jade Donovanik, *The Implications of Compliance with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) For Thailand's Development: Focusing on Plant Protection* (JSM Thesis, Stanford University, 1997) at 4-7.

92. See Kuapoth, above n 32, at 20 – 23; Donovanik, above n 94, at 4-7.

development. As discussed in Chapter 3, the protection of plant varieties is imperative to Thailand, considering the fact that agriculture represents a fundamental economic activity and the livelihood of a large section of the total population; therefore, introducing IPRs in agriculture via the PVP regime is critical to the development of agriculture in Thailand. Thus, it is considered that a more comprehensive framework is needed to enhance the clarity of Thailand's plant protection regime, the validity of the national legislation, and the long-term promotion of development and sustainability in the country's agricultural sector.

What regulatory elements should be used to modify and amend Thailand's current PVP provisions? Since a great number of elements related to the IPR protection of plant varieties and development already exist in international law, it could be argued that including them in a national plant variety protection policy may offset the possibility of protecting the IPRs of plant varieties and receiving international specialisation, and its potential contribution to the promotion of sustainable development. The establishment of plant variety protection through an IPR regime may also serve as a catalyst for promoting sustainable development goals. By incorporating international norms in the legal framework, plant variety protection through an IPR regime is a natural ally of sustainable development. Therefore, the introduction of IPR in agriculture via the PVP regime could make an important contribution to the attainment of sustainable development in Thailand, especially when implemented in conjunction with the TRIPS, UPOV, CBD, and ITPGRFA. Thus, these international regimes will be discussed in the next chapter, Chapter 5, to analyse the extent to which developing countries, such as Thailand, should conform to the provisions in these documents.

Chapter 5

Internalising International Norms into the Thai Legal Framework

5.1 INTRODUCTION

The purpose of this chapter is to analyse the factors that can be drawn from international laws that relate to plant variety protection issues in terms of establishing a plant variety protection framework in accordance with the WTO/TRIPS Agreement. As discussed in Chapter 2, the development of property rights of plant varieties at an international level is represented by various documents and institutions, including the TRIPS Agreement,¹ the UPOV regime,² the CBD,³ and the ITPGRFA of the FAO.⁴ While the relevant international agreements discussed in detail in this chapter may differ in nature, scope and objectives, they can be broadly distinguished as being IPR-related

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1. *Agreement on Trade-Related Aspects of Intellectual Property Rights in Marrakesh Agreement Establishing the World Trade Organization*, opened for signature 15 April 1994, 1869 UNTS 299 (entered into force January 1995) annex 1C (TRIPS Agreement).
 2. *International Convention for the Protection of New Varieties of plants*, 33 UST 2703, 815 UNTS 109 (1961); revised by 33 UST 2703 (1978); revised by 815 UNTS 89 (1991) (UPOV Convention).
 3. *United Nations Convention on Biological Diversity*, open for signature 5 June 1992, 31 UNTS 818 (entered into force 29 December 1993) (CBD).
 4. *International Treaty on Plant Genetic Resources for Food and Agriculture*, Rome, 3 November 2001, Doc. Y3159/E (ITPGRFA).

instruments and biodiversity-related instruments, according to their principal subject matter.

This chapter begins with an introduction of the international standards and rules concerning the IPR protection of plant varieties engendered by the WTO/TRIPS Agreement. The TRIPS Agreement provides the requirements for the IPR protection of plant varieties in Article 27.3(b) and this is critically discussed in this chapter before continuing to analyse the constituents of a plant variety protection framework that developing countries such as Thailand should follow and adopt to protect plant variety rights for the purpose of development. This is followed by an analysis of other relevant international agreements related to plant protection issues, particularly the UPOV, the CBD, and the ITPGRFA, together with a description of the distinction between these treaties and the way in which they can be utilised for the establishment of a plant variety protection regime that meets the requirements of the TRIPS. The chapter is concluded in the final section with some suggestions as to how to accomplish such a regime.

5.2 PROTECTION OF PLANT VARIETIES UNDER THE WTO/TRIPS REGIME

As discussed in the previous chapter, the TRIPS Agreement opened a new chapter for the international protection of IPRs, including the protection of plant varieties. The TRIPS requirements related to plant variety protection are analysed in this section. The analysis follows a conventional pattern by considering the crucial aspects of the relevant provisions, the rule of treaty interpretation, and WTO case law.

5.2.1 REQUIREMENT OF ARTICLE 27.3(B) OF THE TRIPS AGREEMENT

Rather than establishing a consistent standard of protection, the TRIPS Article 27.3(b) offers members a choice of legal regimes through one of three options: (1) a patent system, (2) an effective *sui generis* system, or (3) a combination

of both of these systems to protect plant varieties.⁵ A few general remarks need to be made before turning to a specific discussion. Firstly, WTO members are given the option to extend patent protection to plant variety rights. Bearing in mind that the TRIPS Agreement only imposes the minimum standard for a legal framework of IPR protection, WTO members may provide greater protection for IPRs than that recommended in the TRIPS Agreement.⁶ The provision in TRIPS Article 27.3(b) concerning plant variety protection arguably invites WTO members to protect plant varieties with a patent or a combined patent and *sui generis* legal system. In fact, a number of countries, including the United States, Japan, the United Kingdom, Australia, New Zealand, Kuwait, Lebanon and Tajikistan,⁷ have taken advantage of this opportunity by enabling breeders to obtain the patent protection of new crop varieties provided they meet the required criteria.⁸

Secondly, an understanding of both patent and *sui generis* principles is particularly important to the subject of this study because some nations have found it difficult to protect plant variety rights using a patent system and a *sui generis* legal regime. For instance, Section 9 of the Thai Patent Act prohibits the patenting of plant varieties in Thailand.⁹ Nevertheless, it appears that some

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5. The TRIPS Agreement, above n 1, art. 27.3(b). For a discussion, see Joseph Strauss, 'Bargaining Around the TRIPS Agreement: The Case for Ongoing Public-Private Initiatives to Facilitate Worldwide Intellectual Property Transactions – A Comment on the Paper Presented by Professors David Lange, Duke University and J.H. Reichmann, Vanderbilt University' (1998) 9 *Duke Journal of International and Comparative Law*, 91, 100–101; see also, Carlos M. Correa, 'Patent Rights' in Carlos M. Correa and Abdulqawi Yusuf (eds), *Intellectual Property and International Trade: the TRIPS Agreement* (The Netherlands: Kluwer Law International, 2008) 227–57, at 233.
 6. The TRIPS Agreement, above n 1, art. 1 ("Members shall give effect to the provisions of this Agreement. Members may, but shall not be obliged to, implement in their law more extensive protection than is required by this Agreement, provided that such protection does not contravene the provisions of this Agreement. Members shall be free to determine the appropriate method of implementing the provisions of this Agreement within their own legal system and practice").
 7. *Plant Patent Act 1930* (USC); *Plant Varieties Act 1997* (UK); *The Patent Act 1959* (Japan); *Patent Act 1990* (Australia); *The Patents Act 1953* (New Zealand); *Patent Law No.4/1962* (Kuwait); *Patent Law no. 240/2000* (Lebanon); and *the Law of the Republic of Tajikistan: On Selection Achievements of Agricultural Crops* (Tajikistan).
 8. See e.g., Jayashree Watal, *Intellectual Property Rights in the WTO and Developing Countries* (The Hague: Kluwer Law International, 2000) at 149; and also see, Dan Leskien and Michael Flitner, *Intellectual Property Rights and Plant Genetic Resources: Options for a sui generis system* (Issues in Genetic Resources, No. 6 IPGRI, Rome, 1997) at 8.
 9. See, *the Patent Act B.E.2542 (AD1999)* (Thailand), at § 9.

new commercial crop varieties, such as Thai jasmine rice, are able to receive patent protection under the Thai patent regime.¹⁰

Furthermore, there are significant differences in the approaches of patents and *sui generis* law. In the case of *sui generis*, there is no common *sui generis* system so that WTO members are able to implement a system of their choice. International regimes, including the UPOV, CBD, and ITPGRFA create *sui generis* systems with varying scope and applicability. Conversely, patent laws have a very clear scope and protectability requirements; for example, although the eligibility requirements for protection are high and very difficult to meet, when protection has been granted, it provides exclusive monopolistic rights that exclude third parties from exploiting the patented invention. Lastly, the last sentence of TRIPS Article 27.3(b) calls for the TRIPS Council to make its own review within four years.

In any case, it is essential to understand the fundamental features, as well as pros and cons, of both patent law and the *sui generis* regime and the way in which these two regimes may fit together within the ambit of the TRIPS Agreement. Thus, the patent provisions and *sui generis* requirements of the TRIPS Agreement are identified in the following discussion in order to establish a framework for the subsequent sections of this chapter, which contain an outline of the essential elements of a plant variety protection system that developing countries, such as Thailand, should adopt to protect the IPR of their plant varieties.

A. Plant Patent System

The essential elements of a patent system can be divided into four main categories: (i) the protectability requirement, (ii) the scope of patent rights, (iii) the limitations of the scope of patent rights, and (iv) the duration of the patent protection. These elements are particularly contained in Articles 27–34 of the TRIPS Agreement.¹¹ The jurisprudential and practical legal matters that arise within the plant patent system are examined in this sub-section. It should

10. For the Thai jasmine rice patent, see Thailand Patent Number 072424.

11. The TRIPS Agreement, above n 1, arts. 27–34.

be noted that the plant patent system is only adopted in a few jurisdictions, including Japan and the United States.

Article 27.1 of the TRIPS Agreement, entitled “Patentable Subject Matter,” prescribes that ‘any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application’ will be liable for patent protection.¹² One possible interpretation of Article 27.1 is that, in line with the current practice of many patent offices in the world, plant varieties claimed in patents should be deemed to be “inventions,” and not natural phenomena and naturally occurring substances.¹³

A plant variety also has to be new to qualify for a patent; it must not be obvious, and it must be capable of being applied to industry. The novelty requirement is viewed as a means to ensure that plant varieties must not be prior art, already in existence. The requirement for an inventive step can be viewed as being a means to determine if the invention is obvious to a person skilled in the light of the prior art.¹⁴ The industrial application threshold is concerned with the practical utility of the plant-related invention and whether or not it can be utilised in an industrial way. Obviously, this requirement does not appear to impose any legal barrier to the patenting of new plant varieties,

12. Ibid, art. 27.1 [emphasis added].

13. Obviously, the TRIPS Agreement does not define “invention” within its text. One of the main areas that illustrate the lack of a clear definition of invention relates to the distinction between “invention” and “discovery”. A number of scholars point to the issue that a “discovery” is commonly considered to mean the mere recognition of what already exists; it is the finding of casual relationships, properties or phenomena that exist in nature. On the contrary, an “invention” encompasses the development of a solution to a problem by the application of technical means. The fact that the concept underlying a claimed subject matter resides in a discovery does not mean that such subject matter cannot be patentable, to the extent that the discovery can be applied, i.e., that it has been possible to demonstrate its practical value; see, Carlos M. Correa, *Intellectual Property Rights, the WTO and Developing Countries: The TRIPS Agreement and Policy Options* (London, New York, Penang: Zed Books and Third World Network, 2000) at 177–78. Thus, it is arguable that the plain wording of TRIPS Article 27.1 leaves considerable room for WTO members to define the term “invention” within their own legal regime. This means that the concept of invention has been significantly broadened in many countries to cover “discovering plant material” as well.

14. Carlos M. Correa, ‘Implementing the TRIPS Agreement in the Patent Field: Options for Developing Countries’ (1998) 1(1) *Journal of World Intellectual Property*, 75, at 84; and Laurence R. Helfer, ‘Intellectual Property Rights in Plant Varieties: An Overview with Option for National Governments’ (2002) 31 *FAO Legal Paper Online*, 12, 46.

since varieties are already used in practice in plant breeding and agricultural industries.¹⁵

Furthermore, a patent regime grants exclusive rights to holders of patented products or processes to prevent third parties from making, using, offering for sale, selling or importing the patented products or processes without the permission of the patent holder.¹⁶ Thus, it provides a course of action for infringement against any person who imitates the protected invention. This exclusive right is meant to reward patent holders for their contribution and provide an incentive for them to produce more innovative inventions.¹⁷

The exclusive rights of patent holders are subject to certain exceptions (TRIPS Article 30), which must also pass the “three-step” test: (1) they must not unreasonably conflict with the normal exploitation of the patent; (2) they must not unreasonably prejudice the legitimate interests of the patent owner; and (3) they must take account of the legitimate interests of third parties.¹⁸ The decision made in the case of *Canada–Patent Protection of Pharmaceutical Products (Canada–Patent Protection)*¹⁹ is a classic example of the use of this TRIPS exception provision to counterbalance the rights of the patent holder. In this case, the Panel considered a complaint brought by the European Union in relation to the research exception provisions of the Canadian Patent Act, which permitted the use of patented pharmaceuticals without the patent holder’s authorisation for the purpose of obtaining approval for genetic medicine before the patent’s term of protection expired. The Panel ruled that the research exception allowed by Canadian law was consistent with the TRIPS patent provisions. Based on this guideline, WTO members are

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15. David Bainbridge, *Intellectual Property* (London: Pitman, 1992) at 270–72.
 16. The TRIPS Agreement, above n 1, art. 28. See the *Plant Patent Act* (1930) (USC) § 1601 (stating that “in the case of a plant patent, the grant shall include the right to exclude others from asexually reproducing the plant, and from using, offering for sale, or selling the plant so reproduced, or any of its parts throughout the United States, or from importing the plant so reproduced, or any parts thereof, into the United States.”); and *Patent* (1959) (Japan) § 68 (stating that “a patentee shall have an exclusive right to commercially work the patented invention ...”).
 17. Alan O. Sykes, ‘TRIPs, Pharmaceuticals, Developing Countries, and the Doha “Solution”’ (John M. Olin Law & Economics Working Paper 140, The Law School, The University of Chicago, 2002) at 16–7.
 18. The TRIPS Agreement, above n 1, art. 30.
 19. See *Canada–Patent Protection of Pharmaceutical Products*, WTO Doc. WT/DS114/R, (6 March 2000) (Report of the Panel) (‘Canada–Patent Protection’).

supported to adopt measures (research exceptions) with a view to balancing the rights of patent holders against other important and competing societal goals.

In addition to the exceptions to patent rights stated in Article 30, the compulsory licensing provision in TRIPS Article 31 provides a way for a person other than the rights holder to use the patented products. In the current public debate, this is usually associated with pharmaceutical patents, but it could also apply to patents in any field of technology, including plant varieties. TRIPS Article 31 specifically provides a set of rules to regulate when WTO members can compel patent holders to license their products to governments or private parties.²⁰ For example, the person or company applying for a license must have first been unsuccessful in obtaining a voluntary license from the right holder of the patent on reasonable commercial terms (TRIPS Article 31(b)). Alternatively, there may be public interest, including “national emergencies, or other circumstances of extreme urgency, public non-commercial use, or anti-competitive practices,” that merit the issuance of a compulsory license for the use of patented products (TRIPS Article 31(b)). When considering the term ‘public interest’, it is arguable that the TRIPS provision uses a very broad definition, thereby offering WTO members a certain degree of flexibility in determining when the public interest is affected, and specifically in knowing when they can benefit from being flexible. In the context of plant variety protection, it appears that WTO members are free to adopt measures to protect their vital interests, such as food security (by increasing production in order to protect the public from the high cost of crop varieties), and free to determine the grounds upon which to issue compulsory licenses.²¹

Finally, the TRIPS Agreement requires a minimum 20-year term of protection for patents from the date of filing the patent application.²² All of these provisions form the basic structure of a patent system for plant variety protection.

20. See the TRIPS Agreement, above n 1, art. 31.

21. This is discussed in more detail in Chapter 5.

22. The TRIPS Agreement, above n 1, art. 33.

As mentioned earlier, the IP protection of plants via a patent right regime can be seen in countries in the developed world, including the United States and Japan.²³ Nonetheless, in most jurisdictions, including Thailand, patents were meant and made to exclude living organisms, such as plants and plant varieties from patentability. Several factors contribute to the reason for this objection, namely (i) countries' historic attitude toward the protection of IP rights; (ii) the perceived strategic and cultural significance of staple food that influences the creation of a private property rights regime; and (iii) the perception that a formal IP rights regime in this field, like patents, unequally enriches breeders and biotechnologists at the expense of farmers and local communities.²⁴ As noted above, TRIPS Article 27.3(b) enables WTO members to decline to protect plant varieties with a patent system, provided they protect them with a comparable system.

B. An Effective *Sui Generis* System

The reference to the *sui generis* system in TRIPS Article 27.3(b) presents an alternative option for the protection of plant varieties so that WTO members, including Thailand, can avoid having to introduce patent protection for plant varieties. The term *sui generis* system in this Article seems to benefit developing countries like Thailand, since it provides a certain degree of

23. See the *Plant Patent Act* (1930) (USC); and *Patent Law* (1959) (Japan). Indeed, the possibility of obtaining an IPR in the form of a patent for living organisms, such as plants and plant varieties was not evident until the 1980s. The definitive test and understanding for the patenting of live organisms was decided in the 1980s in the seminal case of *Diamond vs. Chakrabarty* in which an oil spill-eating bacterium had been the subject of patentability. In a much quoted judgment, the court concluded that “everything under the sun made by the hand of man” warrants protection under the patent law”. After this case, the United States Patent and Trademark Office (USPTO) began to grant patents for plant-related inventions under US patent law, and in 1985, the USPTO finally decided to grant the first patent protection for a sexually reproduced plant in the case of *Ex parte Hibberd*; see *Ex Parte Hibberd* 227 USPQ 443, Board of Appeals and Inferences, 1985.

24. Bashar H. Malkawi and Haitham A. Haloush, ‘Intellectual Property Protection for Plant Varieties in Jordan’ (2008) 11(2) *Journal of World Intellectual Property*, 120, at 120; Pawarit Lertdhamtewe, ‘Asian approaches to International Law: focusing on plant protection issues’ (2013) 8(5) *Journal of Intellectual Property Law and Practice*, 388-398; and Kanchana Kariyawasam, ‘The Recent Law Reforms and Plant Intellectual Property Law in Sri Lanka: Compliance with the TRIPS and CBD’ (2005) 7 *Australian Journal of Asian Law*, 169, at 170–71.

flexibility with regard to the system of plant intellectual property protection.²⁵ Specifically, the term *sui generis* regime in this context would enable them to adopt their own individualised system of plant protection, specifically tailored to their development needs and priorities.²⁶ Since what constitutes an effective *sui generis* system is currently uncertain, it is essential to consider the actual meaning of the term in this Article.

At the outset, the *sui generis* system, as stipulated in Article 27.3(b), cannot be similar to a patent system because this would be inconsistent with the TRIPS provisions, which clearly indicate that WTO members have an alternative option. Some commentators have proposed that an alternative option in the form of a *sui generis* system must still be an IP right because it involves the protection of important knowledge.²⁷ Furthermore, when attempting to devise a *sui generis* regime for plant variety protection, WTO members had to be sure that they adopted an ‘effective’ form of protection. It is interesting to observe that the word ‘effective’ is the only standard to be applied to the implementation of TRIPS Article 27.3(b) with respect to a *sui generis* plant protection system, yet the meaning of ‘effective’ is not defined within the text. More importantly, there is no drafting history that can be invoked to construe the term ‘effective’ in relation to the *sui generis* system in TRIPS Article 27.3(b). It is suggested that the definition of the term ‘effective’ can be derived from the use of other terms in the TRIPS Agreement. In the light of this interpretation, the *sui generis* system for plant variety protection needs to allow effective action to be taken against any act of infringement of the rights available under the *sui generis* regime.²⁸ Nevertheless, this interpretation still appears to be open to criticism on the grounds that the

25. See Pawarit Lertdhamtewe, ‘Thailand’s plant protection regime: a case study in implementing TRIPS’ (2012) 7(3) *Journal of Intellectual Property Law and Practice*, 186, 187.

26. Ibid, 187-88.

27. Philippe Cullet, ‘Revision of the TRIPS Agreement concerning the Protection of Plant Varieties: Lessons from India concerning the Development of a Sui Generis System’ (1999) 2(4) *Journal of World Intellectual Property*, 617, 626–27 (discussing the problem of the TRIPS Article 27.3(b) vis-à-vis the *sui generis* system).

28. Rohan Dang and Chandni Goel, ‘Sui Generis Plant Variety Protection: The India Perspective’ (2009) 1(4) *American Journal of Economics and Business Administration*, 303, at 306–07; and Leskien, D, and Flitner, M, above n 8, at 27.

effectiveness of a *sui generis* system cannot be justified solely through its enforcement mechanisms.²⁹

Finally, it is also significant to consider if there is already an existing system at an international level. As noted in Chapter 2, the plant breeders' rights system provided by the UPOV Convention appears to be the only *sui generis* system for plant protection that exists in international law. Some commentators suggest that the plant breeders' rights stipulated in the UPOV Convention constitutes the only available option and that WTO members can only choose between patents and the UPOV Convention.³⁰ It is worth noting that there is no reference in the TRIPS Agreement to the UPOV Convention that could be compared with the mentioning of the Berne Convention, the Paris Convention, the Rome Convention, and the Treaty on Intellectual Property in Respect of Integrated Circuits in Article 3.³¹ This is due to the fact that, when the TRIPS Agreement was negotiated, the 1978 UPOV Convention was considered to be obsolete while the 1991 UPOV Convention had not yet entered into force.³² Therefore, WTO members are not required to adopt the *sui generis* regime presented in the UPOV Convention when setting a standard for TRIPS compliance.³³

As already mentioned, the provision of TRIPS Article 27.3(b) was subjected to review by the TRIPS Council in 1999. Thus, it is essential to

29. Cullet, P, above n 27, at 626.

30. Daniel Gervais, *The TRIPS Agreement: Drafting History and Analysis* (London: Sweet & Maxwell, 1998) 151 (arguing that the UPOV Convention would enjoy the presumption of the effectiveness requirement of the TRIPS Agreement); Nuno Pires de Carvalho, *The TRIPS Regime of Patent Rights* (The Netherlands: Kluwer Law International, 2002) 219 (indicating that the *sui generis* system in the TRIPS Article 27.3(b) is referred to as the UPOV Convention); and Suzi Fadhilah Ismail, *Intellectual Property Protection for Agricultural Biotechnological Inventions: A Case of Malaysia* (PhD Thesis, University of Nottingham, 2010) (suggesting that the *sui generis* in the TRIPS Article 27.3(b) is the UPOV Convention).

31. The Berne Convention (1971), the Paris Convention (1967), the Rome Convention (1961) and the Washington Treaty on Intellectual Property in Respect of Integrated Circuits (1989) are incorporated by reference see the TRIPS Agreement, above n 1, art. 3.

32. Jayashree Watal, *Intellectual Property Rights in the WTO and Developing Countries* (The Hague: Kluwer Law International, 2000) at 140; and Claudio Chiarolla, 'Commodifying Agricultural Biodiversity and Development-Related Issues' (2006) 9(1) *Journal of World Intellectual Property*, 25, 28.

33. *Review of the Provisions of Article 27.3(b)*, WTO Doc IP/C/W/369, 8 August (2002).

consider the review process of TRIPS Article 27.3(b) regarding the protection of plant varieties.

5.2.2 REVIEW OF TRIPS ARTICLE 27.3(B) CONCERNING THE PROTECTION OF PLANT VARIETIES IN 1999

It has been suggested that the implementation of TRIPS Article 27.3(b) concerning the protection of plant varieties constitutes an example of institutional development, since it contains a mechanism for its own review, which operates after a certain period of time.³⁴ This seems to suggest how difficult it has been to find a compromise in terms of plant IP protection and implies the need for a thorough review of this issue.

In December 1998, the TRIPS Council initiated preliminary work on a review of the provision of Article 27.3(b) of the TRIPS Agreement concerning plant variety protection. This review was due to be published in 1999. By February 1999, WTO members in respect of which this Article was in force were invited to provide information about how the matter had been addressed in their countries and how it was treated in their national law. The Secretariat then contacted the relevant organisations, including the FAO, CBD and the UPOV, to request factual information of their activities in this field. It is worth stating at this point, that the TRIPS Council required developing countries to complete a three-page questionnaire and the information gathered was to provide the basis of the review. Several leading developed countries perceived that the review was only being undertaken to determine how far developing countries were providing legal protection to plant varieties in order to monitor the implementation of the provision. The EU and the US clearly stated that the review was limited and should not lead to the renegotiation of the Article. They particularly argued that any attempt by developing countries to connect

34. See Claudio Chiarolla, *Intellectual Property, Agriculture and Global Food Security—The Privatization of Crop Diversity* (Cheltenham: Edward Elgar Publishing, 2011) at 78.

this part of the TRIPS Agreement to other aspects such as the environment and its impact on health and welfare, must be resisted.³⁵

In fact, the discussion concerning the protection of plant varieties was one of the most controversial during the review of TRIPS Article 27.3(b) by the TRIPS Council. The discussion revealed differences between developed and developing countries and touched on a number of critical issues on which these two groups of WTO members may disagree, namely the patenting of life forms and plant varieties.³⁶ The discussion revolved around the perceived problems embedded in Article 27.3(b), as highlighted by developing countries. For example, there were no parameters for what a *sui generis* could amount to, and no explanation of what could be deemed to be 'effective'. The TRIPS provisions were inherently biased to protect breeders and biotechnologists at the expense of farmers and local communities, and the TRIPS and the rights and obligations countries had previously acquired under the CBD were also perceived to conflict.³⁷ In summary, since the review is far from being completed and all uncertain issues are still on the negotiating table, the matter of a legal system for plant protection is still undefined.

5.3 INTERPRETING THE *SUI GENERIS* SYSTEM IN ACCORDANCE WITH THE TRIPS REQUIREMENTS

The TRIPS Agreement, the GATT and the *General Agreement on Trade in Services* (GATS)³⁸ are the three major pillars of the global trade regime, which

35. It should be noted that several developing countries supported the proposal to amend the TRIPS Agreement to include a mandatory obligation to disclose the origin of genetic resources and traditional knowledge in the patent application. This proposal also included the requirement that the applicant should submit evidence of compliance with the CBD's prior informed consent and benefit-sharing provisions. For further discussions, see Chiarolla, above 34, at 111–13; and Suzi Fadhilah Ismail, *Intellectual Property Protection for Agricultural Biotechnological Inventions: A Case of Malaysia* (PhD Thesis, University of Nottingham, 2010) at 84–8.

36. Gervais, D, above n 30, at 227.

37. See e.g., Genetic Resources Action International, 'For a Full Review of TRIPS 27.3(b): An Update on Where Developing Countries Stand with the Push to Patent Life at WTO' (GRAIN, March 2000) at 3.

38. *General Agreement on Trade in Services in Marrakesh Agreement Establishing the World Trade Organization*, open for signature 15 April 1994, 1869 UNTS 183 (entered into force 1 January 1995) annex 1B.

are enforced through the WTO Dispute Settlement Body (DSB). Unlike other provisions of TRIPS, as well as those of the GATT and GATS, the *sui generis* provision as it appears in TRIPS Article 27.3(b) is at best unclear, and has not been subjected to a decision by the WTO/DSB. In the light of this lack of clarification and the current conflict about the content of a *sui generis* regime, the constituents of the *sui generis* requirement of the TRIPS Article 27.3(b) will be analysed in this section. It is specifically proposed that the ambiguous and undefined term of TRIPS vis-à-vis the *sui generis* plant protection system can be better clarified by treaty interpretation, particularly by resorting to the principles of treaty interpretation. As the Appellate Body argued:

[i]nterpretation must give meaning and effect to all the terms of a treaty. An interpreter is not free to adopt a reading that would result in reducing whole clauses or paragraph of a treaty to redundancy or [inutility].³⁹

As noted above, the wording of TRIPS Article 27.3(b) with respect to an effective *sui generis* system is ambiguous, which makes it extremely difficult to interpret. However, the ambiguity of TRIPS Article 27.3(b) can be easily clarified by resorting to the doctrine of treaty interpretation. This requires searching for appropriate guidelines and resorting to the appropriate rules on how to interpret the WTO/TRIPS provisions, particularly the rules for interpreting an international treaty in the WTO context supported by *WTO jurisprudence through various decisions of the Panels and Appellate Bodies*.

5.3.1 ROLE OF THE VIENNA CONVENTION ON THE LAW OF TREATIES IN INTERPRETING THE WTO/TRIPS AGREEMENT

The rules of treaty interpretation are generally contained in the *1969 Vienna Convention on the Law of Treaties*.⁴⁰ Various panels and the Appellate Bodies of the WTO/DSB construe the provisions codified in the Vienna Convention

39. See *United States–Standards for Reformulated and Conventional Gasoline*, WTO Doc WT/DS2/AB/R (adopted 20 May 1996) (Report of the Appellate Body) at para. 23 (US–Gasoline case).

40. *Vienna Convention on the Law of Treaties*, open for signature 23 January 1969, 1155 UNTS 331 (entered into force 27 January 1980) (Vienna Convention).

as “customary rules of interpretation of public international law”. Although a number of leading scholars in the field of WTO law, such as Professors Mavroidis, Palmetier, and Pauwelyn,⁴¹ have attempted to interpret the customary rules of interpretation of public international law to clarify that the existing provisions in WTO Agreements encompass more than the Vienna Convention, they still recognise the vital role of the Vienna Convention in interpreting agreements covered by the WTO. In fact, the Vienna Convention have come to occupy the position of the “customary rules of interpretation of public international law,” as mentioned in Article 3.2 of the Understanding on Rules and Procedures Governing the Settlement of Disputes (DSU).⁴² Article 3.2 of the DSU prescribes the following norms:

The dispute settlement system of the WTO is a central element in providing security and predictability to the multilateral trading system. The members recognize that it serves to preserve the rights and obligations of Members under the covered agreements, and to clarify the existing provisions of those agreements in accordance with customary rules of interpretation of public international law. Recommendations and ruling of the DSB cannot add to or diminish the rights and obligations provided in the covered agreements.⁴³

The fundamental relationship between the interpretation requirement of Article 3.2 of the DSU and the provisions of the Vienna Convention has been observed and confirmed by the Appellate Body in several WTO disputes.⁴⁴

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41. See Petros C. Mavroidis, ‘Remedies in the WTO Legal System: Between a Rock and a Hard Place’ (2000) 4 *European Journal of International Law*, 763; see also, David Palmetier and Petros C. Mavroidis, *Dispute Settlement in the World Trade Organization* (The Hague: Kluwer Law International, 1999); and also, Joost Pauwelyn, ‘Cross-agreement complaints before the Appellate Body: a case study of the *EC–Asbestos* dispute’ (2002) 1(1) *World Trade Review*, 63, at 76 and 83 (offering the principles of ‘effective treaty interpretation as a tool to resolve conflict that may occur from the WTO provisions).
 42. *Understanding on Rules and Procedures Governing the Settlement of Disputes in Marrakesh Agreement Establishing the World Trade Organization*, open for signature 15 April 1994, 1869 UNTS 401 (entered into force 1 January 1995) annex 2 (DSU).
 43. *Ibid*, DSU art. 3.2.
 44. *Argentina–Safeguard Measures on Imports of Footwear*, WTO Doc WT/DS121/AB/R (adopted 12 January 2000) (Report of the Appellate Body) at para. 118 (Argentina–Footwear Safeguard); *United States–Wheat Gluten Safeguard*, WTO Doc WT/DS121/AB/R (adopted on 12 January 2000) (Report of the Appellate Body) at paras 147–151; *United States–Safeguard Measures on Imports of Fresh, Chilled or Frozen Lamb Meat from New Zealand and Australia*, WTO Doc WT/DS177/AB/R, WT/DS178/AB/R (adopted 16 May 2001) (Report of the Appellate Body) at paras 101–116; and *United States–Transitional Safeguard Measure on Combed Cotton*

The most notable case is the *US–Standard for Reformulated and Conventional Gasoline* (US–Gasoline case),⁴⁵ in which the Appellate Body especially observed that the “fundamental rule of treaty interpretation set out in Article 31 of the Vienna Convention had attained the status of a rule of customary or general international law. Based on a number of judgments of the International Court of Justice and the teaching of highly qualified publicists, the Appellate Body in the *US–Gasoline* case concluded:

That general rule of interpretation has attained the status of a rule of customary or general international law. As such it forms part of the ‘customary rules of interpretation of public international law’ which the Appellate Body has been directed, by Article 3(2) of the DSU, to apply in seeking to clarify the provisions of the *General Agreement* and the ‘other agreements’ of the *Marrakesh Agreement establishing the World Trade Organization* (the ‘*WTO Agreement*’). That direction reflects a measure of recognition that the General Agreement is not to be read in clinical isolation from public international law.⁴⁶

Following the *US–Gasoline* case, the above recognition was reiterated and reaffirmed in numerous Appellate Body Reports of the WTO/DSB, for instance, in *Japan–Taxes on Alcoholic Beverages*,⁴⁷ *India–Patent Protection for Pharmaceutical and Agricultural Chemical Products*,⁴⁸ *Argentina–Measures Affecting Imports of Footwear, Textiles and Other Items*,⁴⁹ and *EC–Customs Classification of Certain Computer Equipment*.⁵⁰ Thus, it can be said that the application of the method of interpretation set out in the Vienna Convention has become extremely significant for the interpretation of the

Yarn from Pakistan, WTO Doc. WT/DS192/AB/R, dated 8 October 2001 (Report of the Appellate Body).

45. *US–Gasoline* case, above n 39.

46. *Ibid*, at p. 7.

47. *Japan–Taxes on Alcoholic Beverages*, WTO Doc WT/DS8/AB/R, WT/DS10/AB/R, WT/DS11/AB/R (adopted 1 November 1996) (Report of the Appellate Body) at 10–12.

48. *India–Patent Protection for Pharmaceutical and Agricultural Chemical Products*, WTO Doc WT/DS50/AB/R (adopted 16 January 1998) (Report of the Appellate Body) at paras. 45–6.

49. *Argentina–Footwear Safeguard*, above n 44, at para. 47.

50. *EC–Customs Classification of Certain Computer Equipment*, WTO Doc WT/DS62/AB/R, WT/DS68/AB/R (adopted on 22 June 1998) (Report of the Appellate Body) at para. 85.

WTO treaty. The general rule of interpretation is stated in Article 31 of the Vienna Convention, as follows:

1. A treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose.
2. The context for the purpose of the interpretation of a treaty shall comprise, in addition to the text, including its preamble and annexes:
 - (a) any agreement relating to the treaty which was made between all the parties in connexion with the conclusion of the treaty;
 - (b) any instrument which was made by one or more parties in connexion with the conclusion of the treaty and accepted by the other parties as an instrument related to the treaty.
3. There shall be taken into account with the context:
 - (a) any subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions;
 - (b) any relevant rules of international law applicable in the relations between the parties. A special meaning shall be given to a term if it is established that the parties so intended.⁵¹

5.3.2 IDENTIFYING THE SUI GENERIS SYSTEM OF PLANT VARIETY PROTECTION FOR TRIPS COMPLIANCE

The Vienna Convention on the Law of Treaties, deemed by the WTO jurisprudence to be the codification of the customary rule of interpretation of public international law,⁵² provides an important guideline for interpreting

51. The Vienna Convention, above n 40, art. 31 [emphasis in original].

52. See *United States–Gasoline* case, above n 39, at para. 23; a large body of literature also recognises the role of the Vienna Convention in interpreting the WTO Agreements. This includes Carlos M. Correa, *Trade-Related Aspects of Intellectual Property Rights: A Commentary on the TRIPS Agreement* (New York: Oxford University Press, 2007) 93; Andrew Mitchell, *Legal Principles in WTO Disputes* (New York: Cambridge University Press, 2008) 15–16; Sharif Bhuiyan, *National Law in WTO Law: Effectiveness and Good Governance in the World Trading System* (New York: Cambridge University Press, 2007) 97–98; Asif H. Qureshi, ‘Interpreting the WTO Agreements for Development Objective’ (2003) 37(5) *Journal of World Trade*, 847; Daya Shanker, ‘The Vienna Convention on the Law of Treaties, the Dispute Settlement System of the WTO, and the Doha Declaration on

undefined terms in international agreements.⁵³ Specifically, Article 31 of the Vienna Convention requires a treaty to be interpreted in good faith and to be read in the light of its objective and purpose.⁵⁴ Interestingly, the *WTO Declaration on the TRIPS Agreement and Public Health* also suggests a similar approach with regard to the reading of the TRIPS Agreement by stating that ‘[i]n applying the customary rules of interpretation of public international law, each provision of the TRIPS Agreement shall be read in the light of the objective and purpose of the Agreement as expressed, in particular, in its objectives and principles’.⁵⁵ Thus, the term *effective sui generis* as designated in Article 27.3(b) of the TRIPS Agreement should be guided by the objective and purpose of the Agreement.

The objective of the TRIPS Agreement can be found in Article 7 of the Agreement, which states that:

The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to balance of rights and obligations.⁵⁶

The provision of this Article clearly indicates that IPRs should contribute to the promotion and transfer of technology, as well as to the mutual advantage of producers and users of such technological knowledge.⁵⁷ More importantly, TRIPS Article 7 requires technology to be promoted in a manner conducive to social and economic welfare, and to balance rights and

the TRIPS Agreement’ (2002) 36(4) *Journal of World Trade*, 721; Helge Elisabeth Zeitler, ‘Good Faith’ in the WTO Jurisprudence: Necessary Balancing Element or An Open Door to Judicial Activism?’ (2005) 8(3) *J. Int’l Econ. L.* 721–758; Michael Lennard, ‘Navigating by the Stars: Interpreting the WTO Agreements’ (2002) 5(1) *Journal of International Economic Law*, 17; Joost Pauwelyn, ‘The Role of Public International Law in the WTO: How Far Can We Go?’ (2001) 95 *The American Journal of International Law*, 535; and David Palmeter and Petros C. Mavroidis, ‘The WTO Legal System: Sources of Law’ (1998) 92 *The American Journal of International Law*, 398.

53. The Vienna Convention, above n 40.

54. *Ibid.*, art. 31 [emphasis added].

55. *Declaration on the TRIPS Agreement and Public Health*, WTO Doc WT/MIN (01)/DEC/2 (2001) (adopted 14 November 2001).

56. The TRIPS Agreement, above n 1, art. 7 [emphasis in original].

57. *Ibid.*

obligations.⁵⁸ The objective of the TRIPS Agreement is to recognise members' right to implement their TRIPS obligations in a manner conducive to promoting innovation, increasing the transfer of technology, and enhancing social and economic welfare. Furthermore, the objective of TRIPS Article 7 must be read in conjunction with the principle contained in Article 8 of the Agreement.⁵⁹ TRIPS Article 8 specifically provides that:

Members may, in formulating or amending their laws and regulations, adopt measures necessary to protect public health and nutrition, and to promote the public interest in sector of vital importance to their socio-economic and technological development, provided that such measures are consistent with the provisions of this Agreement.⁶⁰

TRIPS Article 8 provides an important guideline for framing national laws with regard to public health and other public interest measures, provided that such measures are consistent with the TRIPS Agreement.⁶¹ Jointly with Article 8, Article 7 of the TRIPS Agreement provides important elements for the interpretation of an effective *sui generis* system. As noted *above*, the interpretation of the TRIPS Agreement requires the "Objectives" in Article 7 to be read in conjunction with Article 8, "Principle". Thus, an effective *sui generis* system as designated in TRIPS Article 27.3(b) can be justified by considering the system's ability to support WTO members to provide a plant protection system in a way that is fully compatible with their development needs and priorities.

Such a reading of the term *sui generis* fits more comfortably with the theoretical background of this thesis, which views the introduction of IPRs in agriculture via a plant protection system as a means to promote a number of sustainable development goals, including the eradication of poverty, meeting the food needs of every individual and conserving biodiversity, as well as protecting the environment.⁶² In this context, a *sui generis* model creates the

58. Ibid.

59. Ibid, art. 8.

60. Ibid [emphasis in original].

61. Ibid.

62. See Chapter 3 entitled "Development and Intellectual Property Rights" discusses the fundamental relationship between the introduction of IPRs in agriculture through

ability to accommodate national welfare requirements with plant protection, and thereby supplements the formal systems of IP rights, such as patents and other comparable regimes in respect of these issues. More specifically, a *sui generis* plant protection system should not only be concerned with protecting the individual rights of plant breeders; it should also seek to foster food security for all individuals in order to achieve the realisation of humans' fundamental right to food. It should also contribute to sustainable agricultural management and practice. This simply suggests that a *sui generis* plant protection model should aim to promote several types of agricultural management, which can be sustained in the long term, do not lead to the erosion of genetic diversity, and are able to adapt to local climatic conditions. More generally, it should contribute to the development of crops that do not harm the environment and biological diversity.

What elements should specifically be incorporated into a *sui generis* framework for the protection of plant varieties? It is noted that a number of *sui generis* models are available through a variety of instruments that exist in international law, and several, if not all nations view such instruments as being a way to draft their legislation in this field, and thereby conform to international norms and the TRIPS standard. This is as good a reason as any to consider those existing international *sui generis* models.

5.4 EXPLORING *SUI GENERIS* ELEMENTS WITHIN ACCEPTED INTERNATIONAL NORMS

5.4.1 THE UPOV CONVENTION

The UPOV Convention, often referred to as the “Plant Breeders’ Rights System,” represents a *sui generis* system. Although the UPOV Convention did not introduce patents, it sought from the outset to provide the private sector with an incentive to engage in commercial plant breeding by granting IP rights

plant protection and development, especially the sustainable development goals of the United Nations Millennium Development Goals – Goals 1 and 7; also see Nadine Baron and Ed Couzens, ‘Intellectual Property Rights and Plant Variety Protection in South Africa: An International Perspective’ (2004) 16(1) *Journal of Environmental Law*, 19, at 29.

to plant breeders.⁶³ As a result, the UPOV Convention has been styled to reflect some provisions of the patent system (see Figure 3 *below*).

To date, there has tended to be commonalities in the drafting of UPOV-based laws. While a few countries have done so by ratifying the Convention, a number of them, especially developing countries, have simply plagiarised many of the concepts for their own law without actually becoming members.⁶⁴ It is likely that countries draft a UPOV-style law without signing up to the UPOV in order to be close to the international norms on plant variety protection, while sustaining flexibility in the development of their own legal regimes. It would be unwise for developing countries such as Thailand to conform to all the UPOV's provisions, especially when they can choose to structure their own national regime. Nevertheless, several provisions of the Convention provide some useful starting points and templates for shaping plant variety protection laws, even if it may not be suitable for adoption as a whole by developing countries. In any case, developing countries should follow some of those key elements when introducing their legislation in this field. The major elements of the UPOV Convention are examined in this section to determine the extent to which developing countries such as Thailand should conform to the provisions of the UPOV Convention. The examination is also based on a comparison with the patent provisions of the TRIPS Agreement in order to more fully understand the similarities and differences between these two regimes.⁶⁵ Key features of the UPOV include:

- a) The legal definition of plant variety;

63. Remigius N. Nwabueze, 'Ethnopharmacology, Patents and the Politics of Plants' Genetic Resources' (2003) 11 *Cardozo Journal of International and Comparative Law*, 585, at 610; and Philippe Cullet, 'Plant Variety Protection in Africa: Towards Compliance with the TRIPS Agreement' (2001) 54(1) *Journal of African Law*, 97, 100 (highlighting the fact that UPOV provides monopolistic rights that are more watered down than patents but are based on exactly the same premises. Thus, the distinction between the plant breeders' rights model of the 1991 UPOV Convention and the patent system is blurred).

64. Those countries include India, Indonesia, the Philippines, Bhutan, Malaysia, Laos and Cambodia.

65. As noted above, there are three important versions of the UPOV Convention: the original 1961 Act, 1978 Act, and the 1991 Act. The discussion in this chapter focuses on the 1991 UPOV Act on the grounds that it is the latest revision of this Convention and given the fact that countries can now only join the 1991 version of the UPOV Convention.

- b) The eligibility criteria for new plant variety protection;
- c) The scope of plant breeders' rights; and
- d) The duration of the protection.

A. Definition

The *sui generis* plant protection model of the UPOV Convention has some similarities, as well as some differences, compared to the patent system of the TRIPS Agreement. To begin with, the UPOV Convention stipulates a legal definition of “plant variety” within its text. “Plant variety” is defined as a plant grouping within a single botanical tax of the lowest rank in Article 1 of the UPOV. Irrespective of whether the conditions for the granting of a breeder’s rights are fully met, this grouping can be:

- (1) defined by the expression of the characteristics resulting from a given genotype or combination of genotypes;
- (2) distinguished from any other plant grouping by the expression of at least one of the said characteristics; and
- (3) considered as a unit with regard to its suitability for being propagated unchanged.⁶⁶

This definition is important in this context because the basis for structuring a plant variety protection framework requires a definition of the subject matter. Since this has never been defined in any other treaty, even the TRIPS Agreement, it is an extremely useful definition.

B. Eligibility Thresholds

The four conditions for the protection of plant varieties are outlined in Chapter III of the UPOV Convention entitled “Conditions for the Grant of the Breeders’ Rights”, where it is stipulated that they may be protected if they fulfil the criteria of (1) novelty; (2) distinctiveness; (3) uniformity and (4) stability.⁶⁷

According to Article 6 of the UPOV Convention, a variety is deemed to be ‘new if, at the date of filing the application for breeders’ rights, the

66. The UPOV Convention, above n 2, art. 1.

67. Ibid, arts. 6, 7, 8, and 9.

propagating or harvesting of material of the variety has not been sold or otherwise disposed of to others, by or with the consent of the breeders, for the purpose of the exploitation of the variety'.⁶⁸ Critics have asserted that the requirement of novelty in the UPOV tracks the same standard as the patentability of inventions; thus, it may exclude public knowledge, like the traditional knowledge of farmers, from gaining protection.⁶⁹ In fact, the standard required to qualify for protection as being new under the UPOV Convention is easier to meet than that applied to the TRIPS patent system. As noted above, the novelty criterion in the UPOV is defined in terms of commercial novelty, and no other conditions are required under the Convention; neither the equivalent of an inventive step, nor industrial application. Thus, human intervention is unnecessary to qualify for protection, and as a result, plant varieties, including those growing in the wild, may be eligible for protection simply if they are distinctive from earlier known species.⁷⁰

According to Article 7 of the UPOV Convention, a new plant variety is distinctive and eligible for protection if it is 'clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of the filing of the application'.⁷¹ A new plant variety that is novel and distinctive must also be uniform and stable in order for the applicant to receive IP protection under the Convention. Generally speaking, a plant variety should be the same or have a certain degree of similarity, depending on the nature of the propagating method. Article 8 of the UPOV specifies that a variety is uniform if it is 'subject to the variation that may be expected from the particular

68. Ibid, art. 6.

69. Mark Hanning, 'An Examination of the Possibility to Secure Intellectual Property Rights for Plant Genetic Resources Developed by Indigenous Peoples of the NAFTA States: Domestic Legislation under the International Convention for the Protection of New Plant Varieties' (2004) 13 *Arizona Journal of International and Comparative Law*, 175, 235.

70. Chiarolla, above n 32, at 29; and Srividhya Ragavan and Jamie Mayer, 'Has India Addressed Its Farmers' Woes? A Story of Plant Protection Issues' (2007) 20 *Georgetown International Environmental Law Review*, 97, 105 (arguing that the UPOV Convention provides a low eligibility standard for protection, and thus, leaves room for the possibility that commonly cultivated plants can be deemed as being new, provided that they have never been sold).

71. Ibid, art. 7.

features of its characteristics'.⁷² Article 9 adds that 'the variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle'.⁷³ Like the novelty standard, the criteria of distinctness, uniformity and stability have been styled akin to a patent, but are generally adapted to the mode of reproduction of the variety and provide more flexibility than the requirements for the patentability of an invention.⁷⁴ Overall, the UPOV confers breeders' rights on new, distinctive, uniform and stable varieties. Each of these criteria for eligibility is based on exactly the same premise as patents, but has a lower requirement for protection. Thus, in this respect, a lower standard for protection may be beneficial for traditional farmers in developing countries.

C. Scope of Breeders' Rights

With regard to the scope of rights granted under the UPOV Convention and the TRIPS-patent system, a comparison of Article 28 of the TRIPS Agreement and Article 14 of the UPOV Convention illustrates that they are closely related.⁷⁵ As already mentioned, according to Article 28 of the TRIPS, a patent confers on its owner the right to prevent others from making, using, offering for sale, selling or importing the patented product.⁷⁶ Similarly, under UPOV-based legislation, plant breeders have the right to exclude others from producing or reproducing, conditioning for the purpose of propagation, offering for sale, selling, exporting, importing and stocking propagating material of the protected variety.⁷⁷ The right of exclusion is considered to be an integral part of the legal protection granted to holders of new plant varieties. The goal is to protect the fruits of human effort and financial investment from

72. Ibid, art. 8.

73. Ibid, art. 9.

74. See Srividhya Ragavan, 'To Sow or Not to Sow: Dilemmas in Creating New Rights in Food' in Jay P. Kesan (ed), *Agricultural Biotechnology and Intellectual Property: Seeds of Change* (Oxfordshire: CABI, 2007) 318, at 328–329.

75. Chiarolla, C, above n 32, at 29; and Helfer, L, above n 14, at 35.

76. The TRIPS Agreement, above n 1, art. 28.

77. The UPOV Convention, above n 2, art. 14.

undue appropriation by third parties.⁷⁸ It is meant to reward the holders of plant varieties for their contribution and specifically provide an incentive for them to develop new plant varieties.⁷⁹ This is what lies at the heart of the IPR system and justifies the granting of exclusive rights, making it possible to deter free riders and combat counterfeiting and piracy within the market economy.⁸⁰

D. Duration of Protection

Like the patent system in Article 30 of the TRIPS, the UPOV Convention requires a minimum 20-year term of protection from the date of the granting of breeders' rights. Nevertheless, the UPOV Convention goes beyond the TRIPS patent provisions, and provides an extra period of protection (twenty five years) for new varieties of trees and vines.⁸¹ A longer term of protection is offered for trees and vines because these varieties are relatively rare.⁸² Thus, developing countries should also consider the point at which the IPR protection of new plant varieties should be terminated.

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78. Uma Suthersanen and Graham Dutfield, 'Innovation and the law of intellectual property' in Uma Suthersanen, Graham Dutfield and Kit Boey Chow (eds), *Innovation Without Patents: Harnessing the Creative Spirit in a Diverse World* (Cheltenham: Edward Elgar Publishing, 2007) 13, at 13-14 (noting that the existence of IP law was justified in part because of the merit of the reward theory); also see Adam Smith, *An Inquiry Into the Nature and Causes of the Wealth of Nations* (1776) edited by Edwin Cannon, *Adam Smith: An Inquiry Into the Nature and Causes of the Wealth of Nations* (United States: University of Chicago Press, 1976) Book V, Chapter I, at 338 (Adam Smith was generally critical of monopolistic power as being detrimental to the operation of the 'invisible hand', but he still recognised the fact that a limited monopoly can serve as an appropriate reward for costly and risky endeavours); also see Jeremy Bentham, 'A Manual of Political Economy' in *The Works of Jeremy Bentham* (1962) 31, at 71; and John Stuart Mill (1985), *Principles of Political Economy*, Book V, Chapter X, § 5, London: Penguin, at 295-296 (supporting the work of both Smith and Bentham. He concurs that IP protection monopolies (patents) were justified by arguing that a temporary exclusive privilege was preferable to general governmental awards on the ground in that it avoided discretion and ensured that the reward to the inventor was proportional to the invention's usefulness to consumers).
79. See Scott D. Locke, 'Intellectual Property for the Botanist and the Plant Breeder: An Overview of Protection Afforded by Plant Patents and Plant Variety Protection Certificates' (2007) 6 *Chicago-Kent Journal of Intellectual Property*, 198, at 200-01.
80. Malkawi and Haloush, above n 24, at 124.
81. The UPOV Convention, above n 2, art. 19.
82. Adam Masarek, 'Treetop View of the Cathedral: Plant Variety Protection in South and Southeast Asia Least-Developed Countries' (2010) 24 *Emory International Law Review*, 433, at 464.

E. Deficiencies

The UPOV Convention is not without flaws. Currently, the Convention tends to reflect a bias in favour of large-scale commercial agriculture dominated by breeders and seed industries.⁸³ The model designated in the UPOV exaggerates the role of breeders, which could potentially disadvantage farmers, the sustainable management of biodiversity, and the protection of traditional knowledge rights. Viewed from this angle, the UPOV's deficiencies illustrate why developing nations, such as Thailand, oppose such a system. At the time of writing, the *sui generis* model, as represented by the 1991 UPOV Convention, has been ratified by few developing countries, and its membership is still mainly drawn from European nations.⁸⁴

(i) *Lack of Recognition of Farmers' Rights*

As noted earlier, the UPOV Convention is fashioned as a mechanism for breeders' rights and treats the rights of other actors involved in agricultural management as exceptions to breeders' rights,⁸⁵ which is why the UPOV's biggest problem lies in the lack of any recognition of farmers' rights in its statutory provision. In countries with huge farming populations, such as Thailand, adopting a purely UPOV-style law would simply lead to the marginalisation of farmers, and this trend would inevitably disrupt the traditional way of life of local farmers and jeopardise the continuation of sustainable agricultural practice. There are two critical concerns with reference to farmers' rights, the first of which relates to the rights of farmers to save and re-sow seeds applicable to new varieties. Under the UPOV Convention, farmers' rights are outlined as part of the exceptions to breeders' rights under Article 15 of the Convention, which provides two types of exceptions:

83. Ragavan and Mayer, above n 70, at 98; and Cullet, P, above n 63, at 99.

84. For a list of UPOV's membership see <<http://www.upov.int/en/about/members/pdf/pub423.pdf>>. It should be noted that UPOV is currently being actively promoted worldwide by the organisation itself, as well as by the United States and the European Union through bilateral free trade agreements that tend to require developing countries to join the 1991 UPOV Convention.

85. See Robyn Ott, 'Protection of Plant Varieties and Farmers' Rights Act' (2004) 2 *Oklahoma Journal of Law and Technology*, 14.

compulsory and optional.⁸⁶ Compulsory exceptions include acts by farmers or researchers for ‘private, non-commercial purposes, and experimental purposes’. Critics point out that breeders can easily override these exceptions by conditioning the initial access to the protected variety on the forfeiture of farmers’ rights.⁸⁷ In developing countries where the rate of literacy among the farming community is extremely limited, this can result in farmers forfeiting more rights than they had intended. Regrettably, the forfeiture of rights is very important in this context because such rights can enable farmers and local farming communities to conserve and maintain agricultural biodiversity and innovation at a local level.⁸⁸

Another concern relates to the rights of farmers who provide sources of information that result in a new and protected commercial crop variety. The UPOV Convention limits the ability of governments to provide protection for the rights of farmers. National governments may provide farmers’ rights only ‘within reasonable limits and subject to the safeguarding of breeders’ legitimate interests’.⁸⁹ These limitations prevent governments from making concessions to farmers that would adequately balance their social welfare and IP protection. Hence, the failure to adequately balance socio-economic welfare and IP protection demonstrates why many developing countries resist ratifying the UPOV Convention. A system that takes a balanced approach to plant protection would be most beneficial for farmers in the developing world, who generally belong to poorer social classes.⁹⁰

(ii) Public Interest Exceptions

The UPOV’s lack of recognition of farmers’ rights is coupled with the weakness of the public interest exception. Article 17 of the UPOV Convention

86. The UPOV Convention, above n 2, art. 15.

87. Philippe Cullet, ‘Property Rights over Biological Resources: India’s Proposed Legislative Framework’ (2001) 4(2) *Journal of World Intellectual Property*, 211, at 213.

88. Philippe Cullet and Radhika Kolluru, ‘Plant Variety Protection and Farmers’ Rights – Towards a Broader Understanding’ (2003) 24 *Delhi Law Review*, 41, at 55.

89. The UPOV Convention, above n 2, art. 15

90. Pawarit Lertdhamtewe, ‘Effective Plant Variety Protection as Development Policy: A Perspective for Thailand’ (2011) 11:1 *Thailand Journal of Law & Policy*, available from <<http://www.thailawforum.com/articles/plant-variety-protection-as-development-policy-for-Thailand.html>>.

relates to this issue. The provision of this Article states that ‘except where expressly provided in this Convention, no Contracting Party may restrict the free exercise of a breeder’s right for reasons other than of public interest’.⁹¹ Obviously, there must be public interest to merit the issuance of a compulsory license for the use of breeders’ new plant varieties. Unlike the TRIPS patent regime, the UPOV Convention does not provide examples or explanations of what the public interest might be, and this absence of a definition of the term “public interest” seems to create a great deal of ambiguity. Defining the term “public interest” would enable countries to know when they could benefit from the applicable flexibility and avoid potential conflicts between members on the question of what justifies the use of such measures.⁹² Whether a welfare issue, which detrimentally affects farmers, qualifies as a public interest requirement remains open to question, even assuming that a substantial percentage of the population is dependent on agriculture. In this kind of situation, a clear definition is crucial to enhance the clarity and rationality when determining whether or not the limitation of breeders’ rights is in the public interest. This would help developing countries to avoid the difficulty they previously faced with respect to pharmaceutical patents.⁹³ Presumably, based on the obstacles developing countries used to encounter in terms of pharmaceutical patents, they have a strong interest in demanding clarification of the term under the UPOV regime.⁹⁴ Rather than considering the internalisation of the public interest exception in the UPOV, developing countries may wish to consider the public interest exception in the TRIPS, which provides a much wider scope for exceptions.

91. The UPOV Convention, above n 2, art. 17.

92. It is noted that the absence of clear parameters of public interest may subject the compulsory licensing system to abuse.

93. See Srividhya Ragavan, ‘Can’t We All Get Along – Case For a Workable Patent Model’ (2003) 35 *Arizona State Law Journal*, 117.

94. See, Ragavan, above n 74, at 337–38.

Box 2. Key Elements of UPOV 1991 Act

A *sui generis* PVP regime may include:

- The legal definition of plant varieties
- The legal protection of new plant varieties
- The registration requirements
- Scope of plant breeders' rights
- Exceptions to rights of plant breeders
- Compulsory licensing measures
- The minimum 20-year term of protection
- The additional term of protection applicable to varieties, such as trees and vines

5.4.2 UNITED NATIONS CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

As discussed above, the CBD does not deal directly with the issue of plant variety protection, but is relevant to the establishment of legal regimes for such protection, since it has been instructed by the TRIPS Council to examine the fundamental relationship between the CBD and Article 27.3(b) of the TRIPS when drafting a framework for the protection of plant varieties.⁹⁵ According to Article 1 of the CBD, the objectives of the Convention 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’.⁹⁶ In this sense, the overall objectives of the CBD appear to be different from those of the 1991 UPOV Convention, which were only concerned with protecting individuals’ rights (breeders’ rights) over plant materials (See Figure 3 below). As noted earlier, the UPOV model has become substantially akin to the TRIPS patent system. Although the focus of this sub-section is the distinction between the UPOV and the CBD, most of the conclusions also apply to the TRIPS patent system.

95. *Declaration on the TRIPS Agreement and Public Health*, Ministerial Conference, Fourth Session, Doha, 9 – 14 November 2001, WT/MIN (01)/DEC/W/2, dated 14 November 2001.

96. CBD, above n 3, art. 1.

Figure 3: Comparison of the TRIPS-Compatible Patent Law and Sui Generis Systems under the UPOV Convention, CBD, and ITPGRFA

	TRIPS-Patent System	UPOV's Sui Generis Model	CBD's Sui Generis Regime	Sui Generis under ITPGRFA
Scope of Protection	New plant-related inventions	New plant varieties	Biological resources	Plant genetic resources for food and agriculture
Eligibility Requirements	Plant varieties claimed in patent must pass three criteria: (1) novel, (2) non-obvious, and (3) useful	Breeders varieties that can be deemed as 'new, distinct, uniform and stable'	Biological material traditionally cultivated by farmers or of which farmers possess common knowledge	Farmers' rights relevant to plant genetic resources for food and agriculture
Scope of the Rights of Breeders	Exclusive rights granted to patent holders to prevent third parties from making, using, offering for sale, or importing without permission from patent holders	Exclusive rights granted to plant breeders to prevent third parties from making, using, offering for sale, or importing without breeders' permission	No	No
Exceptions to Breeders' Rights	Public interest exception; farmers & researcher exception	Limited in scope for public interest exception; farmers & research exceptions	No	No
Farmers' Rights	No	Optional exclusion	Benefit-sharing arising from utilisation of biological materials	Farmers retains rights to re-sow
Scope of the Rights of Farmers and others	No	No	Traditional knowledge rights (common knowledge); benefit-sharing of biological resources	Protection of common knowledge relevant to plant genetic resources; and farmers' rights to save and re-use seeds
Term of Protection	20 years for all plant varieties, from the date of filing patent application	20 year for all plant varieties from the date of filing the application	No	No
Compulsory Licensing provisions	Flexible applicable to patent protection	Limited the ability of government to use compulsory licensing measures	No	No
Essential Elements	1. Minimum 20 term of protection 2. Compulsory licensing provision	1. Provisions for breeders' rights protection 2. Provisions conditioning the scope of breeders' rights 3. Provisions relating to term of new plant variety protection	1. Provisions for protecting knowledge developed by farmers 2. Provisions for benefit-sharing, and access to genetic resources	1. Provisions for the protection of rights of farmers 2. Provisions for farmers' rights to save seed and re-sow

Source: the author

There is currently much legal debate about the degree of conflict between the CBD and the UPOV. Nevertheless, the focus of this chapter is the establishment of a plant variety protection framework to comply with the TRIPS; hence, such conflict can be viewed as being an opportunity to incorporate useful elements of such regimes within the ambit of the TRIPS. In order to do this, an outline of the main CBD provisions in terms of traditional knowledge rights, biodiversity, and other related issues is provided in this subsection before examining whether, and to what extent, the provisions of the CBD should be incorporated into the legal system of plant variety protection in response to the TRIPS requirements.

A. Provision for the Protection of Farmers' Knowledge and Biodiversity

One of the most significant differences between the UPOV and the CBD is that the CBD appears to provide a much wider scope and applicability for countries to adopt a *sui generis* regime for the purpose of protecting traditional knowledge rights and biological diversity within their jurisdictions.

The most prominent provision that requires the protection of traditional knowledge and biodiversity is Article 8(j) of the CBD, in which it is stated that contracting parties should 'respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilisation of such knowledge, innovations and practices'.⁹⁷

It is arguable that this Article of the CBD supports the limiting of the IPR protection of plant genetic material in certain circumstances where the effect of granting IP rights protection would be to reduce the diversity in traditional agricultural practices by replacing the traditional varieties with a small group of protected varieties.⁹⁸ This aspect of Article 8(j) appears to be inconsistent with the provisions of the UPOV, which allows for the protection of plant genetic materials at the expense of farmers and local indigenous communities.⁹⁹ Based on the CBD's policy framework, provisions may

97. Ibid, art. 8(j).

98. See Philippe Cullet, 'Intellectual Property Rights and Food Security in the South' (2004) 7(3) *Journal of World Intellectual Property*, 261, at 281; Thomas Cottier and Marion Panizzon, 'Legal Perspectives on Traditional Knowledge: The Case for Intellectual Property Protection' (2004) 7(2) *Journal of International Economic Law*, 371, at 385; and Gurdial Singh Nijar and Chee Yoke Ling, 'The Implications of the Intellectual Property Rights Regime of the Convention on Biological Diversity and GATT on Biodiversity Conservation: A Third World Perspective' in Anatole F. Krattiger et al. (eds), *Widening Perspectives on Biodiversity* (Gland, Geneva: IUCN and International Academy of the Environment, 1994) 277.

99. Crucially, the criticism is that UPOV only promotes commercially profitable varieties, but the resulting loss of agricultural diversity affects socially valuable varieties. See Charles R. McManis, 'The Interface between International Intellectual

include elements that may clarify ownership rights, seek to establish protected commonalities, or attempt to address the misappropriation or biopiracy of genetic materials and related knowledge.

B. Provisions related to Benefit-Sharing and Access to Plant Genetic Resources

Moreover, under Article 15(1) of the CBD, the sovereignty of natural resources, including the traditional knowledge of plant genetic resources, is assigned to national governments.¹⁰⁰ Critics point out that this provision of the CBD directly conflicts with the 1991 UPOV Convention, since the sovereignty of genetic resources implies the right of national governments to limit the granting of IPRs to them.¹⁰¹

Several articles of the CBD require member states to create legal regimes, which would require holders of IP rights on genetic resources to share the benefits with the people or community from which they derived those resources. For instance, Article 15(7) of the CBD stipulates ‘sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilisation of genetic resources’.¹⁰² This clearly differs from the UPOV in that it can essentially provide holders of traditional knowledge, which in this case, are farmers and local indigenous and farming communities, with financial compensation if plant breeders seek to misappropriate their knowledge.¹⁰³

One final provision of significance relates to Article 15(5) of the CBD, which prescribes that access to genetic resources must be subject to the prior

Property and Environmental Protection: Biodiversity and Biotechnology’ (1998) 76 *Washington University Law Quarterly* 255, at 276.

100. The CBD, above n 3, art. 15(1) (“Recognising the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation”).

101. See Ragavan, and Mayer, above n 63, at 109; and Cullet, above n 70, at 101.

102. The CBD, above n 3, art. 15(7) [emphasis in original].

103. It has been suggested by some commentators that embracing a *sui generis* regime based solely on the UPOV-style legislation would simply run counter to the CBD doctrine of the equitable sharing of the technology and traditional knowledge of farmers and local indigenous communities; see Ragavan, and Mayer, above n 70, at 109.

informed consent (PIC) of the Contracting Party providing such resources.¹⁰⁴ This would require individuals who are seeking IPR protection for traditional knowledge of genetic resources to give notice and obtain the consent of both the state, and potentially the community from which the resources are derived.¹⁰⁵ A number of reasons favour the incorporation of these CBD elements into a plant variety protection framework. Firstly, it appears that developers have witnessed a number of misappropriation incidents, outstanding examples of which can be found in Thailand. Secondly, there seems to be a general consensus among WTO members as to the desirability of eliminating the illegitimate appropriation of knowledge concerning plant genetic resources.¹⁰⁶ More generally, there is also a consensus that the benefit of a knowledge-based IP right system should be shared with the holders from which the knowledge was obtained, and this appears to be a significant reason why elements of the CBD related to access to genetic resources and benefit-sharing should be directly incorporated into a legal framework for plant variety protection.

Box 3. Major Elements of the CBD

A *sui generis* PVP regime may include:

- The protection of existing plant varieties as a means to promote the rights of farmers and strengthen the common knowledge developed by local farmers;
- The conservation and sustainable use of biological and genetic resources;
- The promotion of domestic innovation;
- The protection of biodiversity;
- The mechanism for preventing misappropriation;
- The fair and equitable sharing of benefits arising from the exploitation of genetic resources

104. The CBD, above n 3, art. 15(5) [emphasis added].

105. Rhys Manley, 'Developmental Perspectives on the TRIPs and Traditional Knowledge Debate' (2006) 3 *Macquarie Journal of International and Comparative Environmental Law*, 113, at 123.

106. See *Taking Forward the Review of Article 27.3(b) of the TRIPS Agreement: Communication from the African Group*, WTO Doc IP/C/W/404 (2003) at para. 2; *Article 27.3(b) Relationship between TRIPS Agreement and the CBD, and the Protection of Traditional Knowledge and Folklore: Communication from the United States*, WTO Doc. IP/C/W/449 (2005); *Relationship between TRIPS Agreement and the CBD, and the Protection of Traditional Knowledge and Folklore: Communication from Peru*, WTO Doc. IP/C/W/441/Rev.1 (2005); and *Relationship between the TRIPS Agreement and the Convention on Biological Diversity and the Protection of Traditional Knowledge: Submission from Brazil and India*, WTO Doc. IP/C/W/443 (2005).

5.4.3 INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE (ITPGRFA)

In a similar vein to the CBD, the ITPGRFA sets out a binding instrument concerning the management of plant genetic resources and the protection of farmers' rights at an international level. Since the rules of the ITPGRFA are relevant to the area of plant variety protection, they also need to be considered.

A. Main Objectives of the International Treaty

According to Article 1 of the ITPGRFA, its objectives are 'the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security'.¹⁰⁷ This illustrates that the purposes of the ITPGRFA are consistent with the central tenets of the CBD, which are devoted to facilitating benefit-sharing and access to plant genetic resources (see Figure 3 above). In fact, the ITPGRFA supplements the CBD's main framework by also providing a consideration of farmers' rights. This sub-section also argues in the same way as the CBD that certain elements of the ITPGRFA should be included in the IPR regime for plant variety protection with a view to satisfying the TRIPS requirements.

B. Provisions for the Rights of Farmers

The most salient feature of the ITPGRFA's *sui generis* stamp lies in its provision for the protection of the rights of farmers, which is stated in Article 9 of the treaty.¹⁰⁸ This provision regulates that 'the responsibility for realising Farmers' Rights, as they relate to plant genetic resources for food and

107. See ITPGRFA, above n 4, art. 1.

108. Ibid, art. 9.1 ("The Contracting Parties recognise the enormous contribution that local and indigenous communities and farmers of all regions of the world, particularly those in the centres of origin and crop diversity, have made and will continue to make for the conservation and development of plant genetic resources which constitute the basis of food and agriculture production throughout the world").

agriculture, rests with national governments,¹⁰⁹ and the national legislation should include measures related to the following:

- The protection of traditional knowledge relevant to plant genetic resources for food and agriculture;
- The right to equitably participate in sharing the benefits that arise from the utilisation of plant genetic resources for food and agriculture; and
- The right to participate in making decisions, at a national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture.

Obviously, this provision of the ITPGRFA obliges member states to take measures to protect and promote farmers' rights. The content of these rights is defined in the balance of that provision and embraces the protection of traditional knowledge, equitable benefit-sharing, and the right to participate in decision-making. The ITPGRFA leaves the legal context within which farmers' rights are to be enacted open to interpretation.¹¹⁰

Moreover, the treaty recognises what is commonly known as “farmers’ privilege”. Article 9.3 of the ITPGRFA prescribes that the provision of this Article must not be ‘interpreted to limit any rights that farmers have to save, use, exchange, and sell farm-saved seed/propagating material’.¹¹¹ Thus, farmers are privileged to save and re-use the seeds from their harvests and can freely exchange seeds of protected varieties with other farmers and farm neighbours, a privilege otherwise lacking in the 1991 UPOV and formal patent regimes. All the foregoing elements of the ITPGRFA should also be included in the legal framework for plant variety protection.

Box 4. ITPGRFA’s salient features

A *sui generis* PVP regime may include:

- Provisions for the recognition of farmers’ rights;
- Provisions by allowing farmers to retain their traditional rights to save and re-use the seeds from their harvests;
- Mechanism to protect knowledge relevant to plant genetic resources

109. Ibid, art. 9.2 [emphasis added].

110. Blakeney, M, above 22, at 417.

111. The ITPGRFA, above n 4, art. 9.3 [emphasis added].

5.5 CONCLUSION

The international regulatory framework for rules related to the protection of plant varieties has been discussed in this chapter. A number of significant points of several instruments have been revealed, including the WTO/TRIPS Agreement, the UPOV Convention, the CBD and ITPGRFA, with a short story of their historical development. The TRIPS Agreement is the most important agreement that has influenced the structure of national IP laws in most countries in the world. It specifically sets out the minimum standard of protection for many forms of IPR for the first time ever. The Agreement requires all WTO members to comply with these forms of IPRs, including plant variety protection, as designated in its Article 27.3(b). The wording of TRIPS Article 27.3(b) grants WTO members the flexibility to protect plant varieties via patents or an effective *sui generis* system, or a combination of both regimes.

The meaning of TRIPS Article 27.3(b) related to the protection of plant varieties has been the subject of significant debates among WTO members with different views of the appropriate system of IP rights for plant varieties. In interpreting the TRIPS provisions concerning plant IP protection, the Vienna Convention on the Law of Treaties has been adopted to construe the TRIPS treaty in this chapter. According to the reading of the TRIPS provisions, there are two principal components of plant variety protection law that any national legislation must also contain. The first relates to the exclusive IP rights offered to plant breeders of new plant varieties, while the second relates to a legal mechanism that can operate to balance breeders' exclusive rights with those of others players involved in agricultural management. Specifically, the foregoing discussion has indicated that there is no single plant variety protection model, and WTO members are free to implement a system of their choice. While the TRIPS and the UPOV provide legal elements of plant breeders' rights protection, these regimes do not protect the rights of farmers and local communities. At the same time, the CBD and the ITPGRFA, which

are concerned with protecting the interests of local people, do not respond to any rights of breeders; consequently, a combination of legal forms is much encouraged in this field.

The analysis in this chapter has shown that a legal system of adequate plant variety protection lies in providing breeders with rights, while at the same time, protecting the rights of farmers and local communities. In this sense, two principal components of plant variety protection operate parallel to each other, the first of which includes systematic elements of plant variety protection, either based on the TRIPS patent provisions or the UPOV's plant breeders' rights model. The second system is to provide a *sui generis* form of plant variety protection to supplement the first system. In this respect, a plant variety protection system should contain a number of elements, the first of which relates to rules on new plant variety protection, and it will have a slightly different substance, depending on whether a country models its rules on the UPOV or the TRIPS patent system. Secondly, the minimum term of protection offered to new plant variety protection must not be less than 20 years. This minimum requirement has become the international standard and norm of the term of protection that several countries apply to their national legislation. Finally, plant variety protection should contain some mechanism to cater for the specific needs of local people. This includes legal mechanisms for the protection of the right to traditional knowledge, farmers' rights, access to plant genetic resources, and benefit-sharing regimes. This "self-serving" *sui generis* approach to the legal protection of plant varieties will enable developing nations to tailor their plant protection regime to suit their unique needs and priorities. Such a legal framework for plant variety protection could form the basis of a plant IP protection regime that would tend to comply with the TRIPS obligations.

Chapter 6

Building a Development-Friendly Framework in Thailand

6.1 INTRODUCTION

The previous chapter concluded that, although various international instruments related to the IPR protection of plant varieties could be used as a basis to enact plant variety protection legislation in developing countries such as Thailand,¹ these documents alone could not address the inherent problems in the current regulatory regime of plant variety protection in Thailand identified in Chapter 4 of this thesis, and thereby provide a satisfactory, practical solution to this issue.² A whole new regulatory framework needs to be constructed for plant variety protection in Thailand to specifically address

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1. The previous chapter, Chapter 5, discussed the international regulatory frameworks for plant variety protection and concluded that essential elements can be drawn from international documents, including the UPOV Convention, the CBD and ITPGRFA to enable the establishment of a plant variety protection framework.
 2. The reason for this is that the proliferation of domestic laws to implement multiple multilateral treaties may be criticised as simply being a patchwork solution. The implementation of many laws to the domestic legal system as a compromise solution without the careful examination of their consistency with domestic conditions, needs and legal principles, may create a patchwork legal system: see Ronald Dworkin, *Law's Empire* (Massachusetts: Harvard University Press, 1986) chapter 6 (arguing that the integrity of the law excludes checkerboard laws, which are products of a compromise between different political positions, making a body of law part of which is based on one principle and another based on a different principle).

the needs of all actors in agricultural management, thereby representing a balance between fully accommodating Thailand's socio-economic conditions and taking a position that tends toward satisfying international legal norms. The potential benefits of this approach include increased predictability on a wide range of related issues, such as enforceable legal norms and the validity of national legislation, and an outcome that enjoys greater acceptance and democratic legitimacy within the sovereign domain.³

From the development perspective, the current Thai legislative framework for plant variety protection, as presented in the *Plant Variety Protection Act B.E.2542 (AD1999)* (PVP Act)⁴ requires a major revision to potentially close the existing loopholes in the rules. This chapter contains a proposal for the reform of the current PVP rules in Thailand, and discusses ways in which they can be modified to make them effective for the purpose of development. Possible elements of an alternative framework for the protection of plant varieties and the role of the institutional body that governs the area of plant variety protection in Thailand are discussed in the following sections. This chapter also highlights the challenges involved in designing a national legal regime to meet the country's development needs, socio-economic priorities, and the domestic level of plant breeding and biotechnology capacity with the aim of finding the most appropriate balance between distributed agricultural innovation and the centralised control of plant-related innovation.

It is worth noting that, because the debate on the introduction of IPR in agriculture predates Thailand's signing of the WTO/TRIPS Agreement,⁵ and

3. See Kaku Shun, 'International Law: A Relief or Threat to Domestic Law?' (AsianSIL-NUS Working Paper 2012/4, Asian Society of International Law, 2012); see also, Allen Buchanan, *Justice, Legitimacy, and Self-Determination* (New York: Oxford University Press, 2004) 301–13; and also Joshua Cohen, 'Deliberation and Democratic Legitimacy' in James Bohman and William Rehg (eds), *Deliberative Democracy: Essays on Reason and Politics* (Massachusetts Institute of Technology, 1997) 67 at 67–9.

4. *The Plant Variety Protection Act B.E.2542* (1999) (Thailand), ('PVP Act of Thailand').

5. Rajeswari Kanniah, 'Plant Variety Protection in Indonesia, Malaysia, the Philippines and Thailand' (2005) 8(3) *Journal of World Intellectual Property*, 283 at 284 (indicating that Thailand is one of the earliest countries to implement a *sui generis* plant protection model to comply with the WTO/TRIPS obligations).

has received a relatively strong input from civil society,⁶ the Thai situation is rich in lessons for other developing nations with similar agricultural sectors. Therefore, although this thesis focuses on the Thai situation, all the main findings can be extended to a number of other developing nations, which are in a broadly comparable situation.

The Thai PVP Act is in the process of being amended at the time of writing this thesis.⁷ However, the possibility of it being completed within the near future is fairly remote, partly because of the frequent bouts of political instability in Thailand.⁸ More crucially, the Thai government suspended the amendment of the Act in 2012 because it was extremely dissatisfied with the proposal. It was felt that domestic interests and concerns were not taken into account⁹ and the proposal failed to promote innovation in plant breeding without sidelining farmers' rights and livelihoods. Specifically, it was felt that other areas of IP rights, such as copyrights, trademarks, and patents should be addressed as a matter of priority in the near future.¹⁰ This continued impasse of the amendment of Thailand's plant protection regime will threaten the

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6. The vast majority of literature discusses the debates concerning IP rights protection over plant varieties in Thailand including Jade Donovanik, *Implications of Compliance with the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) For Thailand's Development: Focusing on Plant Protection* (JSM Thesis, Stanford Law School, Stanford University, 1997); Jaroen Compeerapap, 'The Thai Debate on Biotechnology and Regulations' (1997) 32 *Biotechnology and Development Monitor*, 1315; Supara Janchitfah, 'Patenting Mother Nature provokes outrage', *Bangkok Post* (Thailand) 4 January 1998; Witoon Lianchamroon, 'Community Rights and Farmers' Rights in Thailand' (1998) 36 *Biotechnology and Development Monitor*, 9; Tanit Changthavorn, *Plant Variety Protection in Thailand* (PhD Thesis, University of London, 1998); and Jakkrit Kuanpoth, 'Protection of Traditional Knowledge in the Face of Globalisation: Balancing Mechanism between CBD and TRIPS (2009) 12:1 *Thailand Journal of Law & Policy*, available online.
 7. See Cabinet Resolution, *Draft of Plant Variety Protection Act (Issue No...) Year ...* (The Cabinet of Thailand Meeting on Tuesday 16 November 2010).
 8. For a recent and unfortunate typical example see Richard Bernstein, 'Letter from America: The Failure of Thailand's Democracy', *The New York Times* (Asia Pacific), 25 May 2010; see also Verapat Pariyawong, *Three-Course Recipe for the Court's Cookery: A Critique on Thai Democracy and Judicial Review* (LLM Thesis, Harvard Law School, 2010); and also, *Thai PM Deposed in Military Coup*, BBC News, September 20, 2006.
 9. This was because the proposal of the amendment, which was prepared by the Ministry of Agriculture and Cooperatives, was modelled on the text of the 1991 UPOV Convention. As a result, it was likely to have a negative impact on farmers' rights provisions in the current framework of plant variety protection in Thailand.
 10. Significant attention has been paid to traditional rights such as copyrights, trademarks and patents in Thailand, as well as other new areas of IP rights, including geographical indications, traditional knowledge rights protection, and others. However, less attention has been paid to the IP rights with respect to plant varieties.

future and continuation of the country's agricultural development. The fundamental reform of the current PVP regime is essential to ensure the effective protection of plant varieties, the validity of national legislation, and the long-term promotion of Thailand's development and sustainability in agriculture. The recommendations in this chapter of the thesis are proposed to aid this effort.

6.2 POSSIBLE ELEMENTS OF THE PLANT VARIETY PROTECTION FRAMEWORK

As discussed in the previous chapters, the ineffectiveness of the current PVP provisions in Thailand is an issue. For instance, Thailand's current plant variety protection regime gives preference to farmers and local communities, with the majority of the protection related to local domestic plant varieties, thus providing special and differential treatment to farmers and local communities.¹¹ This preference has been criticised as not being very helpful for both farmers and local societies, considering that no farmers and local communities have yet been able to claim the benefits of the generous provisions to protect local domestic plant varieties. Furthermore, Chapter III of the Thai PVP Act concerning the protection of breeders' varieties shows a detrimental lack of appreciation of the role of breeders. The ineffectiveness of these provisions relates to three important areas: (i) low standards of protectability; (ii) insufficient terms of protection provided to breeders' varieties; and (iii) lack of guaranteed rights for plant breeders.¹² Thus, consideration should be given to the establishment of a coherent set of rules in the form of a new legislative framework in order to address plant variety protection issues more effectively and consistently.

In terms of the regulatory elements to be included in the new PVP framework, specific legal provisions should be developed in line with international standards, i.e., the standards adopted by several other countries

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11. *See* Chapters IV and V of the Thai PVP Act, above n 4. *See* Chapter 4 of this thesis for a discussion concerning the protection of farmers' and local communities' rights in the Thai PVP law.
 12. *See* Chapter III of the Thai PVP Act, above n 4. *See* Chapter 4 of this thesis for a further explanation of the protection of plant breeders' rights under the Thai PVP Act.

and applied to their national PVP legislations.¹³ The new PVP framework should also provide coherent and diverse protection terms that apply to the duration of the protection.¹⁴ Specifically, the following discussions propose that reforms of the regulatory PVP regime are necessary in two areas: (1) Rules regarding Extant Varieties, and (2) Rules for New Plant Varieties. As discussed in the following sections, these proposed reforms can be incorporated in the new PVP regime, although they do not comprise an exhaustive list of provisions.

If the recommendations suggested in the following sections are to be adopted to create a plant variety protection framework, this will imply the suspension of the current legal rule of Thailand's plant protection regime, since the new provisions would affect the current status of Thai PVP law. In addition to creating a new PVP framework, by providing a coherent regulatory structure of plant IP protection, the proposal of a new PVP regime would make a statement that plant variety protection issues are considered to be just as essential as other traditional IP right issues, such as copyrights, trademarks, and patents, being promoted by the government of Thailand, thereby demonstrating that agricultural development priorities are no longer only a subject of elaborate rhetoric.

6.2.1 ADJUSTMENT OF RULES REGARDING EXTANT VARIETIES

A. Revision of Local Domestic Plant Variety Protection Provisions

Elements of the new PVP framework could include the revision of local domestic plant variety protection provisions. The introduction of these

13. Pawarit Lertdhamtewe, 'Asian Approaches to International Law: Focusing on Plant Protection Issues' (2013) 8(5) *Journal of Intellectual Property Law and Practice*, 388 (suggesting that the Thai PVP provisions concerning the protection of breeders' rights should conform to international standards imposed by the UPOV Convention).

14. Several academic studies suggest that developing countries should adopt different durations of protection; for example see, Philippe Cullet, 'Intellectual Property Rights and Food Security in the South' (2004) 7(3) *Journal of World Intellectual Property*, 261 at 282.

provisions was meant to balance breeders' rights with those of other players in Thailand's agricultural practices. The typology for the protection of local domestic plant varieties was first introduced to protect traditional knowledge and communities rights.¹⁵ Local domestic plant varieties could be registered by a particular community, which was required to provide the method of their conservation or development, the landscape together with the concise adjacent area, as well as a list of members of the community.¹⁶ At the time of writing this thesis, no local domestic plant varieties have been registered in Thailand.¹⁷

The rights to local domestic plant varieties belong to local communities or indigenous groups in Thailand, and Section 3 of the Thai PVP Act defines 'local community' as 'a group of people residing and commonly inheriting and passing over culture continually and registered under the Thai law'.¹⁸ Obviously, there is no express mention of indigenous people, but the term 'local community' in the PVP Act is also used to refer to the recognition of local indigenous groups.¹⁹ Such a community is a dynamic concept, the components of which change over time as people move from one community to another.²⁰ Thus, it is virtually impossible to derive a suitable single

15. See Chapter 4 for an explanation of local domestic plant variety protection in the Thai PVP Act. Jade Donovanik, *Plant Variety Protection Law in Thailand* (Bangkok: Nititham Publishing, 2013) 29 (in Thai); and Tanit Changtavorn, 'Law on Plant Variety Protection in Thailand' in the Thai Bar Association (ed), *Textbook on Intellectual Property Law in Thailand* (Bangkok, the Thai Bar Association, 2011) 290, 294-5 (in Thai) (suggesting that the important aspect of a local domestic plant variety protection is to create community property rights in contrast to breeders' variety, a concept ignored by UPOV).

16. The PVP Act of Thailand, above n 4, § 44(1), (2), and (3).

17. There is a doubt that local domestic plant varieties exist in Thailand. Also, the inherent complexity and difficulty in meeting the requirements of local domestic plant variety registration have created a widespread perception that the PVP system would never have resulted in the registration of local domestic plant varieties. The inefficiency of this set of provisions in the current PVP regime has led to the inclusion of local domestic plant variety protection provisions in the amendment agenda, with the possibility of rule modification.¹⁷ Nonetheless, it is unlikely that the inherent difficulty in providing local domestic plant variety protection could be settled to a satisfactory level. Dr. Tanit Changtavorn, a Thai government official, has characterised "local domestic plant variety protection provisions" in the Thai legal system of plant protection as a "subject of political rhetoric," and suggests revising it in the proposal for amendment made by the government of Thailand.

18. The PVP Act of Thailand, above n 4, § 3 [emphasis in original].

19. Donovanik, above n 15, 29; and Changtavorn, above n 15, 294.

20. Donovanik, above n 15, 29; Changtavorn, above n 15, 294; and Sun Thathong, 'Rethinking Strategies in Legal Protection of Traditional Knowledge – A Case Study

definition of such a versatile concept. Indeed, considering the historical context of Thailand, local domestic plant variety protection should not be included in the PVP system. Thailand has made statements to the United Nations, which relates to the rights of indigenous people.²¹ From the country's perspective, there is no such thing as indigenous groups in Thailand. Instead, all Thais are considered to be indigenous people, and each indigenous group forms an integral part of the Thai nation, and thus cannot be considered in isolation. Based on Thailand's declaration to the United Nations, proposing that local domestic plant varieties should belong to local Thai communities overlooks the fact that a single community or indigenous owner of a plant variety in Thailand cannot be identified.

In fact, general and wild domestic varieties occur on a larger scale, but the category for local extant varieties is meant especially for varieties that have been cultivated only in a specific part of the country by a specific group of people working together on the field. Obviously, there might be more than one community relating to plant varieties, so that no single community can exactly claim the actual rights to register and benefit from the PVP provisions. Instead of providing rights to a particular community, the PVP law should relax the requirements of local domestic plant variety protection by allowing two or more communities to be given rights to a common variety. This would enable local farming communities to be able to register their varieties, thus realising the benefits. In a country like Thailand where the size of local farming communities is massive,²² protecting these rights would not only promote innovations at local level, but also demonstrates that rights are contoured to suit the development needs of the Thai nations. This clearly adheres to the

of Thailand' (2009) 2(2) *Journal of the Thai Justice System* 97, 110-111 (arguing that there are several local communities and local people relative to local plant varieties in Thailand, so that no one can claim for itself the precise right to register and benefit from local domestic plant variety protection provisions).

21. *Thailand Government Statement: Hill-Tribe Welfare and Development*, UN Doc. E/CN.4/AC.2/1992/4 (1992).
22. See Chapter 3 of this thesis.

objectives of the *United Nations Convention on Biological Diversity* (CBD),²³ and responds to the recommendation of the TRIPS Council.²⁴

Summary: Provisions specifying local domestic plant variety protection should be amended:

- Since its inception, the lack of local domestic plant variety registrations has proved that Thailand has no local domestic plant varieties;
- Proposing that local domestic plant varieties should belong to local Thai communities overlooks the fact that a single community owner of a plant variety in Thailand cannot be identified;
- The new PVP elements should allow two or more communities to be given rights to a common variety.

In addition to protection of rights of local societies, the farmer–saved seed exemption, discussed below, can also provide sufficient protection for farmers’ way of life. Moreover, general domestic plant and wild plant variety protection measures can make it easier for predatory breeders to misappropriate domestic plants, and the provision of a benefit-sharing arrangement also represents a sense of consideration to rewarding farmers and local custodians. Each of the elements discussed below not only represents farmers’ rights protection, but also demonstrates that the rights are contoured to suit the unique national conditions.

23. *United Nations Convention on Biological Diversity*, art. 8(j), opened for signature 5 June 1992, 31 UNTS 818 (entered into force 29 December 1993). Art. 8(j) states that [C]ontracting parties should respect, preserve and maintain knowledge, innovation and practices of [...] local communities embodying traditional knowledge lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilisation of such knowledge, innovations and practices.

24. *Review of the Provision of Article 27.3(b)*, IP/C/W/369, 8 August 2002, para. 13. The TRIPS Council also suggests that a *sui generis* system under Article 27.3(b) should be established to promote protection of innovation of farmers and local farming communities in the developing world through the implementation of a more comprehensive *sui generis* system for plant variety protection.

B. Protection of Rights of Farmers in the Proposed Regime

Farmers' rights represent a complex set of issues and concerns for Thailand's development needs and priorities in terms of ensuring food security.²⁵ The ability of farmers to control farm inputs and maintain livelihood is at the heart of the issue. As discussed in the preceding chapters, the ITPGRFA recognises farmers' rights and encourages countries to take measures that protect and promote them (Article 9).²⁶ It specifically reminds us that the protection of farmers' rights and their participation in policy-making and decision-making are the key elements to ensure food security.²⁷ Thus, it is imperative for the Thai PVP law to incorporate provisions for the protection of such rights.

Generally, the current Thai PVP law provides that authorisation from breeders is unnecessary in cases where farmers use a product of the harvest they have obtained by planting on their own holdings, for cultivating and propagating protected varieties listed in the Thai PVP law.²⁸ Obviously, the Act is showcased by allowing farmers to retain their traditional rights to save and re-use seeds from their harvests. On the basis of this provision, farmers do not have to buy seeds in each planting season. This provision should be incorporated in the new PVP law. Such provision would clearly adhere to the Article 9 of the ITPGRFA, mentioned above, and responds to Thailand's strong sentiments against the impact of prohibitive prices for seeds sold by large agribusiness producers. There is a considerable debate on farmers' rights to reuse protected varieties. As noted in Chapter 5, the 1991 UPOV Convention does not recognise the general right to re-use protected seeds, as discussed throughout the thesis.²⁹ Breeders insist that, when farmers re-use protected varieties, they should lose part of their rightful compensation for

25. Bearing in mind the development objectives of Thailand, discussed in Chapter 3, meeting the food needs of each and every individual Thai is also one of the basic requirements for achieving sustainable development.

26. *International Treaty on Plant Genetic Resources for Food and Agriculture*, art. 9, Rome 3 November 2001, Doc. Y3159/E (ITPGRFA).

27. See Chapter 3 Section 3.3.2.

28. *Ibid.*, § 33(4).

29. See Chapters 2 and 4 of this thesis for discussion on farmer-saved seed exemption in UPOV.

second-generation seeds. The breeders' lobby and the seed companies have opposed the right to re-sow on the grounds that it is contrary to the principles of western IP norms. On the other hand, farmers regard re-sowing as their natural right.³⁰ The right to re-sow is important for farmers to maintain their livelihood and for the nation to remain self-sufficient. For instance, farmers account for 89% of Thailand's seed production. Denying the right to re-sow would result in private corporations displacing farmers as the country's major seed producers. In developing countries like Thailand, which has a considerable farming population, it is important to make concessions and exceptions to maintain the balance between trade and national welfare. Thus, the save seed exception in the PVP regime is outstanding, with a unique national flavour.

There are some certain issues worth considering. Specifically, when certain types of cross-bred hybrid or high-yielding variety seeds are used, it may not be worth for farmers saving the seeds or propagating materials because of second generation sterility. This is an outcome of the breeding involved in these varieties. As discussed in Chapter 3, the Green Revolution trend towards marketing of hybrid varieties has been the subject of significant debates for decades.³¹ Two important issues arisen with reference to the hybrid varieties. The first relates to concerns surrounding hybrid varieties, which are often marketed and labelled as high-yielding seeds but which also require the re-purchase of seeds after each cultivation season. The second

30. Unlike developed nations, where seed companies and corporate farmers own large tracts of farmland, most seed companies in Thailand contract out seed production to small farmers, who are then supervised by those seed companies. The seed companies benefit from this arrangement because they are able to avoid the costs and risks of seed production and any tariff associated with the industrial production of seeds. Further, the small farmers are able to obtain subsidies from the government for many agricultural inputs, such as water and electricity.

31. Yos Santasombat, '*Sui Generis* Rights: History of A Struggle' (Signpost to Sui Generis Rights: 8) (GRAIN Publication, 1998). Professor Santasombat suggested that After the Green Revolution, the Thai farmers were told to use new miracle seeds, pesticides and chemical fertilisers. They were promised a brighter future, more cash income, and luxurious lifestyles. They became, in fact, poorer and poorer. The Green Revolution invariably destroyed rural self-reliance, self sufficiency and local seed varieties. Technology was transfer from villages to scientific labs, germplasm was transferred from agricultural fields to genebanks, agricultural research centres were set up to destroy local seed varieties; and GRAIN, 'Biopiracy, TRIPS and the Patenting of Asia's Rice Bowl: A collective NGO situationer on IPRs on rice' (GRAIN Publication 25 May 1998).

relates to the issue of genetic use restriction technologies, which aims to restrict the use of germplasm by controlling the expression of a gene associated with particular traits or with genes that are crucial to plant protection. If such technology is successful, it is possible that farmers will not be able to save seeds for the following season and will consequently become dependent upon seed manufacturers for their supply of seeds.³² Such concerns are directly relevant to the protection of farmers' rights, and in response to concerns, some measures must also be taken.

Unlike the Thai PVP law, the Indian Protection of Plant Varieties and Farmers Rights Act (PPVFR Act)³³ has an interesting farmers' rights provision related to marketing or labelling disclosure.³⁴ It requires that breeders must disclose to farmers the expected performance under given conditions, and that if such propagating materials fails to perform adequately the farmers can claim compensation via the PPVFR authority. This kind of provision is likely targeted at deceptive marketing or labelling claims of high-yield varieties that unfairly raise the expectation of farmers, and which may affect their food sovereignty.³⁵ This suggests the new PVP law should also incorporate this type of provision that provides protection for deceptive marketing regarding the yield, quality or characteristics of a protected crop variety.

As regard to the issue of genetic use restriction technologies, the PVPFR Act of India also provides an interesting case study. The Act explicitly excludes genetic use restriction technologies from registration and protection under the PVP system, indicating that they are included under technologies

32. See for this discuss, Stephen Hubicki and Brad Sherman, 'Terminator Gene as "Technical" Protection Measures for Patents?' in Christopher Heath and Anselm Kamperman Sanders (eds), *New Frontier of Intellectual Property: IP and Cultural Heritage, Geographical Indications, Enforcement and Overprotection* (Oregon: Hart Publishing, 2005); and also, B. Visser et al, 'Potential impacts of genetic use restriction technologies (GURT) on agrobiodiversity and agricultural production systems' (Rome: Commission on Genetic Resources for Food and Agriculture, Background Study Paper 15, 2001).

33. *The Protection of Plant Varieties and Farmers' Rights Act* (2001) (India) (PPVFR Act).

34. Ibid, § 39.2 of the PPVFR Act of India.

35. Daniel Robinson, 'Exploring Components and Elements of Sui Generis System for Plant Variety Protection and Traditional Knowledge in Asia' (ICTSD Programme on Intellectual Property Rights & Sustainable Development, March 2007) 45.

that are injurious to the life or health of human beings, animals or plants. Reminding that under the TRIPS,³⁶ WTO members may exclude inventions subject to national *order public* and morality concerns.³⁷ Consequently, other PVP elements, which are relevant to farmers' rights protection, might also include the restriction of potentially harmful technologies, and technologies contrary to the maintenance of order public.

Summary: proposed sui generis PVP elements for the protection of farmers' rights should include:

- Protection of the rights of farmers to save, use, sow, re-sow, exchange, and sell their farm-saved seed;
- Marketing and labelling requirements in the PVP system;
- Provisions providing protection regarding deceptive marketing or labelling claims of high-yield seeds;
- Restrictions on potentially immoral or harmful technologies or contrary to public order (i.e. genetic use restriction technologies).

C. Database and Registration System for General Domestic Plant & Wild Plant Varieties

Another area that is highly relevant to the protection of the rights of farmers and local communities is general domestic plant and wild plant variety protection. The protection of general domestic plant and wild plant varieties was introduced as a means to emphasise common knowledge and strengthen traditional knowledge rights, which is a concept ignored by the UPOV. The manner of stylising protection reflects a keen sense of consideration to capture all types of plant varieties within the Thai sovereign domain. This clearly adheres to the principles of the CBD and responds to domestic concern about the misappropriation of plant genetic resources. Other countries with similar

36. See Chapter 5 of this thesis on the interpretation of TRIPS Article 27.3(b) and its related provisions.

37. *Agreement on Trade-Related Aspects of Intellectual Property Rights in Marrakesh Agreement Establishing the World Trade Organization*, art. 27.2, opened for signature 15 April 1994, 1869 UNTS 229 (entered into force 1 January 1995) annex 1C (TRIPS Agreement).

concerns about their sovereign control of plant varieties may also wish to establish the same cover-all protection as Thailand, including general domestic plant and wild plant varieties. However, such protection of plant varieties is controversial, because provisions in the Thai PVP law do not require such varieties to be registered, leaving general domestic and wild plant varieties officially unprotected.³⁸

It is well-known that Thailand has witnessed a great number of biopiracy incidents.³⁹ The patenting of the medicinal extract plant from *Plao Noi* in 1983 by a Japanese corporation is a good example.⁴⁰ A classic example is the patenting of the so-called “Kwao Krua” variety by the United States in 2002.⁴¹ Both of these varieties are common in Thailand, having been cultivated for a long time in many geographical areas of Thailand. The more relevant examples relate to the registration of the Thai traditional fruit named *Papaya* and the granting of a Thai herbal plant named “*Prik*” or “Chilli” as new plant varieties. Both of which are rarely sold because they are commonly found in most backyards. It has been suggested that a major cause of the illegitimate appropriation of plant genetic resources is that relevant offices (patent offices) are often unaware of the existence of such resources in the field for which they

38. See Chapter 4 for further explanation.

39. See Daniel Robinson and Jakkrit Kuanpoth, ‘The Traditional Medicines Predicament: A Case Study of Thailand’ (2009) 11(5) *Journal of World Intellectual Property*, 375-403 (providing a number of incidents regarding the misappropriation of genetic resources in Thailand).

40. The healing properties of Plao-Noi (*Croton sublyratus*) have been recorded in Thailand’s traditional palm leaf books for a long time. Yet Sankyo, the second largest pharmaceutical firm in Japan, was awarded a patent in Tokyo for this famous Thai herbal plant. In 1975, a team of researchers from Sankyo and the Department of Forestry collected samples of Plao-Noi in Prachuabkeereekhan province, south of Thailand. Sankyo brought the samples to the lab, extracted its active ingredient which it called “Plaonotol” – named after the plant itself – and applied for a patent. The company cultivates more than 1,000 ha of Plaonoi in Prachuabkeereekhan province and sells it in tablet forms as “Kelnac,” to treat ulcers. Sankyo’s earnings from Kelnac were estimated to be around \$40 million in 1987. Genetic Resources Actions International, ‘Biopiracy, TRIPS and the Patenting of Asia’s Rice Bowl: A Collective NGO situationer on IPRs on rice’ (25 May 1998) available at <<http://www.grain.org/article/entries/27-biopiracy-trips-and-the-patenting-of-asia-s-rice-bowl>>.

41. For the Kwao Krua patent, see US Patent Number 6673377. For discussion, see Daniel Robinson, *Confronting Biopiracy: Challenges, Cases and International Debates* (London: Earthscan, 2010) at 57–58.

are granting protection.⁴² For example, in Thailand, the *Department of Intellectual Property* (DIP) and the *Department of Agriculture* (DOA) do not investigate existing knowledge unless the legitimacy of certain application is challenged. Thus, there is an obvious need to establish a registration system and a database for extant general domestic plant and wild plant varieties of Thailand.⁴³

The creation of such a database may serve to mitigate this problem. By recording all the plant varieties found in Thailand on a database, patent offices or relevant authorities anywhere in Thailand and rest of the world could easily conduct searches to determine whether the plant-related invention to be protected was or was not derived from extant plant varieties (prior art).⁴⁴ Such a system has already been adopted to an extent by the India-based Society for Research and Initiatives for Sustainable Technologies and Institutions, which is in the process of creating a “traditional knowledge database”, working closely with the communities concerned.⁴⁵ Another country that has pioneered the creation of such a system (Biodiversity Database) is Taiwan.⁴⁶ Some reflection on the experience in those countries may be appropriate here.

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42. Rhys Manley, ‘Developmental Perspectives on the TRIPs and Traditional Knowledge Debate’ (2006) 3 *Macquarie Journal of International and Comparative Environmental Law*, 113, 130.
 43. Thomas Cottier and Marion Panizzon, ‘Legal Perspective on Traditional Knowledge: the Case for Intellectual Property Protection’ (2004) 7(2) *Journal of International Economic Law*, 371, at 372 (suggesting that introducing some kind of IPR regime would protect traditional knowledge from being misappropriated by outsiders).
 44. See e.g., Carlos M. Correa, ‘Implementing the TRIPS Agreement in the Patents Field: Options for Developing Countries’ (1998) 1(1) *Journal of World Intellectual Property*, 75 at 83. Professor Correa suggested that, in order to prevent biopiracy facilitated by the relative novelty requirement of patents, some institutions initiated the publication of community knowledge, thus destroying its novelty for the purpose of patentability). India’s Council of Scientific and Industrial Research is reported to have launched a programme to analyse nearly 500 medicinal plants, in order to place the information on CD-ROMs and make it available to patent offices as a reference guide.
 45. India has pioneered the creation of a system for the registration of traditional knowledge. See Arvind Subramanian, ‘Proprietary Protection of Genetic Resources and Traditional Knowledge’ in Bernard Hoekman, Aaditya Mattoo, and Philip English (eds), *Development, Trade, and the WTO: A Handbook* (World Bank, Washington D.C., 2002) 388.
 46. See K T Shao et al, ‘Experience and Strategy of Biodiversity Data Integration in Taiwan’ (2013) 12 *Data Science Journal*, 61.

The creation of Taiwanese biodiversity databases started in 2001, the year that Taiwan joined the Global Biodiversity Information Facility (GBIF).⁴⁷ Prior to that year, databases concerning biodiversity were scattered in various government agencies, private institutions and other academic organisations.⁴⁸ Thus, in 2001 the government of Taiwan began to integrate its biodiversity data.⁴⁹ The data collected cover expert lists, species checklists, specimen information, geographical distribution, spatial and temporal distribution, invasive species, species description, literature and biological resources in the country. As the GBIF was formally established, Taiwan joined it as an associate participant. As a result, Taiwan can apply technologies and standards of GBIF's metadata and exchange platform to promote the integration of its biodiversity information and the exchange with other GBIF partners.⁵⁰

As regard to India's experiences, there have also been several cases of genetic misappropriation in India. For preventing such instances, various

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47. Global Biodiversity Information Facility (GBIF) is an international organisation that focuses on making scientific data on biodiversity available via the Internet using web services. The data are given by many institutions from around the world; GBIF's information architecture makes these data accessible and searchable through a single portal. One of the major data available through the GBIF portal is primary distribution data on plants.
48. There was no real horizontal integration; these databases, at most, provided links to other sites or the home pages of relevant databases on their websites. These agencies and institutions may have departments or research units under them, each in turn may have its own websites and databases. For instances, under the Council of Agriculture (COA), there are the Forestry Bureau and Taiwan Plant Varieties Research Institute; under the Construction and Planning Agency, there are many national parks. As for the biodiversity-related private organisations, more than 30 of them have established databases and websites. The large-scale or integrated research projects promoted by the government also have their own websites, such as the Forestry Bureau's National Survey and Mapping of Floral Diversity Project, the Bureau of Animal and Plant Health Inspection and Quarantine's invasive species project, the Council for Economic Planning and Development's National Geographic Information Systems, and the National Science Council's Long-Term Ecological Research Network. However, these sites usually cover project introductions, research reports, literature, news articles, and policy and regulation guidance but lack metadata, raw data or primary data from research project. For a discussion see, Shao et al, above n 33, 62.
49. The new National Digital Archives Program aimed to archive not only data in the field of humanities and social sciences but also data in biological and natural sciences, such as specimens and species information. The Executive Yuan approved the Biodiversity Promotion Plan in the 2001. One of the projects under the Promotion Plan is for the National Science Council, leading nine co-organisers to collect and integrate biodiversity data and exchange them with global organisations, Ibid, 62.
50. As of 2012, there are currently 37 Voting Participants; and 15 Associate Country Participants. Thailand is not a participant to the GBIF. See, the website of GBIF at <<http://www.gbif.org/participation/list>>.

initiatives have been taken to establish database on traditional knowledge and biodiversity. Some of noteworthy examples include the followings:

- The efforts of the Centre for Ecological Sciences, Indian Institute of Science, Bangalore, were pioneering efforts on documentation of knowledge in agriculture. By mid 1998, 75 Plant Biodiversity Registers had been established in ten States.
- Gene Campaign has undertaken work on documentation of biodiversity and knowledge relating thereto (including plant genetic resources) among tribal populations.
- The Research Foundation of Science, Technology and Ecology initiated a movement called the *Jaiv Panchayat*. According to this initiative, its movement aims to establish definitive sovereignty of local communities on their biodiversity resources, including knowledge about plant genetic resources.
- The efforts of the “Save the Seeds Campaign” (*Kalpavriksh* and the *Beej Bachao Anandolan*), initiated an exercise in 1995 to document various bio-resources used by local communities and conservation practices.
- The Biodiversity Register Programme also evolved to encompass all elements of biodiversity, and knowledge and perception of individuals, households, ethnic and multi-ethnic groups.⁵¹

Rationales for the creation of such databases in India are to document existing knowledge to stop patent claims from being accepted in other jurisdictions because of a lack of written description and to levy charges on bio-prospecting or royalties on the commercial use of the materials or knowledge.⁵² Considering domestic concern about the misappropriation of genetic resources, a general domestic plant and wild plant variety database

51. For discussion see, Committee on Trade and Environment, Council for Trade-Related Aspects of Intellectual Property Rights, *Protection of Biodiversity and Traditional Knowledge – the Indian Experience*, WTO Doc. WT/CTE/W/156/IP/C/W/198 (14 July 2000) (submission by India).

52. See Philippe Cullet, ‘Plant Variety Protection in Africa: Towards Compliance with the TRIPS Agreement’ (2001) 45(1) *Journal of African Law*, 97, at 114 (providing a discussion on the creation of biodiversity registers in India).

created under the Thai PVP Act should be also established, and such a system will need to collaborate closely with the World Intellectual Property Organization to promote the protection of the traditional agricultural knowledge of farmers and local farming communities in Thailand worldwide. One may argue that creation of such a database may have limited implications for patent grants in overseas jurisdictions. It is possible that while it will not stop extraction of genetic resources to extraterritorial locations, such a database could restrict deceptive acts domestically, thereby encouraging other countries to follow suits. Hence, there should be a registration system and database for these types of plant varieties that exist in the public domain. This type of registration system could potentially have prevented the initial granting of extant plants found in Thailand, by providing registry offices with an easily accessible database on which to conduct a search.

Summary: new PVP elements concerning the protection of general domestic plant and wild plant varieties could include:

- The establishment of a registration system and database for Thailand's existing general domestic plant and wild plant varieties;
- Cooperation and collaboration with the World Intellectual Property Organization in order to promote the protection of agricultural knowledge of farmers and local farming communities in Thailand worldwide.

D. Access and Benefit-Sharing

Another proposed PVP elements may include the provision regarding access and benefit sharing (ABS). As discussed in preceding chapters, ABS is two concepts which have been placed within the CBD framework.⁵³ The ABS has gained importance when issues surrounding research commercialisation and

53. See Chapter 2 and 5 of the thesis. Some commentators have suggested that the ABS scheme is being seen as a corollary to the setting up of some kinds of biodiversity database.

exclusive IP control over plant genetic resources have been problematic.⁵⁴ Thus, ABS mechanism has been introduced as a means to formalising the transaction or exchange of plant germplasm and agricultural knowledge developed by farmers and local societies.⁵⁵

The Thai PVP law quite advances in relation to the ABS. As discussed in Chapter 4, the Act details ABS rules for general domestic plant and wild plant varieties and sets out a range of requirements with regard to IP, including the intention of those seeking access to genetic resources.⁵⁶ More importantly, the law requires breeders to accept a profit-sharing agreement where a general domestic plant or wild plant variety or any part thereof has been used in the breeding of the variety for a commercial purpose. This is meant to facilitate the introduction of benefit-sharing to protect the rights of local societies. Since the current Thai PVP Act is replaced by the proposed legislative amendment, it is possible that ABS mechanisms in the existing Thai PVP should also be incorporated into the new PVP system.

Summary: new PVP system concerning the ABS mechanism should contain the following elements:

- Prior informed consent regarding the use of general domestic plant and wild plant varieties;
- Stipulation of the timing of benefits, the distribution of benefits between parties, and mechanisms for benefit-sharing.

54. Genetic Resources Action International (GRAIN), 'Biodiversity for Sale: Dismantling the hype about benefit sharing' (Global Trade and Biodiversity in Conflict, GRAIN Publication No. 4, April 2000) 1-2.

55. See Srividhya Ragavan and Jamie Mayer, 'Has India Addressed Its Farmers' Woes? A Story of Plant Protection Issues' (2007) 20 *Georgetown International Environmental Law Review*, 97, 120 (describing that benefit sharing refers to the concept of sharing a proportion of the benefits accruing to a breeder of a new variety with qualifying claimants who could be indigenous groups, individual farmers, or local farming communities).

56. Daniel Robinson, 'Sui Generis plant variety protection systems: liability rules and non-UPOV systems of protection' (2008) 3(1) *Journal of Intellectual Property Law and Practice*, 659, 663.

Moreover, there is at least one piece of legislation worth considering here. This is the Act on Protection and Promotion of Traditional Thai Medicinal Intelligence B.E.2542 (AD1999) (PPTMI Act).⁵⁷ There is also evidence in the past showing that developing a *sui generis* PVP regime cannot be considered separately from other fields of law.⁵⁸ Since the PPTMI Act regulates access to biological resources, it also needs to be considered. The PPTMI Act is one of only few legislations of its kind in the world. It was particularly developed at the same time as the PVP Act and there was considerable cross-department cooperation and discussion.⁵⁹ Due to the primary concern of the Thai government and the local society was deemed to be the extraction of biological resources for research and development outside Thailand, the Act has different access requirements for both foreigners and Thai researchers. Accordingly, foreigners are faced with a more complex procedure for access to genetic resources (traditional Thai herbal drugs in this case) than Thais.⁶⁰ The provision-style in this Act seems clear that local genetic resources could be exploited by Thai researchers, but local groups may not receive consequent benefits. Thus, while differential treatment for foreign nationals might protect sovereign rights over biological resources, it does not guarantee respect for the local custodianship of resources.

E. Permit Licence for the Use of Extant Varieties and Benefit-Sharing of Rewards through a Plant Variety Protection Fund

In relation to the use of extant varieties, which refer to *general domestic plant and wild plant varieties*, those seeking to use such plants for commercial purposes are required to apply for a permit licence from the Ministry of

57. *The Act on Protection and Promotion of Traditional Thai Medicinal Intelligence B.E.2542* (1999) (Thailand) (PPTMI Act of Thailand).

58. Cullet, above n 52, 118 (arguing that a *sui generis* plant variety protection should not be developed in isolation. This is because plant varieties are only a subset of biological resources and all countries that are members of the WTO and the CBD should aim at drafting a single all-encompassing law which takes into account CBD and TRIPS requirements).

59. Kuanpoth, above n 6; and Daniel Robinson, *Biodiversity-Related Traditional Knowledge in Thailand: Intellectual Property Relations and Geographies of Knowledge Regulation* (PhD Thesis, University of Sydney, Australia 2007) 218.

60. Chapter 2 of the PPTMI Act of Thailand, above n 57, §§ 14-16.

Agriculture and Cooperatives.⁶¹ This licence can be issued subject to certain conditions; for example, it must include a profit-sharing agreement.⁶² The royalties from the licences and profit-sharing agreements will be put into a Plant Variety Protection Fund, which will be distributed to local farmers and local farming communities in Thailand to support plant breeding research and development.⁶³ The objective is to promote innovation while at the same time rewarding the farmers.

While the objective of this provision is to be commended, the poorly drafted language of the statute can lead to its misuse. For the most part, the statute does not define the type of licence, and the absence of a definition for such licences seems to create regulatory ambiguity. More importantly, the law provides the same level treatment to users of extant varieties with widely different levels of income, including subsistence farmers who sell extant varieties for survival rather than profit. The failure to comply could lead to harsh penalties for infringement. The statute tries to deter infringement by providing stringent penalties at THB 400,000 (roughly US \$13,400) or a term of imprisonment not exceeding two years, or both.⁶⁴ In developing countries like Thailand, where literacy among the farming community is limited, this can result in farmers engaging in more infringement than they had intended. The case of *Surat Maneenoprattanasuda*,⁶⁵ a vendor of CDs, demonstrates this point.⁶⁶ While the case is not directly relevant to plant variety protection issues, it provides a good analogy.

61. The PVP Act of Thailand, above n 4, §§ 48, 52.

62. Ibid, §§ 52 (1) to (9).

63. Ibid, §§ 52 and 54.

64. The PVP Act of Thailand, above n 4, § 66.

65. *Surat Maneenoprattanasuda and non-compliance of the Motion Pictures and Video Act B.E.2551*, [2010] Thailand, Criminal Court.

66. For explanation, see Bangkok Post, 'Police, Pirate tapes, poverty and polices: a sad tale', *Bangkok Post* (August 26, 2010). According to Mr. Surat's version of the story, besides working as a temporary employee at City Hall, he also collects saleable scrap from the garbage to make extra income to feed his family. On the day he was arrested by the police, he was selling the scraps he'd collected, which included some 30 copyrighted CDs. He claimed that two other vendors who were selling pirated CDs and DVDs right next to him were left untouched by the policemen. What is most troubling about the case is that the police appear to have applied a double standard in arresting Surat while ignoring the two other vendors.

In 2010, Surat Maneenoprattanasuda was found guilty of selling copyrighted VCDs without a licence under the Motion Pictures and Video Act B.E.2551 (AD2009) of Thailand,⁶⁷ and was fined 133,400 baht (about US\$ 4,250) by the Thai Criminal Court. The court reasoned that he had a duty to obtain a licence to sell CDs, and non-compliance may lead to severe punishment. What is wrong with this case is that, in a country like Thailand where the level of literacy among poorer people is limited, a certain level of innocent infringement is only to be expected. In such circumstances, the imposition of a duty to obtain a permit licence on all people, including those living below subsistence level, as outlined in Surat Maneenoprattanasuda's case, would create a huge burden on society considering the lack of sophistication among poorer people.

As for the case of a permit licence for the use of extant varieties, subsistence farmers should be exempt from this in order to maintain national welfare and social justice, considering the poverty level of the farming communities in Thailand. In terms of adopting standards to determine the status of users of extant varieties, individuals' income could be considered. Normally, the government of Thailand uses individuals' income level to categorise them into different income groups; therefore, this economic indicator could be used as a primary determinant of the status of users of extant varieties. Methods for differentiating special treatment for different levels of users/farmers should be sought, and exceptions to the licence should be made in line with individuals' income level in order to minimise the abuse of the provision. Such an exception is economically efficient because the Thai courts are already burdened. Furthermore, a standard of one rule for all regarding the use of extant varieties could generate huge protests from farmers. Thus, it is arguable that the exception to the licence allowed by the law is outstanding with a unique national flavour.⁶⁸

67. *The Motion Pictures and Video Act B.E.2551 (2009) (Thailand).*

68. The detailed content and scope of a permit certification for the use of extant varieties, which can be prescribed by the Plant Variety Protection Commission, need to be further analysed and discussed.

Lastly, the benefit-sharing of rewards through the PVP Fund in Thailand's PVP law should be reconsidered. Some commentators have expressed that the benefit-sharing of rewards is disconnected from the farmer and cumbersome to implement.⁶⁹ Critics assert that, considering the social, economic, and educational conditions of local farming communities, farmers may not be vigilant in applying for benefits.⁷⁰ Consequently, communities will be left uncompensated for breeder appropriations. Moreover, the dearth of regional offices among local communities could pose procedural complications for farmers, requiring them to apply to remote offices. Thus, a practical solution would perhaps be to authorise NGOs or local government bodies to apply for benefit-sharing on farmers' behalf.⁷¹ Thus, further regulations or rules could be developed to assist this matter.

Summary: New PVP elements related to permit licences for the use of extant varieties and benefit-sharing reward through the PVP Fund could include:

- Exemptions to licence made legal for subsistence farmers;
- Standards to determine the different level of users of extant varieties, such as their level of income;
- Rules or regulations authorising NGOs to apply for benefit-sharing on farmers' behalf.

The remainder of this section will examine the regulatory reform of provisions pertaining to the rights of plant breeders in Thailand.

6.2.2 MODIFICATIONS TO NEW PLANT VARIETIES RULES

As discussed in Chapter 5, it has become the norm to provide UPOV-style plant breeders' rights protection for new plant varieties. Even unique laws, such as the Indian Protection of Plant Varieties and Farmers' Rights Act of

69. Robinson, above n 56, 663; Thathong, above n 20.

70. Robinson, above n 56, 663.

71. Thathong, above n 20 (suggests that it is desirable for the Thai government to establish a specialised body to supervise benefit-sharing agreements because, as with any contractual agreement, there are issues of equal bargaining power between local communities and commercial enterprises).

2001 (PPVFR Act),⁷² utilise elements for new plant variety protection drawn from the text of the 1991 UPOV Convention.⁷³ In order to comply with the WTO/TRIPS Agreement, and in the spirit of encouraging agricultural innovation, Thailand must provide for the protection of new plant varieties in accordance with the 1991 UPOV treaty. Consequently, the proposed regulatory reforms suggest that Thailand's PVP provisions need to be amended in many areas of plant breeders' rights protection to be in line with the 1991 International Convention for the Protection of New Varieties of plants (UPOV Convention),⁷⁴ as discussed below.

A. Setting the New Standards of Eligibility for Protection

Sections 11 and 12 of the Thai PVP Act are the major provisions that regulate the standards for eligibility for new plant variety protection; however, as previously discussed, these provisions have low standards for eligibility.⁷⁵ Instead of contributing to innovation in plant breeding, the low standards for eligibility in Thailand's current PVP regime can result in granting rights for miniscule innovations that can shift plants from the public to the private domain.⁷⁶ This diluted version of the requirements for eligibility means that Thailand's PVP Act provides insufficient protection. Thus, establishing new requirements for the protection of new plant varieties may clarify the situation, and one way to do this is to redraft the requirements for eligibility for new plant variety protection in the current PVP Act of Thailand.

72. *The Protection of Plant Varieties and Farmers' Rights Act* (2001) (India) (PPVFR Act).

73. For a discussion see Daniel Robinson, 'Exploring Components and Elements of Sui Generis System for Plant Variety Protection and Traditional Knowledge in Asia' (ICTSD Programme on Intellectual Property Rights & Sustainable Development, March 2007) at 22; also see Pawarit Lertdhantewe, 'Plant Variety Protection in Thailand: the Need for a New Coherent Framework' (AsianSIL-NUS Working Paper, 2012/11 Asian Society of International Law, 2012).

74. *International Convention for the Protection of New Varieties of plants*, 33 UST 2703, 815 UNTS 109 (1961); revised by 33 UST 2703 (1978); revised by 815 UNTS 89 (1991) (UPOV Convention).

75. The PVP Act of Thailand, above n 4, §§ 11 and 12. See Chapter 2 of this thesis for further explanation.

76. The planting of *Papaya* which is discussed in Chapter 2 of this thesis, can serve as a notable example. See, Registration No. 30/2547, dated 16 September 2004.

Though the standard provided by the UPOV treaty provides the similar (low) standard for protection, it provides a basis for drafting PBR regime. Under the 1991 UPOV Act, a new plant variety is generally understood to be a variety that has been bred to exhibit traits that are novel when compared to known varieties, but that also retains distinctive, homogenous or uniform characteristics and stability between breeding cycles.⁷⁷ Obviously, the standards provided by UPOV are not that hard to meet because breeders are specifically crafted to accommodate the peculiar needs of plant breeding. Therefore, the criteria of distinctiveness, uniformity and stability (DUS) are generally adapted to the mode of reproduction of the plant variety.⁷⁸ Moreover, the novelty criteria are defined in terms of commercial novelty: a plant variety cannot be protected if it has been offered for sale in the relevant market prior to the date of application.⁷⁹ No other conditions are required under the 1991 UPOV Convention;⁸⁰ neither is the equivalent of utility/industrial application, nor inventive step/non-obviousness required. It can be said that no definite amount of human intervention is necessary in order to qualify for protection. Thus, in principle, all plant varieties, including plants that grow in the wild, may be eligible for protection simply if they are distinctive from earlier known species.⁸¹ As also noted in Chapter 4, the standards in UPOV appear quite similar to that of Thailand's PVP, but have lower threshold for eligibility.⁸² Thus, adopting the UPOV's eligibility requirements would not prevent the misappropriation of genetic materials. A number of recent scholarships have expressed such concerns and even provide evidence of alleged case of bio-

77. See the UPOV Convention, above n 74, arts. 5, 6, 7, 8 and 9.

78. Ibid, arts. 7, 8 and 9.

79. UPOV Article 6.1 establishes that a variety shall be deemed to be new if it has not been sold by, or with the consent of, the breeder "earlier than 1 year before the date of application, within the territory of the Contracting Party in which the application has been filed, earlier than 4 years or, in the case of vines, earlier than 6 years before the said date, outside the territory of the Contracting Parties" *Ibid*, art. 6 [emphasis added].

80. UPOV Article 5.2 states that "the grant of the breeder's right shall not be subject to any further or different conditions, provided that the variety is designated by a denomination in accordance with the provisions of Article 20, that the applicant complies with the formalities provided for by the law of the Contracting Party with whose authority the application has been filed and that he pays the required fees, *Ibid*, art. 5.2 [emphasis in original].

81. See Claudio Chiarolla, 'Commodifying Agricultural Biodiversity and Development-Related Issues' (2006) 9(1) *Journal of World Intellectual Property*, 25, 29.

82. See discussions in Chapter 4 of this thesis on low eligibility standards of protection in the Thai PVP Act.

prospecting created by UPOV.⁸³ Some engagements with those reviews might be appropriate here.

First, it is argued that UPOV leaves open the possibility for commonly cultivated plants in remote parts of the world to be deemed “new,” provided that they have never been sold, because prior cultivation does not defeat novelty. Secondly, the distinctiveness requirement in UPOV operates as a “highly diluted version” of the non-obviousness requirements of the patent system.⁸⁴ That is, plant will also qualify as “distinctive” under the UPOV system, so long as it is distinguishable from a variety for which an application has been successfully made or has been entered in the official register. According to their views, such plant will pass the distinctiveness requirement even if it is not disguisable from a commonly cultivated and well-known plant, provided that no application for protection or registry has been successfully made for such variety. In essence, common knowledge, use, or even repeated *cultivation* of the application material is not an impediment for qualifying as “new” and “distinct” under UPOV.⁸⁵

Based on the above review, it is clear that the model created in UPOV attempts to monopolise well-known varieties by using a highly diluted version of eligibility. Such eligibility thresholds in UPOV are even lower than that of Thailand, which for examples, deems plant variety to be distinct if it can be shown that it is distinct from other plant varieties provided that ‘*such distinctness is relate to the feature beneficial to the cultivation, consumption, pharmacy, production or transformation ...*’.⁸⁶ In this sense, adopting purely

83. A number of literatures discussed this point, see for instances, GRAIN, ‘Ten Reason Not To Join UPOV’ (Global Trade and Biodiversity in Conflict, GRAIN Publication Issue No. 2, May 1998); Ragavan and Mayer, above 55, 112; Owain Williams, ‘*Sui Generis* Rights: A Balanced Misplaced’ (Signpost to *Sui Generis* Rights: 7, GRAIN Publication, 1998) (identifying a single *sui generis* system would at least give potential alternatives to the UPOV model); and Graham Dutfield, ‘The Role of the International Union for the Protection of New Varieties of Plants (UPOV)’ (Global Economic Issue Publications, Intellectual Property Issue Paper Number 9, 2011) 5-6; Cullet, above n 52, 110; Philippe Cullet, ‘Revision of the TRIPS Agreement concerning the Protection of Plant Varieties: Lessons from India concerning the Development of a *Sui Generis* System’ (1999) 2(4) *Journal of World Intellectual Property*, 617, 649; and Chiarolla, above n 81, 29.

84. Ragavan and Mayer, above n 55, 107.

85. For examples, see, Ragavan and Mayer, above n 55, 107; Chiarolla, above n 81, 29.

86. The PVP Act of Thailand, above n 4, §§ 11–12.

UPOV-style law would repeatedly result in vesting breeders' rights over miniscule innovations. While the UPOV treaty provides some diluted version for eligibility, it provides a useful starting point for drafting of PVP system. Thus, Thailand can adapt PBR rules from the UPOV treaty by providing higher conditions for protection.

In addition to the setting up of eligibility standards, Thailand can also adapt new plant variety rules from the UPOV model to suit its own interests. For example, an important aspect of the Indian PPVFR Act is akin to a "disclosure of source and legal provenance requirement".⁸⁷ Notably "disclosure" has been the subject of debate in forums such as the TRIPS Council, but with respect to international patent law.⁸⁸ It has also been discussed during the course of the United Nations Convention on Biological Diversity (CBD)⁸⁹ as part of a potential international regime on accessing genetic plants, which could include certificates of origin to act as passports or permits attached to the transfer of genetic resources. While domestic PVP requirements in Thailand alone will not stop the extraction of genetic resources to extra-territorial locations (a major concern for bio-diverse countries, like Thailand), it could restrict deceptive acts domestically and encourage other countries to follow suit, thus reflecting a political leadership in the ASEAN region.⁹⁰

87. See PPVFR Act of India, above n 33, §§ 18(1) (e) and (h). For discussion about these provisions of Indian PPVFR Act see, Ragavan, and Mayer, above n 55, at 114.

88. See *Taking Forward the Review of Article 27.3(b) of the TRIPS Agreement: Communication from the African Group*, WTO Doc IP/C/W/404 (2003) at para. 2; *Article 27.3(b) Relationship between TRIPS Agreement and the CBD, and the Protection of Traditional Knowledge and Folklore: Communication from the United States*, WTO Doc. IP/C/W/449 (2005); *Relationship between TRIPS Agreement and the CBD, and the Protection of Traditional Knowledge and Folklore: Communication from Peru*, WTO Doc. IP/C/W/441/Rev.1 (2005); and *Relationship between the TRIPS Agreement and the Convention on Biological Diversity and the Protection of Traditional Knowledge: Submission from Brazil and India*, WTO Doc. IP/C/W/443 (2005). Professor Graham Dutfield has also suggested a "proof of legal acquisition" requirement in international patent law, which is also relevant here. Such a requirement may be less onerous than the plant variety applicant and examiner than an "origin" requirement. See, Graham Dutfield, *Protecting Traditional Knowledge: Pathways to the Future* (ICTSD: Geneva, Issue Paper No. 16, 2006).

89. *United Nations Convention on Biological Diversity*, opened for signature 5 June 1992, 31 UNTS 818 (entered into force 29 December 1993) (CBD).

90. The ASEAN is the Association of Southeast Asian Nations, which comprises 10 member states, including Thailand, Indonesia, Malaysia, Singapore, the Philippines, Brunei, Cambodia, Laos, Myanmar and Vietnam.

It has been suggested that, rather than using the term “origin,” which may require a historic investigation by the breeder, it could be more feasible to require the source or legal provenance of the genetic materials. Under the Indian PVP law, applicants must disclose complete passport data related to the source of the genetic material, and all the information related to the contribution of any farmers, villages or communities in the breeding of the variety.⁹¹ They must also make a declaration that the genetic or parental material was obtained by lawful means. Consequently, a new PVP framework in Thailand should include the foregoing elements.

Summary: New PVP elements specifying the standards for eligibility could include:

- Rules for registration similar to those of the UPOV Convention, but which develop existing flexibilities in the UPOV model;
- Conditions for protection that are higher than that of UPOV;
- A requirement that applicants disclose the source, origin or legal provenance of genetic or parent materials;
- A condition that includes the disclosure of any relevant common knowledge.

B. Extension of Terms for Protection

A provision offering the term of protection to breeders’ varieties is provided in the Thai PVP Act without any coherent standards, i.e., standards that several countries apply to their protection term.⁹² Under the current PVP Act of Thailand, new crop varieties have a specific term of 12 or 17 years, depending on the type.⁹³ Such a term of protection is considered to be too short for breeders to secure the maintenance of their enormous and costly breeding

91. See PPVFR Act of India, above n 33, § 40. Section 40 requires breeders to disclose information “regarding the use of genetic material conserved by any tribal or rural families in the breeding or development of such [new] variety” [emphasis added].

92. Commentators have suggested that there has been no thorough economic analysis to determine the optimum duration of new plant variety protection in Thailand and it remains to be seen whether such a term of protection will create ‘an unnecessary burden on society or provide unreasonably large profits for the holders of new plant varieties see Donovanik, above n 15, 29; Changtavorn, above n 15, 294; and Pawarit Lertdhamtewe, ‘Plant variety protection in Thailand: the need for a new coherent framework’ (2013) 8(1) *Journal of Intellectual Property Law and Practice*, 33, 38.

93. The PVP Act of Thailand, above n 4, § 31.

practices, as discussed in Chapter 4, and it seems to provide little incentive for research and development for creating new plant varieties.⁹⁴ A recent study emphasises the need for a longer duration of protection in the Thai PVP Act.⁹⁵ Hence, the new legislative framework for plant variety protection should provide a new standard for the term of new plant variety protection to enhance the clarity and rationality of the PVP system.

The term of protection provided by the 1991 UPOV Convention can be considered. The UPOV Convention uses a fixed period of no less than 20 years,⁹⁶ and this provision can be used as a basis for providing the period of plant breeders' rights protection in the Thai PVP regime. Considering the need for different terms of protection for different fields of technology,⁹⁷ thus methods for differentiating the term of protection for different types of plant varieties should still be sought. The sub-categorisation of protection terms, such as the one used by the UPOV Convention, can be adopted for such differentiation. For instance, Article 19(2) of the 1991 UPOV Convention authorises a longer term of protection to be applied to trees and vines.⁹⁸ This additional duration can be differentiated according to the characteristic of the particular plant varieties, such as trees and vines, because these types of plant varieties typically do not become obsolete in the sense that it is relatively rare for a new and better tree and vine to be bred.⁹⁹

One may argue that such a longer period of protection is unnecessary,¹⁰⁰ and in some respects, inappropriate for promoting the development of

94. See Chapter 4 of this thesis. Also see, Surinder Kaur Verma, 'Fitting Plant Variety Protection and Biotechnology Inventions in Agriculture Within the Intellectual Property Framework: Challenge for Developing Countries' (Intellectual Property Rights, Innovation and Sustainable Development, Hong Kong People's Republic of China 8–10 November 2004) 10 (arguing that the *sui generis* system for plant variety protection providing less protection may give little incentive for research and development in this field).

95. See Donavanik, above n 15, 29; Changtavorn, above n 15, 294; and Lertdhamtewe, above n 92, 38.

96. The UPOV Convention, above n 74, art. 19.

97. See Chapter 4 of this thesis, particularly in Section 4.3.2 (b).

98. Ibid, art. 19(2).

99. Adam Masarek, 'Treetop View of the Cathedral: Plant Variety Protection in South and Southeast Asian Least-Developed Countries' (2010) 24 *Emory International Law Review*, 433, 464.

100. Leskien and Flitner argue that, in general, stronger and more exclusive rights should be granted for shorter periods. See Dan Leskien and Michael Flitner, *Intellectual*

Thailand.¹⁰¹ Would the suggestion to adopt a greater period of protection for breeders' varieties create an unnecessary burden on Thai society? This question can be addressed by providing economic evidence. Christie and Rotstein have conducted an impressive economic analysis of protection term by examining whether a minimum 20-years term of protection (patents in their cases) should be given to the technology, like plants and plant varieties.¹⁰² In doing so, they determine what is the optimum duration with the duration of protection (for plant-related inventions). They reach the interesting conclusion that the duration of protection for 20 years *do* in fact is within the reasonable bounds of what might be considered the optimal duration of protection for plant-related inventions.¹⁰³

Whether or not the 20 years is appropriate term of protection, it is possible to argue that offering breeders protection for longer than the other *sui generis* system will definitely increase their incentive to apply for legal protection because their reward will be greater, while offering protection for a shorter period, like the current Thai PVP Act, dilutes their incentive to apply for protection because the reward is relatively smaller than it is in other countries.¹⁰⁴ Thus, this higher level of protection, proposed here, is not necessarily insufficient and inappropriate because it is recognised as a reasonable accommodation for promoting the incentive to invest in research and development to create new plant varieties.¹⁰⁵ The same rationale can be applied in the case of the period of protection of breeders' varieties in Thailand, considering that the country's need for a longer period of protection is justified, as shown in the aforementioned example. In any case, offering

property rights and plant genetic resources: options for a sui generis system (Issues in Genetic Resources No. 6 International Plant Genetic Resources Institute, Rome 1997).

101. See e.g., Jakkrit Kuanpoth, 'Legal Protection of Traditional Knowledge: A Thai Perspective' (2007) 24(2) *Asia-Pacific Tech Monitor* 34 (implying that a long period of IP protection in Thailand (copyright law in this case) will create an unnecessary burden on society or provide unreasonably large profits for the owners of IP rights).
102. Andrew F. Christine and Fiona Rotstein, 'Duration of patent protection: does one size fit all?' (2008) 3(6) *Journal of Intellectual Property Law and Practice*, 402-408.
103. *Ibid*, 408.
104. See e.g., Masarek, A, above n 99 at 464.
105. Ragavan and Mayer, above 55, 102 (arguing that all nations have to appreciate that the under-protection of plant breeders' rights detrimentally affects trade, and would therefore fail the TRIPS requirements, and further asserting that inadequate protection of breeders' rights can also erode the incentive to innovate).

protection for a similar duration as that provided in the 1991 UPOV Convention would be beneficial for international consistency, which would contribute to foreign investors' confidence stemming from familiarity with other countries' PVP legislations.¹⁰⁶

Achieving regulatory coherency for protection terms also requires the establishment of a provision for term extension and adjustment. It is still not clear if such a period of protection is consumed by the typical delay in the application process and prosecution.¹⁰⁷ Thus, extensions may be provided to counter certain administrative delays, as in the US., where it is possible to obtain an extension if the USPTO delays the issuance of a patent.¹⁰⁸ This may result in patents being issued for longer periods than 20 years. The reasons for extension include: (i) Delayed response to an application for a patent; (ii) Patent application being considered for more than 3 years; and (iii) Delay due to a secrecy order or appeal.¹⁰⁹ It is possible to receive an extension of time equal to the delay. In view of this, it can be persuasively argued that the new PVP law in Thailand should also provide extended-protection periods, which may be similar to those of U.S. law. Such term extensions are deemed necessary to compensate for administrative delay, considering that the protection term for plant variety in Thailand is calculated from the date of filing the application.

106. Amir N. Licht, 'Legal Plus-Ins: Cultural Distance, Cross-Listing, and Corporate Governance Reform' (2004) 22 *Berkeley Journal of International Law*, 195 at 207–208 (suggesting that transnational companies' prefer to do business in familiar settings).

107. As discussed in Chapter 4, experience to date has shown that part of the term of protection is automatically consumed by the typical delay in the application process and prosecution. Specifically, the average duration for examining and inspecting an application is approximately 24 to 36 months; see Plant Variety Protection Division, *Procedure and Guideline for the Examination of New Plant Variety Protection Application* (Bangkok: Ministry of Agriculture and Cooperatives, Thailand).

108. Such an extension or adjustment is the result of certain specified types of delays which may occur when an application is pending before the administrative process and prosecution.

109. 35 U.S.C. § 154(b) [emphasis added].

Summary: New PVP elements affecting the term of protection may include:

- Different lengths of protection could be offered from those stated in the UPOV model (see the following points);
- A minimum 20 year-term of protection offered to new plant varieties;
- A sub-differentiation term of protection offered to varieties, such as vines and trees (ideally a term of protection of 25 years or more);
- Provisions for extensions to the term to compensate for administrative delays in the application process and prosecution.

C. Redefining the Scope and Limitations of Breeder's Rights

The scope of plant breeders' rights in the Thai PVP Act should be reconsidered. As examined in Chapter 4, the exclusive rights of plant breeders are subjected to certain exemptions under the Thai PVP law. Exemptions, such as the research exception, are somewhat controversial.¹¹⁰ Section 33 of the Thai PVP Act specifically provides a weak research exception.¹¹¹ The clause of experimental exemption in the Thai PVP Act is not well defined, nor does the legislation indicate who holds the ownership rights over a new variety resulting from the protected variety.¹¹² Based on this provision, no authorisation is required from breeders in cases where the protected variety is sought for plant breeding and other experimental activities. One of the most contentious issues is whether or not a simple duplication of the protected variety to develop a hybrid or different plant variety constitutes any infringement. Thus, it is crucial to provide a clear explanation to determine the scope of breeders' rights and the extent of its limitations to avoid potential disagreement between breeders and other actors.

110. See Pawarit Lertdhamtewe, 'Has Thailand Fulfilled its TRIPS Obligations? An Analysis of Thailand's Plant Protection Regime' (Paper presented at the 9th Annual Conference, Asian Law Institute at Faculty of Law, National University of Singapore, 31 May – 1 June 2012).

111. Plant breeders' rights in Thailand's PVP Act are subjected to several exemptions; see the PVP Act of Thailand, above n 4, § 33.

112. *Ibid.*, § 33(2).

Obviously, the scope of breeders' rights in UPOV is too contentious and problematic.¹¹³ Breeders' rights, by virtue of the Article 14(5) (a) of UPOV, extend to both the protected variety and the "varieties not clearly distinguishable" from the protected variety.¹¹⁴ The rights conferred in this article afford breeders' rights to varieties that are not clearly distinguishable from protected and harvested materials. Further, Article 14(5) (b) extends breeders' rights to "essentially derived varieties" (EDVs).¹¹⁵ EDVs are varieties derived either from the protected variety, or from another variety that is predominately derived from the initial protected variety, and are clearly distinguishable from the initial variety. Basically, essentially derived varieties are the first or second generation derivatives from the protected varieties. Thus, breeders' rights extend to varieties that are not clearly distinguishable (by virtue of Article 14(5) (a)) as well as those that are clearly distinguishable (when read with Article 14(5) (b)) derivatives of the protected variety.¹¹⁶ For instance, assuming that a farmer uses the personal experimentation allowance under UPOV to derive Plant *A*, which is not clearly distinguishable from the protected variety, Fruit *B*; he then derives Crop *Z* from Plant *A*. Even if Crop *Z* is clearly distinguishable from both Fruit *B* and Plant *A*, the breeders' rights over Fruit *B* extend to both Plant *A* and Crop *Z* under UPOV. In this sense, UPOV enables breeders to claim rights to the experimental varieties of other farmers and breeders, even when the result is clearly distinguishable from the protected variety.¹¹⁷ It can be said that, from the standpoint of a country

113. See Chapters 2 and 4 for further explanation.

114. The UPOV Convention, above n 46, art. 14(5) (a).

115. Ibid, art. 14(5) (b).

116. Ibid, art. 15(1) (ii). For discussion see Chapters 2 and 4 of this thesis.

117. As discussed in Chapter 2, a number of leading scholars, such as Professors Dutfield, Suthersanen and Ragavan, have been critical of the 1991 UPOV Convention for altering the scope of breeders' rights to favour more technologically-advanced breeders over other breeders and farmers. Professors Dutfield, Suthersanen and Ragavan explain that the breeder of protected variety *A* has a legal right to demand that the breeder of variety *B* secure his authorisation to commercialise variety *B* if it was essentially derived from *A*. Essentially-derived varieties (EDVs) are somewhat controversial because there is still little consensus over the genetic conformity threshold required to identify EDVs from the initial variety. For example, a potential incremental modification of the initial variety can be obtained by the selection of a natural or induced mutant, or a somaclonal variant, the selection of a variant individual from plants of the initial variety, backcrossing, or a transformation by genetic engineering. Thus, EDV protection means that breeders will not be able to get away with making a minor modification to an initial variety, protecting and commercialising it, without seeking the approval of the original breeders. Graham

involved in exploiting new varieties for the purpose of stimulating innovation in plant breeding, using the scope of breeders' rights in UPOV-style law would amount to the statutory marginalisation of farmers and local breeders. Rather than attempting to formalise exclusive rights for plant breeders, as in UPOV, which could be a complex and controversial undertaking, Thailand should provide other forms of incentives to breeders and farmers of plant varieties. Thus, the new PVP law should promote research on protected varieties by allowing anyone to use a registered variety to conduct experiments or research, or as an initial source of variety for the purpose of creating other varieties. The statute should also require authorisation from the owner of the initial variety to derive the second-generation variety. Such authorisation should only be required where the repeated use of such variety as a parental line is necessary for the commercial production of a newly-developed variety. The objective is to promote research while preventing the premature exploitation of protected varieties in the name of research.

The suggested regulatory reform takes a different position from that of the UPOV, which provides the breeder with the rights for up to two generations of EDVs. While the definition of the suggested elements of EDVs is similar to that of UPOV, it additionally grants the rights over an EDV to the farmer or breeder (second generation breeder) who derived it, and not to the breeder of the initial variety, unless the EDV was also developed by the breeder of the new variety. Furthermore, EDVs should also be registered provided that they are accompanied by the required conditions. The experimental exemption coupled with the farmer-saved seed exemption, suggested above, demonstrates that breeders' and farmers' rights can be adequately and concurrently protected.

Dutfield and Uma Suthersanen, *Global Intellectual Property Law* (Cheltenham, Edward Elgard, 2008) 189 – 191; also see, Ragavan and Mayer, above n 55 at 110; and Srividhya Ragavan, 'To Sow or Not to Sow: Dilemmas in Creating New Rights in Food' in Jay P. Kesan (ed), *Agricultural Biotechnology and Intellectual Property: Seeds of Change* (Oxfordshire: CABI, 2007) 318 at 328–329.

Summary: New PVP elements relating to the scope of breeders' rights and its limitations could include:

- Scope of PBRs' rights b similar to that of the UPOV Convention;
- Research exception by allowing the use of a registered variety to conduct experimental research or as an initial source of variety for the purpose of creating other varieties;
- Protection of essentially derived varieties (EDVs), which are not protected in the existing Thai PVP system;
- A condition that requires authorisation from the owner of the plant variety to derive the second-generation variety where the repeated use of such variety was necessary for commercial purposes.

D. Adjusting Provision related to Compulsory Licensing

The Thai PVP Act provides a means for a person other than the plant variety rights holder to use the protected new variety.¹¹⁸ The Ministry of Agriculture and Cooperatives can grant a compulsory licence to a third party to use the plant variety without the authorisation of the plant breeder.¹¹⁹ While this compulsory licensing provision provides an essential stability to national welfare, such as food security,¹²⁰ the poorly drafted language of the section can lead to the misuse of the compulsory licensing provision. The fundamental deficiencies of the compulsory licensing provision in the Thai PVP Act lie in four important areas, reflecting the lack of guarantee of the rights of breeders.¹²¹ Firstly, the law does not limit the scope of the licensees; thus, in practice, the licensees may include competitors of the holder of the variety's rights. Secondly, no time limit is imposed on the duration of the use of a compulsory licence. More importantly, there is no provision that would lead to the termination of the compulsory licence if the circumstances that led to its issuance cease to exist. Lastly, breeders do not have the legal right to appeal before an independent administrative body or court in order to issue a

118. Ibid, § 37.

119. Ibid.

120. Lertdhamtewe, above n 92, 37.

121. The PVP Act of Thailand, above n 4, § 37.

compulsory licence. Thus, regulations or rules of the new PVP regime could be developed to provide guidance for the scope of a compulsory licensing exception and determine the duration and termination of the use of a compulsory licence. Such a provision is not unreasonable or unrealistic, as a precedent exists in Article 31 of the WTO/TRIPS Agreement,¹²² which has been incorporated in the Thai patent law, and the case for such rules has already been made in some other literature.¹²³

Unlike the current PVP Act, the Patent Act B.E.2542 (AD1999)¹²⁴ of Thailand provides a set of rules that regulates when the government of Thailand may compel patent holders to licence their products to other parties,¹²⁵ and provides a variety of conditions to be included in the compulsory licence, thereby incorporating the principles of compulsory licensing under TRIPS Article 31.¹²⁶ At the end of three years, any protected product can be subject to compulsory licensing if the reasonable requirements of the public for the patented product have not been satisfied or the patented product is not available to the public at a reasonable price.¹²⁷ Price is also a consideration when determining whether or not the reasonable requirements of the public have been satisfied.¹²⁸ Furthermore, the person or company applying for a licence must have first been unsuccessful in an attempt to obtain a voluntary licence from the rights holder on reasonable commercial terms.¹²⁹ If no agreement has been reached by the parties, the government can fix the remuneration and prescribe the conditions and restrictions as deemed appropriate subject to the following requirements:

- (i) The scope and duration of the licence, which cannot be more than necessary under the circumstances;
- (ii) The patentee shall be entitled to further licence others;

122. The TRIPS Agreement, above n 37, art. 31.

123. Bashar H. Malkawi and Haitham A. Haloush, 'Intellectual Property Protection for Plant Varieties in Jordan' (2008) 11(2) *Journal of World Intellectual Property*, 120 at 124.

124. *The Patent Act B.E.2542* (1999) (Thailand) (Patent Act of Thailand).

125. *Ibid.*, §§ 46, 48, 49, 50, 50*bis* and 51.

126. See chapter 4 of this thesis for a discussion related to the compulsory licensing measure in TRIPS Article 31.

127. The Patent Act of Thailand, above 92, § 46.

128. *Ibid.*, § 46(2).

129. *Ibid.*, § 47.

- (iii) The licensee shall not be entitled to assign the licence to others, except with that part of the enterprise or goodwill, particularly of the part under the licence;
- (iv) The licensing shall be aimed predominately for the supply of the domestic market;
- (v) The remuneration fixed shall be adequate for the circumstances of the case.¹³⁰

The Thai Patent Act further indicates that ‘a compulsory licensing issued may be terminated if and when the circumstances, which led to it ceases to exist and are unlikely to recur’.¹³¹ Given the fact that the Patent Act’s compulsory licensing exception is wider than that in Thailand’s PVP law and covers the protection of public order or vital interests, as well as the security of right holders, more crucially, the patent holders may appeal the order to issue such a compulsory licence to the court within a certain period of time.¹³² All of these elements are important for the country to know when farmers can benefit from the applicable flexibility, and thus avoid future disputes between right holders and other parties on the question of the use of the compulsory licensing exception, an element otherwise lacking in the current PVP law of Thailand. Therefore, the new PVP framework should be styled similar to the provisions of the Thai Patent Act of 1999 in order to more fully and comprehensively address the problem of the compulsory licensing exception in Thailand’s plant protection regime. By introducing such clauses of compulsory licensing, the new PVP law could remove the most crippling impediments to introducing extensive compulsory licensing provisions, thereby representing a balance between fully allowing public interest exception and taking a position that tends toward preventing breeders’ security altogether.

130. Ibid, § 50 [emphasis added].

131. Ibid, § 50*bis*.

132. Ibid, § 52.

Summary: New PVP elements related to a compulsory licensing provision may include:

- Regulations or rules providing guidance for the scope of compulsory licensing similar to those stated in the Thai Patent Act and TRIPS Article 31;
- Guidance for determining the duration and termination of the use of compulsory licensing exceptions, such as that stipulated in Thailand's patent law.

Overall, this thesis suggests that Thailand should conform to some of the key elements of plant breeders' rights protection as stipulated in the 1991 UPOV Convention, without signing up to the UPOV. The reason for this is that Thailand can come close to international norms and maintain flexibility to develop its own *sui generis* plant variety protection regime while specifically addressing the country's socio-economic priorities. This may also create some flexibility for Thailand to create its own unique system that may be different from the text of the UPOV Convention, thus providing a broader space for future law-making flexibility.

In conclusion, it can be said that the potential benefits of the regulatory reforms of the PVP law lie in catering to the needs of nations that prefer to promote innovation without threatening farmers' livelihoods. The TRIPS Agreement grants members the flexibility to prioritise farmers when shaping a policy for plant variety protection. The new PVP regime is exemplary in its ability to capitalise on the flexibility in TRIPS by compromising international legal norms with specific regulatory provisions to address local conditions. Each of the suggested elements not only represents a fairly high level of compliance with the norms of international law, but also showcases rights contoured to suit unique national conditions. Nowhere is such a balance more important than in agrarian third world countries where farmers generally belong to poorer societal classes.

6.3 CASE FOR INSTITUTIONAL APPARATUS IN THAILAND

The current problem with the organisational structure related to the IP rights protection of plant varieties in Thailand is that the current organisational apparatus is insufficiently effective to address complex and long-term issues of plant variety protection, as discussed in Chapter 4. The mandate of the Thai Plant Variety Protection Commission (PVP Commission)¹³³ is limited and the current Plant Variety Protection Division's (PVP Division)¹³⁴ activities to assist the Thai PVP Commission, as well as local breeders and farmers, have also been rather limited in scope. The problems of ineffectiveness and insufficiency can be addressed by expanding the duties and authority of the Thai PVP Commission and elevating the existing PVP Division to full Department status, thus strengthening the organisational apparatus governing the area of plant variety protection in Thailand.

6.3.1 ROLE OF THAILAND'S PLANT VARIETY PROTECTION COMMISSION

This section considers the role of Thailand's PVP Commission proposed earlier. The primary objective of the PVP Commission is to set an agenda and promote the protection of plant varieties in favour of all actors in Thailand's agricultural management. This role can include the following tasks:

- (A) Promotion of an agenda and implementation of relevant policies;
- (B) Regulatory monitoring of plant variety protection;
- (C) Institution and supervision of plant-related activities, including those of PVP Divisions.

133. The Plant Variety Protection Commission was established under the Thai PVP Act, above n 4, § 5.

134. The Plant Variety Protection Division was established under the Department of Agriculture in the Ministry of Agriculture and Cooperatives, Thailand.

A. Policy Implementation

The Thai PVP Commission should create a regulatory environment in the legal framework that allows and facilitates the implementation of policies.¹³⁵ This will enable the Commission to identify problems and gaps in the current regulatory system in facilitating agricultural innovation and development and set an agenda on a regular basis. This agenda may be discussed at the Ministry of Agriculture and Cooperatives and the Cabinet of Thailand to develop a more development-supportive regulatory policy and framework and modify the relevant rules, when necessary, to support domestic interested groups. While promoting innovative plant breeding activities and other development-related agenda, the PVP Commission should also cooperate with relevant government authorities, such as the Department of Agriculture (DOA),¹³⁶ the Department of Intellectual Property (DIP),¹³⁷ the National Innovation Agency

135. As discussed in Chapter 2, the functions and authority of the current PVP Commission of Thailand have been limited in scope. The role of the PVP Commission mainly focuses on the enforcement of the PVP. According to Section 6 of the Thai PVP Act, the current PVP Commission has the following authority and duties:

- (1) To submit recommendations to the Minister on the issuance of Ministerial Regulations and Notifications under this Act;
- (2) To consider and decide appeals against orders of the Direct-General relating to registration of new plant variety protection;
- (3) To give opinions or advice to the Minister with regard to the execution of this Act;
- (4) To prescribe regulations with regard to the studies, experimentation, research, breeding or development of or into plant varieties from local domestic plant varieties, general domestic plant varieties and wild plant varieties or any part thereof;
- (5) To prescribe regulations with regard to the management of the Plant Varieties Protection Fund;
- (6) To lay down rules and procedures for giving special remuneration to State employees or officials who have bred new plant varieties for the agencies to which they are attached;
- (7) To determine agencies or institutions to be authorised to examine and appraise biological and environmental safety impacts;
- (8) To perform such other acts as prescribed by law to be under the responsibility of the Commission.

136. Department of Agriculture (DOA) is established under the Ministry of Agriculture and Cooperatives of Thailand with a mandate to promote research and development in agricultural innovation and technology, including plants. For further duties and authorities of the DOA available at, <http://www.doa.go.th/th/index.php?option=com_content&view=article&id=51&Itemid=74>.

137. Department of Intellectual Property (DIP) is established under the Ministry of Commerce of Thailand with a mandate to (i) encouraging creation of IP, (ii) promoting management and commercial exploitation of IP, (iii) developing IP services thoroughly and efficiently, (iv) developing IP protection system towards

(NIA),¹³⁸ and the National Centre for Genetic Engineering and Biotechnology (BIOTEC)¹³⁹ of Thailand. By means of this cooperation, the agenda set by the PVP Commission would more effectively and consistently promote agricultural development throughout the country.

In addition, a procedure should also be developed for the relevant government authorities to provide regular assistance to breeders, particularly farmers. This would involve reporting the activities of breeders and farmers that are relevant to the agenda and policies established by the PVP Commission. The PVP Commission should receive details of their activities and examine them on a regular basis, and further discuss them with the relevant authorities. The Commission should then decide whether or not these agendas are being met within a certain period. The point of this proposal is to develop a more coherent organisational apparatus to set a relevant agenda for plant protection and agricultural development on a regular basis and oversee and assist with technical support and other development-related issues by means of a reporting mechanism.

B. Regulatory Monitoring

The PVP Commission should also monitor compliance with the aforementioned development assistance policies. Failure to comply should be reported to the PVP Commission if it is detrimental to the interests of domestic farmers and breeders. The PVP Commission should subsequently

comprehensive efficiency, (v) putting force fair use of IP rights and suppressing IP rights infringement, and (vi) developing IP network both domestic and foreign countries. For missions and mandates of the DIP available at <http://www.ipthailand.go.th/ipthailand/index.php?option=com_content&task=category§ionid=17&id=111&Itemid=187>.

138. The National Innovation Agency is a department of the Ministry of Science and Technology of Thailand. Its functions include conducting activities that accelerate innovation in industry, agriculture, business, government and societies in systemic and sustainable ways, and supporting and developing Thailand's innovation system, both in terms of improvement and initiation, to promote economic restructuring and competitive enhancement. A detailed account of the NIA's activities and mission is available at <http://www.nia.or.th/en/index.php?page=aboutus_vision>.

139. The National Centre for Genetic Engineering and Biotechnology (BIOTECH) was established under the National Science and Technology Development Agency. It was created to support research and development related to agricultural science, transfer of technology for the development of agriculture, natural resources, environment and other issues. The functions of the BIOTECH can be accessed at <<http://www.biotec.or.th/EN/index.php/about-us>>.

consult with the relevant organisations to seek a resolution. The commitments of the PVP Division in the PVP law can be monitored by the PVP Commission. Compliance with these commitments may require a broader policy adjustment by the Cabinet, which may necessitate monitoring by the PVP Commission. Moreover, the PVP Commission should publish an annual report on the status of compliance with these development assistance provisions and monitor any systematic failure to comply. The PVP Commission should include such a problem in the promotion of innovative plant breeding activities and the agricultural development agenda for further assistance and possible modifications to the rule.

C. Instituting and Supervising Committees

The PVP Commission should institute standing or ad-hoc committees on plant variety protection to address the specific issues of plant variety protection and agricultural innovation and development that require long-term attention, such as technical support for breeding techniques, biotechnology, and sustainable farming practices. There should be at least one committee specifically devoted to the problems of farmers, and another to assist with building the capacity of Thai farmers to participate fully in agricultural innovation and development and realise the benefits. Assistance should be provided to local breeders, as well as farmers involved in costly and time-consuming breeding practices,¹⁴⁰ and the current PVP Division should be expanded to offer assistance to every group of breeders and farmers' representatives who need assistance to develop new commercial plant varieties. Consideration should be given to whether or not assigning the function of the existing PVP Division to a standing committee under the PVP Commission would serve the need of farmers.

140. A recent study emphasised that breeding is extremely laborious and time-consuming work. As discussed in previous chapters, it generally takes between 7 and 10 years to get a new commercial plant variety that is marketable; see Graham Dutfield and Uma Suthersanen, *Global Intellectual Property Law* (Cheltenham: Edward Elgar, 2008) at 182. Experience to date also shows that breeding a new plant variety costs approximately 10 – 20 million THB a year (roughly 30,000 to 60,000 U.S. dollars); see Phusadee Arunmas, 'Seed Firms Push for Protection' *Bangkok Post* (Thailand), 4 September 2009.

Summary: The role of Thailand's Plant Variety Protection Commission may include:

- The promotion of an agenda and implementation of relevant policies;
- Regulatory monitoring related to plant variety protection;
- Instituting and supervising plant-related activities in Thailand.

6.3.2 DEPARTMENT OF PLANT VARIETY PROTECTION OF THAILAND

Another institutional apparatus related to the protection of plant varieties in Thailand is the PVP Division, which was established under the auspices of the DOA in the MOAC.¹⁴¹ As previously discussed, the mandate of the Thai PVP Division is limited and its activities to assist the PVP Commission of Thailand, as well as local breeders and farmers, have also been rather limited in scope.¹⁴² Thus, there is a need for new institutional apparatus in Thailand to govern the protection of plant varieties. One way to resolve the ineffectiveness of the current institutional apparatus governing the IPR protection of plant varieties in Thailand is to elevate the existing PVP Division to full Departmental status, thus strengthening the organisational apparatus.

In terms of the proposed organisational reform, the need for such an elevation can be explained by comparing it with the treatment of other traditional IP rights promoted by the Ministry of Commerce of Thailand, such as copyrights, trademarks, and patents. Even though plant variety protection concerns the majority of the Thai population, it has received little attention to date. Nonetheless, the importance of foregoing IP rights was emphasised, and the full status of a Department, not a Division, as well as a set of separate

141. The PVP Division was established under the auspices of the Ministry of Agriculture and Cooperatives to oversee the issue of plant variety protection in Thailand.

142. For a discussion about the PVP Division and its functions see Chapter 2 of this thesis.

agreements and working groups were established to address the complex and long-term IP issues in Thailand.¹⁴³

As mentioned earlier, plant variety protection issues concern the vast majority of Thai working people, and there is a consensus in Thailand that these issues should be addressed as a priority at the present time.¹⁴⁴ If these plant protection issues, which concern the majority of the Thai population, are considered as important as other traditional IP rights,¹⁴⁵ it is fair that issues of plant variety protection be accorded the same institutional attention and weight by elevating the current working Division to full Departmental status. This proposed institutional reform would help to resolve the doubt that plant variety protection issues are not receiving due attention and are being ignored.

The proposed elevation will not only make a statement recognising the essential importance of the plant variety protection issue, but will also meet practical needs, which will include the replacement of the present working groups with the new Department. A number of working groups have currently been established in Thailand to address important issues, such as food security, poverty and debt, which are closely linked to farmers' rights concerns. These issues are complex and require continued attention. A Department, rather than a limited Division, is necessary to incorporate these important issues into a working agenda, which could be overseen by the PVP Commission, as discussed *above*. The proposed expansion of the current organisational apparatus means an increase in staff and available resources to assist local

143. As for legal matters, the government of Thailand established the DIP within the Ministry of Commerce to oversee issues related to IP rights protection, including copyrights, patents, trademarks, geographical indications, industrial designs, layout-designs of integrated circuits, and trade secrets. For technical support, a number of sub-divisions, such as an IP Management Division, Copyrights Division, Patent Division, and Trademark Division, Promotion of IP Development Division etc. have been established to assist Thais with IP rights issues. Furthermore, a number of Ministerial regulations and government policies were also enacted with a view to facilitating the enforcement of those IPR laws in Thailand. More importantly, the Central Intellectual Property Court of Thailand and its procedural mechanisms were established in 1996 to oversee disputes in IP rights matters in Thailand.

144. Lertdhamtewe, above n 92 (expressing the need to reform the plant variety protection policy to promote development and sustainability in agriculture in Thailand).

145. As mentioned, the protection of plant varieties is an aspect of IP rights. In Thailand, while some attention has been paid to traditional IP rights such as copyrights, trademarks, and patents, until recently, virtually no attention has been paid to IP rights with respect to plant variety protection.

breeders and farmers with technical support. Therefore, a new Department of Thailand's PVP would need to be established to oversee the effective operation of these activities. In addition, individual farmers face unique problems as a result of their lack of education and knowledge about IPR law on PVP,¹⁴⁶ and securing the full benefits of the Thai PVP law.¹⁴⁷ Therefore, additional divisions may be necessary to bring adequate institutional attention to these problems, and assist local citizens more effectively on an individual basis. The current DOA, DIP, NIA and BIOTECH could be expanded and incorporated into this body to render technical advice to local breeders and farmers.

In this area, it can be said that the lack of due organisational status and the resulting appearance of insufficient institutional attention to issues of IP rights on plant variety protection have created a widespread perception that Thailand pays more attention to other areas of IP rights issues than those of the majority of its citizens, i.e. farmers. One way to resolve this issue is to elevate the current PVP Division in charge of plant variety protection issues to a Departmental level. Instituting a new Department could also serve important functions that the current PVP Division is not mandated to serve. Such functions could include building a better organisational apparatus to deal with specific complex and long-term issues related to the protection of plant varieties. Such a new Department would have a wider mandate to assist the PVP Commission of Thailand to promote plant variety protection and other development-related issues, and the capacity to address essential development issues that concern the majority of Thai citizens.

146. Robinson, above n 41 at 663 (suggesting that groups of local farmers who have been interviewed seem hesitant to take an interest in the prospect of benefits arising from the PVP).

147. Lertdhamtewe, P, above n 92, 41.

Summary: The PVP Division should be reformed and elevated to the level of full Department for the following reasons:

- To build institutional competencies and authority to oversee these issues, which concern the vast majority of the Thai working population;
- To empower both manpower and budget resources;
- To increase the cooperation and communication of the PVP Commission and other government authorities.

6.4 LESSONS LEARNED AND CONCEPTUAL CONTRIBUTION OF THE CASE STUDY OF THAILAND

The foregoing case study of Thailand is rich in lessons for the enhancement of plant variety protection regimes in other developing nations, partly because it tests the validity of the theoretical approaches adopted to identify and explain the key factors that influence the structural framework and standard-setting activities (and their developmental implications in the studied country). It also serves as a useful case in point because it represents a concrete example of how the national implementation of international legal norms brought about by the WTO/TRIPS Agreement have proved to be problematic because of their disconnection with the domestic reality, both in research and farming. It provides an important lesson for making the law a real instrument of intervention for plant IP rights protection, as well as sustainability and development in agriculture.

In order to make this fundamental conceptual contribution, this chapter has proposed a new legislative framework in the area of plant variety protection in Thailand. Recommendations for improving the Thai domestic legislation related to the protection of plant varieties have been made, including several areas where further work may be necessary, such as training and capacity development for domestic stakeholders and institutions, and enhanced

implementation and revision of legislation with a focus on differentiation between technological fields.

This case study has also shown the extent to which the proposed regulatory reform of Thailand has taken advantage of the flexibility of TRIPS Article 27.3(b) in designing an IP rights regime to promote agricultural innovation. It has particularly identified international legal norms as key elements that can be adopted to satisfy the TRIPS requirements, and has highlighted the delicate balance of interests (e.g. promoting international trade commitments, access to foreign markets, inflows of foreign investment and technologies, etc.) that needs to be considered when governments with similar socio-economic conditions decide to develop their own *sui generis* regime for plant variety protection. Therefore, the case study was built upon an analysis of the international plant IP protection framework described in Chapter 4 by providing a deeper insight into the flexibility and constraints arising from the domestic implementation of the TRIPS Agreement, the UPOV Convention, the CBD, and the ITPGRFA.

A key lesson learned is that the provision of adequate IP-related technical assistance to government agencies and all relevant stakeholders may play a critical role in enhancing the capacity of countries to set their priorities in global trade to ensure the maximum exploitation of economic opportunities arising from trade liberalisation. At the same time, it would preserve the legal scope to promote technological development and diffusion in the public interest, especially in relation to food security and the sustainable use of plant genetic resources and crop varieties cultivated by local citizens. Various key lessons learned from the case study of Thailand that may be relevant to other developing nations (especially those in the process of joining the WTO, implementing the TRIPS Agreement, the UPOV Convention, and some principles of the CBD and ITPGRFA) are described below.

Firstly, it is apparent that the proposal for reform constitutes a real alternative to patents and the UPOV model, which could be used as a basis for the development of a *sui generis* regime for plant variety protection in other developing nations with similar concerns. While the proposed plant variety

protection framework fundamentally introduces monopolistic rights for formal plant breeders, other regulatory bases have also evolved within the paradigm with a view to satisfying other relevant actors in agricultural management. The proposal to introduce UPOV-style plant breeders' rights protection constitutes a significant conceptual contribution, since it seeks to offer some benefits of the IP rights system to plant breeders who have not previously been able to benefit from the set of provisions.

A register of domestic plants and wild plant varieties also constitutes an excellent tool to counter the unwarranted application of plant variety rights. It would provide written evidence that knowledge already exists and can therefore not be granted protection as being "state-of-the-art". Further, it can serve as an extremely useful source of knowledge for all farmers in cases where access is offered to other farming communities, and this may contribute to revitalising the farmer's role as a breeder. In the context of developing a *sui generis* PVP system, a registration system and database for extant plant varieties constitutes a defensive strategy to help to mitigate the impact of the international patent system on local farmers and farming communities. Furthermore, the benefit-sharing of rewards through the PVP Fund strategy has also been proposed to reduce the impact of IP rights protection on farmers and local communities. Indeed, this constitutes a useful strategy to eliminate biopiracy, which is marked by the absence of any acknowledgement, compensation or benefit-sharing.

Lastly, another key lesson to be learnt from the Thai experience concerns the response that countries must give to their various international commitments.¹⁴⁸ Most WTO member states have other international obligations in this field, and the CBD is central in this regard, since it constitutes the main documents related to biological resources.¹⁴⁹ Further, it acknowledges the potential impact of IP rights on biodiversity management and even gives specific guidance to member states by advising them to ensure

148. Although Thailand is not a signatory to the CBD or other international environmental treaties, a key lesson can also be learnt from the case study of Thailand.

149. It is noted that because the ITPGRFA has only recently come into force, and due to its still limited membership (55 ratified Parties as of 2012), its full impact remains uncertain.

that such an IP rights regime on plant variety protection supports the objectives of the Convention, rather than running counter to them.¹⁵⁰ Since states have to comply with all their international obligations concurrently and most WTO member states are parties to the CBD, it is imperative that a plant variety protection regime should also comply with their other environmental commitments. Thus, it is of the utmost importance that, as in the case of the regulatory reform of Thailand's PVP regime, member states adopt legislation related to the management of biological resources that covers the policy aspects of the CBD.

In this aspect, it can be said that the proposed regulatory elements in the case of Thailand provide a significant lesson learned and conceptual contribution, which can be used as the basis for other developing nations with comparable socio-economic conditions to develop their own *sui generis* regimes for plant variety protection.

6.5 CONCLUSION

In order to address the existing problems with the current regulatory regime of plant variety protection in Thailand, it is important to examine the regulatory structure of Thailand's plant variety protection provisions, as represented by the PVP Act, and the current institutional apparatus. The current PVP provisions, as well as the PVP Commission and PVP Division are insufficiently effective to meet the needs of the Thai nation. Thus, regulatory and organisational reforms are necessary to effectively meet the development needs and implement new PVP rules. This reform should include the expansion of the current PVP Commission's authority and duties, and the elevation of the PVP Division to a new Department of Plant Variety Protection, as well as the establishment of a coherent body of rules that meet the particular needs of all actors in agricultural management.

The proposed expansion of the current organisational apparatus requires an increase in staff and available resources to assist local breeders and farmers in

150. CBD, above n 56, art. 8.

Thailand. As of 2011, the PVP Fund budget of 1 million THB (roughly 35,000 U.S. dollars) for technical cooperation and training would be inadequate to meet this proposal.¹⁵¹ Financial assistance from the current PVP Fund has enabled local farmers' associations and representatives to participate in innovative plant breeding activities. However, the financial assistance necessary to enable the participation of local citizens should not be left to the generosity of the PVP Fund, but should be systematically provided by the government of Thailand. The new Department of PVP should be supported by a budget. The government budget allocation to the activities and functions of the PVP Department should be significantly increased to meet these needs.

Technological assistance and access to capital need to be improved to address the needs arising from the limited financial resources of Thai local breeders and farmers. The scarcity of these resources often prevents Thais from fully participating in development; thus, PVP Commission meetings schedules should also be established to enable the maximum participation of these interested groups. The use of modern and "environmental-friendly" technology, such as hybrid varieties, modernised breeding techniques, and recombinant DNA technology, should be provided to increase local farmers' productivity, since it is not currently financially possible to station plant experts from Thailand and abroad to participate in their breeding and farming programmes. The lack of participation of farmers in development processes has been often cited as the reason why agriculture remains under-developed; thus, ways should be sought to relieve these difficulties, such as the proposals made above.

A monitoring and enforcement mechanism of the development-assistance provisions and policies should also be provided. The requirement of a development assistance report should be considered. The Department of PVP should be required to make this regulatory Report, subject to a review by the PVP Commission. The requirement for such a report will be consistent with the objectives of facilitating development manifested in the Constitution of the

151. The PVP Act of Thailand, above n 4, § 54.

Kingdom of Thailand.¹⁵² The proposed organisational and regulatory reform, as well as this suggested improvement of practical technology assistance, would help to turn what many have doubted to be merely “rhetoric for agricultural development assistance” into real and effective actions to assist Thailand to resolve these issues.

152. *The Constitution of the Kingdom of Thailand B.E.2550* (2007) (Thailand), § 86.

Chapter 7

Conclusion

This thesis sets out to test the proposition that the current statutory regime governing the protection of plant varieties in Thailand is insufficient and, in some respects, inappropriate to promote agricultural development in terms of defending the rights of breeders and farmers, conducting agricultural research, and sharing the benefits among all the players in agricultural management. The key reason for this is that such a regime disregards the important function of a plant variety protection system.

In order to address the above proposition, this thesis has analysed three specific issues, namely, the institutional limitations and systemic weakness of Thailand's plant protection system in the context of fulfilling the needs of all the actors in agricultural practice; the development implications of changes in the legal status of plant IP protection within the global trade regime; and the available options for improving the current legal framework with a view to making the law a viable instrument to promote Thailand's agricultural innovation, development and sustainability. The issues summarised above (and introduced in Chapter 1 of this thesis), are strictly interrelated and all chapters provide one or more elements that are essential to conclude this thesis.

7.1 INTELLECTUAL PROPERTY, PLANT VARIETY RIGHTS AND THAILAND'S DEVELOPMENT NEEDS

The thesis has discussed several theoretical questions related to the IPR in agriculture and development. Specifically, the thesis has explored several notions of the concept of 'development,' which is rooted in the notion of sustainable development. Furthermore, the thesis has described the philosophical approaches and rationale behind the granting of IPRs in agriculture through the PVP policy in order to understand how IP law on plant variety protection should be implemented to promote sustainable development. The above analysis in Chapter 3, has essentially shown that there is a process of interaction between IP and development. Specifically, the IP protection of plant varieties is particularly important in the context of IPRs in agriculture, because it touches a number of issues of relevance to sustainable development. These include the issues of poverty, rural development, food security, and environmental conservation and management. All of these issues best captures the intent of the United Nations Millennium Development Goals as well as Thailand's own developmental objectives, which include the eradication of poverty, the promotion of freedom from hunger and ensuring environmental sustainability.

The thesis has also explored the rationale for introducing IPR in agriculture in Thailand. Specifically, the PVP law is important in Thailand, considering Thailand's development needs and priorities, socio-economic conditions, biological characteristics of the country and players engaged in agricultural sectors. With this assumption, the thesis emphasises that the PVP law in Thailand must contribute to its sustainable development goals. It must be designed to protect the interests of all actors in agricultural management. It must also be made to promote research and innovation in agriculture.

7.2 PLANT VARIETY PROTECTION: LIMITATIONS AND SYSTEMIC WEAKNESS OF THAILAND'S CURRENT REGIME

This thesis has further discussed the IP rights law on plant variety protection in Thailand currently represented by the *Plant Variety Protection Act B.E.2542 (AD1999)* (PVP Act), and analysed its key statutory provisions. A careful examination of the Thai plant protection regime has led to the conclusion that the current PVP rules in Thailand are not sufficient to facilitate agricultural development; in fact, many of these provisions are out of tune with the interests and specific needs of the Thai nation.

The greatest flaw of the Thai PVP Act is the ineffective implementation of the provisions that relate to the rights of farmers and local communities. Thailand's current plant variety protection regime responds to the preferences of farmers and local communities, with the majority of those preferences found in the set of provisions concerning local domestic plant varieties that provide special and differential treatment to farmers and local communities. This provision is criticised as being unhelpful for both farmers and local communities, since no farmers or local communities have yet been able to claim the benefits of its generous protection of local domestic plant varieties.

The lack of an effective provision of farmers' rights is coupled with the problem related to the provision of protection for general domestic plant and wild plant varieties. The inclusion of general domestic plants and varieties of wild plants was meant to emphasise traditional knowledge rights. However, this protection of existing varieties is controversial, because the Thai PVP law does not require them to be included on a database or be registered; thus, general domestic plant and wild plant varieties in Thailand are officially unprotected.

There is also a further fundamental problem regarding the use of such varieties, which is that the Thai PVP Act requires those seeking to use general domestic plant or wild plant varieties for commercial purposes to apply for a

permit from the government of Thailand. Failure to do so may lead to harsh penalties for infringement under the Thai PVP law. Thus, the law provides the same treatment to users of existing varieties with widely different levels of income, including subsistence farmers who sell them for survival rather than profits. In developing countries like Thailand, where literacy among the farming communities is limited, this can result in farmers committing more infringement than they intend to.

Moreover, the benefit-sharing rewards offered to farmers and local farming communities through the Plant Variety Protection Fund (PVP Fund) are also contentious. The distribution of shared benefits through the PVP Fund is disconnected from farmers. Also, local farmers' groups seem to hesitate to become involved in the prospect of benefits arising from the PVP Fund, because of the lack of sophistication among local farming communities. Thus, in practice, farmers and local farming communities remain uncompensated for breeders' appropriations.

In addition to the concerns for the rights of farmers and local societies, the inadequacy of Thailand's PVP Act is the result of ineffective and insufficient provisions for plant breeders' rights protection. Under the Thai PVP Act, breeders can receive legal protection if their varieties fulfil four distinctive criteria, namely, new, distinct, uniform, and stable. Since the Act contains a diluted version of the eligible standards for the protection of new plant varieties, it leaves room for commonly cultivated plants in remote parts of Thailand to be eligible for protection. Rather than stimulating innovation in plant breeding, the low standards of eligibility for protection result in encouraging the misappropriation of plant genetic resources in the public domain and protecting them as premium inventions. This diluted version of eligibility requirements means that Thailand's PVP Act provides insufficient protection.

Furthermore, the Thai PVP Act provides a term of protection to breeders' varieties without any coherent standards, i.e. standards that several countries apply to their protection terms. Crop varieties have a specific term of 12 or 17 years under the current PVP Act of Thailand, depending on the type of new

crop varieties. Such a term of protection is considered to be too short for breeders to recoup their investment in developing new commercial plant varieties. More importantly, the duration of protection also falls short of international standards, as well as the standards adopted by several other countries, some of which offer a minimum term of protection of 20 years. This inadequate term of protection is also coupled with a delay in the application process. The average duration for examining and inspecting an application is approximately 24 to 36 months, and this delay means that plant breeders certainly receive less than the full term of protection for their crop varieties. This insufficient term of protection and the reduction in the term of protection of plant varieties is viewed as being a huge impediment to the incentive to invest in new crop varieties in Thailand, further diluting the benefits of Thailand's PVP Act.

The scope of breeders' rights in the Thai PVP law is also problematic. The Thai PVP law grants exclusive rights to plant breeders for their new crop varieties as a means to prevent piracy and combat free riding within the Thai market economy. However, the exclusive rights of breeders are subject to certain exemptions, such as experimental exemption, which is extremely controversial. Specifically, the clause of experimental exemption is not well-defined, nor does the statute indicate who holds the ownership rights of the new variety emanating from the protected variety. Based on this provision, no authorisation is required from breeders in cases where the protected variety is sought for plant breeding and other experimental activities. One of the most critical questions is whether or not simply duplicating the protected variety to develop a hybrid or a different plant variety constitutes an infringement. Thus, providing a clear explanation to determine the scope of breeders' rights and the extent of its limitations is crucial to avoid potential disagreement between breeders and other actors.

Another problem relates to the lack of guarantees for the rights of plant breeders. Generally speaking, the Thai PVP Act provides for a person other than the breeder of new varieties to use the protected variety without the breeder's authorisation. This provision is another exception to the exclusive

rights of plant breeders, which is commonly known as a “compulsory licensing exception”. While the objective of this section is commendable, the poorly drafted language can lead to the misuse of the compulsory licensing provision. The gaps in the compulsory licensing provision in the Thai PVP Act can be found in four important areas. Firstly, the law does not limit the scope of the licensees. Thus, in practice, the licensees may include competitors of the holder of the variety rights. Secondly, no time limit is imposed on the duration of a compulsory license. More importantly, there is no provision that would lead to the termination of the compulsory licence if the circumstances that led to its issuance cease to exist. Lastly, breeders do not have the legal right to appeal before an independent administrative body or court in order to issue a compulsory licence. This lack of guarantees for the rights of breeders defines the basic reason why the overall number of plant variety rights granted is too minimal.

Another problem with Thailand’s current PVP Act is that the organisational structure is insufficient to address the complex and long-term issues of plant variety protection. The mandate of the Thai Plant Variety Protection Commission (PVP Commission) has a limited scope and the current Plant Variety Protection Division’s (PVP Division) activities to assist the Thai PVP Commission, as well as administrative matters and local breeders and farmers, also have a rather limited scope. Specifically, the PVP Commission of Thailand’s authorities mainly focus on enforcing the law under the Thai PVP Act. Several other essential issues need to be addressed, i.e. the implementation of provisions related to the protection of existing varieties as a means to facilitate the development of farmers and local farming communities, and stimulate farmers and local breeders to participate in the development of new plant varieties; however, the current Thai PVP Commission has no mandate to address these essential issues. The poor organisational status and apparent lack of sufficient institutional attention to plant IP protection issues have created a widespread perception that too much attention is paid to other areas of IP rights than PVP issues, which concern the majority of the Thai population. Therefore, the institutional apparatus

governing the area of plant variety protection in Thailand also needs to be further addressed.

Overall, the inefficiency of Thailand's current regime suggests that more effort is needed to protect plant varieties, and it is apparent that a more comprehensive and coherent framework needs to be established. Having reached this conclusion, this thesis has explored the ways in which the development of innovation in Thailand's agricultural industry can better be promoted, while preserving the current traditional ways of farming and the continuation of sustainable agricultural development. Thailand can provide a more coherent framework for plant variety protection by carefully calibrating the PVP provisions and establishing a coherent set of rules in the form of a new legislative framework. As for the regulatory elements to be included in the new PVP framework, this thesis notes that a number of elements are available from a variety of instruments that exist in international law. Four major documents, including the *Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPS Agreement) of the World Trade Organization (WTO), the *1991 International Convention for the Protection of New Varieties of plants* (UPOV Convention), the *1992 United Nations Convention on Biological Diversity* (CBD), and the *International Treaty on Plant Genetic Resources for Food and Agriculture* (ITPGRFA) are central in this regard. Several nations, if not all, view such instruments as ways of drafting their legislations on plant variety protection, thereby conforming to the norms of international law.

7.3 RESOLUTION THROUGH INTERNATIONAL LAW

Plant variety protection through an IPR regime has assumed great importance in terms of juridical development and economic diplomacy with its inclusion in the WTO/TRIPS Agreement. The TRIPS Agreement leaves a remarkable degree of freedom in the field of plant variety protection for designing plant IP protection legislation for domestic needs and promoting local innovation and development. TRIPS Article 27.3(b) states that members shall provide for the

IPR protection of plant varieties by patents or by an effective *sui generis* system or a combination of both patents and a *sui generis* system. Thus, the wording of this article creates a flexible standard of protection in line with WTO members' socio-economic priorities.

The *sui generis* option in TRIPS Article 27.3(b) seems to benefit developing countries, like Thailand, since it offers a certain degree of flexibility with regard to the system of plant IP protection. Specifically, it allows each country to adopt its own individualised system of plant protection tailored to its development needs and priorities. This thesis argues in favour of taking advantage of the flexibility of TRIPS by establishing a self-serving *sui generis* form of legal protection that provides a balanced approach to plant variety protection. This implies that a plant IP protection system may contain some elements of the relevant TRIPS provisions, UPOV-style law, as well as some of the access principles of the CBD and ITPGRFA. This would allow a certain degree of flexibility for developing countries, like Thailand, to create plant IP protection regimes compatible with their socio-economic conditions, and would therefore be consistent with the international norms and the requirement of TRIPS.

In terms of the elements to be drawn from these international regimes to set up a plant variety protection framework in accordance with the TRIPS' *sui generis* requirements, it has become the norm to provide UPOV-style plant breeders' rights protection for new plant varieties. In order to satisfy the requirements of TRIPS concerning the IPR protection of plant varieties and, in the spirit of stimulating agricultural innovation, countries must provide for the protection of new plant varieties. Thus, the basic elements of a plant variety protection framework may include new plant variety rules based on the text of the 1991 UPOV Convention. Key elements of UPOV could be adopted, such as the eligibility standards for protection and the duration. Generally, UPOV considers breeders' rights over new, distinctive, uniform, and stable varieties. Each of the eligibility requirements is based on exactly the same premises as patent rights, but with a lower threshold for protection. The minimum 20-year term of protection set by UPOV could also be used as a basis for conditioning

the duration of new plant variety protection. In addition, countries may wish to include a number of exceptions to limit breeders' exclusive rights. For instance, they may include public interest exceptions, such as a compulsory licensing provision in the plant variety protection framework, so that they can adopt measures to protect public interest or prevent vital interest, such as food security, when necessary. Public interest exception may be styled similarly to the text of TRIPS Article 31, which provides a wide array of public interest measures that can be regulated by governments to compel IP rights holders to licence their products to governments or private parties.

While developing countries like Thailand should consider the systematic elements of plant variety protection laws that would best serve their public interest and encourage agricultural innovation, they should also consider the need to compromise the rights of other players involved in agricultural practices, which are missing from the UPOV regime. What else can be drawn from the text of international instruments to contribute to the creation of a unique *sui generis* plant protection system? This thesis has suggested that certain provisions of the CBD and ITPGRFA, which relate to the protection of traditional knowledge rights, farmers' rights concerns, and access and the beneficial sharing of biological resources, should also be directly incorporated into a plant variety protection regime.

When attempting to devise a *sui generis* regime for plant variety protection, developing countries, like Thailand, should consider incorporating provisions for traditional knowledge rights protection. The CBD is central in this regard, since it is the main instrument involved with the management of biological resources and the protection of traditional knowledge rights. The Convention acknowledges the potential impact of IPRs on biodiversity management and even provides specific guidance to member states by advising them to ensure that such IP rights support the objectives of the CBD rather than running contrary to them. Based on the CBD's policy framework, provisions for traditional knowledge rights protection may include elements to clarify ownership rights, seek to establish a common form of protection, or attempt to address the misappropriation or biopiracy of genetic materials and related

agricultural traditional knowledge rights. One possible way is to incorporate regulatory measures to allow farmers to register existing varieties within plant variety protection law. Further elements of plant variety protection law could include provisions for access to genetic resources and the sharing of benefits arising from biological resources. Access to genetic resources and sharing benefits are two concepts that are generally broadly placed within the context of the CBD's policy framework. There appears to be a significant reason that elements of the CBD related to access to plant genetic resources and benefit-sharing should also be directly incorporated into the legal framework for plant variety protection.

Furthermore, elements of a plant variety protection framework may also include the recognition of farmers' rights, which generally encompass the ability of farmers to save, use, exchange and sell farm-saved seeds and propagating materials from their harvest. The ITPGRFA reminds us that the protection of agricultural knowledge and participation in policy-making and decision-making are the key elements of a plant variety protection framework to ensure farmers' way of life. Thus, elements of a plant variety protection system should incorporate some regulatory basis by allowing farmers to retain their traditional rights to save and re-use seeds from their harvest.

In this sense, there would be "two systems" parallel to each other. The first would be a system that operates to protect the interests of plant breeders by granting exclusive IP rights protection to them based on the UPOV's plant breeders' rights model. This is intended to enable a plant-breeding industry to emerge and grow in developing countries, such as Thailand. The second would be a system that introduces a number of measures to prevent the national welfare issues enjoyed by farmers from being over-ridden by the formal IP rights regime. Such a combination of legal approaches to plant variety protection would allow developing countries like Thailand to balance the protection of plant variety rights with other important societal goals.

In summary, this thesis has suggested that Thailand should conform to some of the key elements concerning plant breeders' rights protection as stipulated in the 1991 UPOV Convention, without signing the UPOV. The

reason for this is that Thailand could be close to international norms while maintaining flexibility to develop its own *sui generis* plant variety protection regime to specifically address its socio-economic priorities. This may also create some flexibility for Thailand to create its own unique system that may incorporate some principles of the CBD and ITPGRFA and be different from the text of the UPOV Convention, thus providing a broader space for future law-making flexibility.

7.4 RECONSTRUCTING THAILAND'S PLANT PROTECTION REGIME TOWARD A COHERENT REGIME, COMPLIANT WITH THE TRIPS OBLIGATIONS

While various international instruments related to the IPR protection of plant varieties could be used as a basis to enact plant variety protection legislation in a country like Thailand, these documents alone cannot address the unique problems of Thailand's current regulatory regime of plant variety protection, and thereby provide a satisfactory, practical solution to those problems. Thus, it is imperative to construct a new regulatory framework for plant variety protection that specifically addresses the needs of all the actors in agricultural management in Thailand. This would represent a balance between fully recognising Thailand's socio-economic priorities and adopting a position to satisfy the norms of international law. As mentioned earlier, the current PVP provisions, as well as the mandates of the PVP Commission and PVP Division, are insufficient to meet the practical needs of the Thai nation. Therefore, regulatory and organisational reforms are necessary to effectively meet the need for development and the implementation of new PVP rules. These reforms should include the expansion of the current PVP Commission's authority and duties, the elevation of the PVP Division to a new Department of Plant Variety Protection, and the establishment of a coherent body of rules to meet the particular needs of all the actors in agricultural management.

On the whole, the new PVP framework of Thailand may develop specific legal provisions in line with international standards, namely, the standards

adopted by several other countries and applied to their national PVP legislations. Furthermore, the new PVP framework may also provide coherent and diverse protection terms related to the duration of protection. This means that Thailand should ascertain that the PVP law concerning plant breeders' rights protection is in harmony with the UPOV treaty. Specifically, the proposed regulatory reforms would suggest that Thailand's PVP provisions should be amended in many areas, including (1) the set of provisions concerning local domestic plant variety protection, (2) provisions related to the protection of general domestic plants and wild plant varieties, (3) licence for the use of existing varieties and the benefits arising from the PVP Fund, (4) eligibility standards for new plant variety protection, (5) term of protection, (6) scope of breeders' rights and exceptions, (7) compulsory licensing provision, (8) expansion of the role played by the PVP Commission, and (9) the elevation of the current PVP Division to Department level.

Firstly, elements of the new PVP framework may include the revision of the local domestic plant variety protection provision for a number of reasons. Generally, since its inception, the lack of local domestic plant variety registrations has proved that Thailand has no local domestic plant varieties. Also, proposing that local domestic plant varieties should belong to local Thai communities overlooks the fact that a single community owner of a plant variety in Thailand cannot be identified. Most importantly, the legal protection of local domestic plant varieties exists because provisions for such plant protection arose from a political compromise. Thus, the set of provisions for local domestic plant variety protection needs to be amended in the new PVP regime. This could be to relax certain requirements for registration of local domestic plant varieties by allowing two or more communities to be given rights to a single common variety.

Secondly, farmers' saved seed exemption, which is directly linked with food security issues, should still be sought in the Thai PVP law, and the farmers' rights mechanism in existing Thai PVP law should be incorporated into the proposed PVP framework since the proposed regime will replace the current Thai PVP law. Other elements, which relates to the protection of

farmers' rights, include provisions regarding deceptive marketing and labelling claims of high yields seeds, as well as statutory restrictions on potentially immoral or harmful technologies or contrary to public order.

Thirdly, there is an obvious need to establish a registration system and database for Thailand's existing general domestic plant and wild plant varieties, since the creation of such a database may serve to mitigate the problem of misappropriation. By recording all plant varieties in Thailand on a single database, patent offices anywhere in the world could easily conduct searches to determine whether the plant-related invention to be protected was or was not derived from existing plant varieties in Thailand.

Furthermore, the proposed PVP element also encompasses the ABS mechanism that exist in the current Thai PVP Act. Specifically, such element may include prior-informed consent regarding the use of general domestic and wild plant varieties, as well as stipulation of the timing of benefits, distribution of benefits between parties and mechanisms for benefit-sharing.

In addition to the ABS mechanism, the type of permit or licence for the use of existing general domestic plant and wild plant varieties should also be modified. Obviously, subsistence farmers should be exempted from the licence considering the poverty levels of Thailand's farming communities. Individuals' income status could be considered. Normally, the government of Thailand uses individuals' income levels to categorise them into different income groups. Therefore, this economic indicator can be used as a primary determinant for the status of users of existing varieties. Methods for diverse special and distinctive treatment of different levels of users/farmers should be sought, and licence exemption should be provided to subsistence farmers/users of existing varieties who sell them for survival rather than profit in accordance with their individual levels of income. Moreover, the benefit-sharing of rewards from the PVP Fund in Thailand's PVP Act should also be addressed. Some commentators have expressed that the benefit-sharing of rewards via the PVP Fund is disconnected from the farmers. Critics assert that farmers may not be vigilant in applying for benefits considering the social, economic and educational conditions of Thailand's local farming communities. Also, the

dearth of regional offices among the local communities in Thailand could pose procedural complications for farmers, requiring them to apply to remote offices. Thus, a practical solution is to authorise NGOs or local government bodies to apply for benefit-sharing rewards on farmers' behalf. Further regulations or rules could be developed to assist this matter.

Another area that needs to be addressed relates to a set of provisions specifying the protection of plant breeders' rights. Thus, setting new eligibility standards for protection may increase clarity, and one possible way to do this would be to redraft the eligibility standards for new plant variety protection in the Thai PVP Act. Furthermore, Thailand could adapt new plant variety rules from the UPOV model to suit its own interests, thereby incorporating the principles of CBD related to access to plant genetic resources. For instance, the new PVP rules may include a "disclosure of source and legal provenance requirement", which could serve as a key avenue to ensure the minimisation of the illegitimate appropriation of plant genetic resources.

Moreover, the provision related to the term of protection in the Thai PVP Act should be amended, and in this respect, the term of protection provided by the UPOV Convention could be considered. The UPOV Convention uses a fixed period of no shorter than 20 years. Methods to differentiate the term of protection for different types of plant varieties should still be sought, and the sub-categorisation of protection terms, such as the one provided by the UPOV Convention, could be adopted for such differentiation. This provision of UPOV could be used as a basis for providing the period of plant breeders' rights protection in the revised Thai PVP regime. In addition, there may be a provision to extend the term because of certain administrative delays. Such term extension and adjustment is necessary, considering that the protection term for plant variety in Thailand is calculated from the date of filing the application.

The scope of plant breeders' rights and the clause of exceptions in the Thai PVP law should also be reconsidered, since these elements are not clearly defined in the Thai PVP Act. Thus, Thailand should provide other patterns of plant breeders' rights, and determine the extent of limitations on breeders'

rights with a clear explanation. This could mean that the new PVP regime would promote research on protected varieties by allowing the use of a registered variety to conduct experimental research or as an initial source of variety for the purpose of creating other varieties. The new PVP statute may also require authorisation from the owner of the plant variety to derive the second-generation variety. This authorisation would only be required where the repeated use of such a variety as a parental line was necessary for the commercial production of such a newly developed variety.

Furthermore, the compulsory licensing exception in Thailand's plant protection regime is also contentious, which can lead to the misuse of the compulsory licensing provision. Thus, regulations or rules of the new PVP framework could be developed to provide guidance for the scope of compulsory licensing exception and determine the duration and termination of the use of compulsory licensing. The compulsory licensing provision in the Thai Patent Law, which incorporates the principles of compulsory licensing exception in TRIPS Article 31, could be adopted in response to this issue. Thus, the new PVP framework should be styled similar to the provisions of the Thai Patent Act. By introducing such a clause of compulsory licensing, the new PVP law could remove the most crippling impediment to introducing extensive compulsory licensing provisions, thereby representing a balance between fully allowing public interest exception and taking a position that tends to preventing breeders' security altogether.

In terms of the institutional apparatus governing the area of plant variety protection in Thailand, the mandate of the Thai PVP Commission is extremely limited and the PVP Division's activities and authority to assist the PVP Commission are also rather limited in scope. The problems of ineffectiveness and insufficiency could be resolved by expanding the role of the PVP Commission and elevating the existing PVP Division to full Departmental status, thus strengthening the organisational apparatus in Thailand. Expanding the role of the PVP Commission could incorporate important functions that the current PVP Commission is not mandated to serve. Such functions could include building a better institutional body to deal with plant variety protection

issues. They could also include a wider mandate to implement all necessary measures to promote the IP rights protection of plant varieties, as well as the participation of farmers and local interest groups. Specifically, its role could include: (a) the promotion of an agenda and implementation of relevant policies, (b) regulatory monitoring concerning plant variety protection, and (c) instituting and supervising plant-related activities in Thailand.

With respect to the suggested organisational reform of the PVP Division, the need for such an elevation can be explained by comparing it with the treatment of other IP rights, such as copyrights, trademarks, patents, and geographical indications, promoted by the government of Thailand. While plant variety protection issues concern the majority of Thai citizens, they have not received much attention. Nonetheless, the importance of foregoing IP rights has been emphasised, and the full status of a whole Department, not only a small Division, as well as a set of separate procedures and working staff, have been established to address such IP right issues in Thailand. Plant variety protection issues concern a vast number of the Thai working population, and there is a consensus in Thailand that they should be addressed as a priority at the present time. If these issues, which concern the majority of the Thai population, are considered to be as important as other IP rights, it is only fair that they should be accorded the same institutional attention and weight by elevating the present working Division to full Departmental status. This proposed institutional reform would help to alleviate the doubt that plant variety protection issues have been ignored and not given their rightful attention.

7.5 *SUI GENERIS* SYSTEM OF PLANT VARIETY PROTECTION: GUIDELINE FOR DEVELOPING COUNTRIES

Drawing on the case study of Thailand, the final section of this thesis provides guidelines for developing countries in relation to the setting up of development-friendly framework for plant variety protection. When adopting any of the proposed elements, developing countries should carefully consider

their particular situations, which vary enormously across countries and across regions. Each of the elements, detailed below, provide a main theme for other developing countries when formulating their *sui generis* plant variety protection system.

Minimum Requirements

The minimum requirements proposed here are based on the premise that most developing countries are members of the WTO. These include the following elements:

National treatment: National treatment rule is an indispensable requirement of the TRIPS Agreement. It requires that each WTO member must accord to the nationals of other members treatment no less favourable than that it accords to its own nationals with regard to the protection of IPRs.

Most-favoured nation treatment: Most-favoured Nation (MFN) rule, being a reciprocity norm, requires that any advantage, favour, privilege, or immunity granted by a member to the nationals of any other country shall be accorded immediately and unconditionally to the nationals of all other members.

Since the TRIPS Agreement requires WTO Members to apply both NT and MFN rules for all types of IPR protection, the legal system for the protection of plant varieties should also apply the same standards.

Effective enforcement mechanism: Beyond applying the NT and MFN rules, developing countries should also ensure that they provide effective enforcement procedures for PV system under their domestic laws.

Generic Factors of Common Concerns

This section provides main themes and templates for the PVP rules that developing countries should consider as a necessary step towards the setting up of plant variety protection framework.

Definition of plant varieties: the basis for understanding and classifying plant varieties into different categories requires definition of the subject matter. A legal definition of “plant varieties” within the text of the UPOV treaty could be considered. UPOV generally defined “plant variety” as a plant grouping within a single botanical taxon of the lowest rank, which grouping, irrespective of whether the conditions for the grant of a breeder’s rights are fully met. The UPOV’s definition is important in this context because it has never been defined in any other treaties, even in the TRIPS Agreement, thus it is considered to be a useful definition.

Definition of breeders: Another generic factor that developing countries should take into account is the legal definition of breeders. Again, the definition of breeders should be considered as a starting point for defining breeders. Under UPOV, a breeder is generally deemed to be a person who has bred or developed a variety and, as a consequence thereof, obtained a new plant variety. Obviously, a farmer can be a breeder, but community of farmers that creates such a new variety will not fall within the scope of this definition.

New plant variety rules: throughout the thesis, it becomes clear that UPOV is the standard to emulate. It is important to provide new plant variety rules in spirit of encouraging agricultural innovations. Under the 1991 UPOV Convention, a new plant variety is commonly considered to be a variety that has been bred to demonstrate characteristics that are novel when compared to known varieties, and that also retain distinct, or uniform traits, and stability between breeding cycles. While the UPOV-style law provides some useful templates for conditioning the standards of eligibility, the UPOV’s eligibility requirement for protection may not prevent misappropriation of genetic resources. Thus, developing countries may have to adopt a higher degree of eligibility requirements.

Rights Conferred: UPOV model provides the monopoly exclusive rights to holders of plant varieties (plant breeders). It specifically requires national governments to grant exclusivity to holders of new plant variety in order to prevent other from selling or producing the protected plant variety without their consents. The purpose of this is to protect the fruits of their efforts and of

financial investment from undue appropriation by third parties. This is what lies at the heart of IPR system, what justifies in the end the grant of exclusive rights, and which makes it possible to deter free riding and to combat counterfeiting and piracy within a market economy. The right of exclusion is thus considered an integral part of PVP elements.

Exception to Breeders' Rights: In view of concerns of developing countries regarding the fear of creating monopolisation over food crops brought about by IPR system, developing countries may wish to include a number of exceptions to limit breeders' exclusive rights. For example, developing countries may include public interest exception, such as compulsory licensing, so that they can adopt measures when required to protect public interest, such as food security. Obviously, scope and content of public interest exception must be wider than that of UPOV, and the text of TRIPS Article 31, which provides a wide array of public interest measures that regulates when national governments may compel IPR holders to licence their products to governments or private parties, must be considered.

Duration of Protection: While developing countries should consider the common elements of PVP law that would best serve their public interests and encourage innovations in plant breeding activities, they should also consider at what point IPR protection over new plant materials should terminate. At present, the minimum 20-year term of protection set by UPOV has become the norm that several countries apply to their protection term. Obviously, offering protection for the same duration to those provided by other UPOV models would carry the benefits of consistency, which would contribute to foreign investors' confidence stemming from familiarity with the law. Methods for differentiating the term of protection for different types of plant varieties should also be sought, and the sub-categorisation of protection terms, such as the one used by the UPOV Convention, can be adopted for such differentiation. The UPOV Convention authorises a longer term of protection to be applied to trees and vines.

Unique PVP Elements

Beyond considering whether to provide UPOV-style law in spirit of the fact that it protects the rights of plant breeders, developing countries should also focus on the need to compromise the rights of other players in agricultural practices, which has been missing from the aforementioned regime. This section provides other ingredients for developing countries to consider.

Local domestic plant variety: The registration of plant variety should separate new plant varieties from domestic plant varieties so as to provide categories for special and differential treatment in favour of local communities. The introduction of local domestic plant varieties is generally meant to balance breeders' rights with the rights of other players in agricultural practices. It is introduced to protect the rights of local communities – such a protection ignored by UPOV.

Drawing on the Thai case study, proposed regulatory reform, and the CBD's policy framework, provisions for local domestic plant variety protection may include elements that may clarify ownership rights; seek to establish protected common, or attempt to address the misappropriation or bio-prospecting of genetic materials and related knowledge. One possible way is to allow farmers and local communities to register domestic or extant varieties within PVP law. Considering that domestic plant variety is a log of materials in the public domain, such variety may not pass novelty requirement for normally plant variety protection. Should novelty be an absolute requirement? It may be imperative for developing countries to modify the scope of plant varieties covering all types of plant varieties, such as domestic plant, wild plant or the landraces and farmers' varieties. Thus, the legal definition of plant varieties in UPOV, as discussed above, can be considered. Other important aspect for the registration of local domestic plant variety is to allow two or more communities to be given rights over a common variety.

Farmers' Rights: Farmers' rights generally encompass the ability of farmers to save, use, exchange and sell farm-saved seeds. The ITPGRFA reminds us that the protection of such rights, their knowledge, and participation in policy-

making and decision-making are the key elements for PVP regime as to ensure food security and farmers' ways of life. Elements of PVP should thus include this kind of provision by allowing farmers to retain their traditional to save and re-use seeds from their harvests.

Access and Benefit Sharing (ABS): Developing countries should also consider to adopt the ABS mechanism. ABS is two concepts, which have been placed within the text of the CBD. Providing ABS mechanism is crucial to avoiding the maladies that developing countries previously faced with respect to bio-prospecting incidents. Such mechanisms may include the prior informed consent regarding the use of domestic varieties and the stipulation of the timing of benefits, the distribution of benefits between two parties, and mechanisms for benefit-sharing.

Other Essential Elements

Apart from the above elements, there are other essential elements for the creation of the PVP system. Thus, developing countries should also consider these elements when developing their *sui generis* plant variety protection systems.

Biodiversity Database: There is an obvious need to establish a database for existing plant varieties in the developing world. The creation of some kind of (biodiversity) database may serve to mitigate the problem of misappropriation. By recording all plant varieties found in the sovereign domain of the state, patent offices or relevant authorities anywhere in the world could easily conduct searches to determine whether the patent-related invention to be protected was or was not derived from existing plant materials (prior art). More importantly, such a system will also need to collaborate closely with international organisations, such as the World Intellectual Property Organization, to promote the protection of agricultural traditional knowledge in the developing world worldwide.

Essentially Derived Varieties (EDVs): Another essential element to be considered in relation to the setting up of PVP framework is EDVs. Based on

the suggested regulatory reform of Thailand's PVP law, developing countries should take a different position from that of UPOV, which provides the breeders with rights for up to two generations of EDVs. While the definition of the suggested elements of EDVs is similar to that of UPOV, it additionally grants the rights over an EDV to the farmer or breeder (as the case may be) who derived it, and not to the breeder of the initial variety. Such provisions for the protection of EDVs are also important for the setting up of PVP in developing countries.

Disclosure of Origin: In formulating their sui generis PVP frameworks, developing countries may also adapt new plant variety rules from the UPOV, discussed above, to suit its own interests. This is to develop a disclosure of origin in the PVP law in order to act as passports or permits attached to the transfer of genetic resources. While such a domestic requirement alone will not stop the extraction of genetic resources to extra-territorial jurisdictions, it could restrict illegal acts domestically and encourage other countries to follow suits.

Mechanisms for Misleading Marketing and Harmful Technologies: One final area of essential PVP elements includes mechanisms for misleading marketing or labelling regarding the seeds and restriction of harmful technologies. Since these issues are directly relevant to the protection of farmers' rights, developing countries should adopt some measures to deal with such concerns. Thus, elements might include the restriction of potentially harmful technologies, and technologies contrary to the maintenance of public order.

In conclusion, it can be said that the regulatory reforms of the Thai PVP law and the proposed PVP elements for other developing countries, suggested *above*, caters to the needs of nations that prefer to promote agricultural innovation without threatening farmers' livelihood. The TRIPS Agreement grants members the flexibility to prioritise farmers when shaping a policy of plant variety protection. The proposed PVP regime, as well as the suggested elements in this thesis is unique in its ability to capitalise on the flexibility of TRIPS by combining international legal norms with specific regulatory rules

to address local concerns. This represents a fairly high level of compliance with the norms of international law, and also emphasises that rights are contoured to suit unique national conditions. Nowhere is such a balance more important than in agrarian third world countries where farmers generally belong to poorer classes of society.

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Annex I

Plant Variety Protection Act, B.E 2542 (1999)

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PLANT VARIETY PROTECTION ACT, B.E. 2542 (1999) BHUMIBOL ADULYADEJ, REX.

Given on the 14th Day of November B.E. 2542;
Being the 54th Year of the Present Reign.

His Majesty King Bhumibol Adulyadej is graciously pleased to proclaim that;
Whereas it is expedient to have the law on plant varieties protection;

Whereas this Act contains certain provisions relating to the restriction of rights
and liberties of the people, which section 29 in conjunction with section 48 and section
50 of the Constitution of the Kingdom of Thailand allow to be done by virtue of law;

Be it, therefore, enacted by the King, by and with the advice and consent of the
National Assembly, as follows:

Section 1. This Act shall be called the “Plant Varieties Protection Act, B.E.
2542 (1999)”.

Section 2. This Act shall come into force as from the day following the date
of its publication in the Government Gazette.

Section 3. In this Act,
“plant” means a living organism in the kingdoms of plants and shall include
mushroom and seaweed but exclude other micro-organisms;

“plant variety” means a plant grouping of similar or identical genetic and
botanical characteristics, with particular features which are uniform, stable and distinct
from other grouping in the same species of plant and shall include trees the propagation
of which is conducive to the plant grouping of the aforesaid features;

“local domestic plant variety” means a plant variety which exists only in a
particular locality within the Kingdom and has never been registered as a new plant
variety and which is registered as a local domestic plant variety under this Act;

“wild plant variety” means a plant variety which currently exists or used to exist in the natural habitat and has not been commonly cultivated;

“general domestic plant variety” means a plant variety originating or existing in the country and commonly exploited and shall include a plant variety which is not a new plant variety, a local domestic plant variety or a wild plant variety;

“genetic material” means the chemical material defining particular features of a living organism and capable of being a pattern for self-model and of passing to its next generation.

“genetic modification” means a process for the permanent combination of a genetic material originating from a living organism, be it a natural, induced or synthesized genetic material, with the initial genetic material of a given plant, thereby resulting in a characteristic unfound in its natural setting;

“genotype” means the overall genetic data defining the expression of characteristics of a living organism in conjunction with its environment;

“propagating material” means a plant or any part thereof capable of producing a new plant by an ordinary agricultural means;

“breeder” means a person who has bred or developed a variety and, as a consequence thereof, contained a new plant variety;

“locality” means a group of people residing and commonly inheriting and passing over culture continually and registered under this Act;

“Commission” means the “Plant Variety Protection Commission”;

“competent official” means a person appointed by the Minister for the execution of this Act;

“Director-General” means the Director-General of the Department of Agriculture;

“Minister” means the Minister having charge and control of the execution of this Act;

Section 4. The Minister of Agriculture and Cooperatives shall have charge and control of the execution of this Act and shall have the power to appoint competent officials, issue Ministerial Regulations prescribing fees not exceeding the rate attached hereto and prescribing other activities and issue Notifications for the execution of this Act.

The Ministerial Regulations and Notifications shall come into force upon its publication in the Government Gazette.

CHAPTER I

Plant Variety Protection Commission

Section 5. There shall be a Plant Variety Commission consisting of Permanent Secretary of the Ministry of Agriculture and Cooperatives as Chairman, Secretary-General of the Consumer Protection Board, Director-General of the Department of Internal Trade, Director-General of the Department of Intellectual Property, Director-General of the Department of Fisheries, Director-General of the Royal Forest Department, Director-General of the Department of Agriculture Extension, Director of the National Genetic Engineering and Biological Technology, Director of the Institute of Thai Traditional Medicine, Director of the Botanic Gardens Organisation, and twelve qualified members appointed by the Council of Ministers as members; provided that six must be appointed from farmers, one from academics in the field of plant variety breeding in educational institutions, one from academics in the field of natural resources conservation in educational institutions, two from representatives of non-governmental organisations not seeking profit whose activities are related to agriculture and natural resource conservation, and two from representatives of associations whose objects involve the breeding and propagation of plant varieties, as members and Director-General of the Department of Agriculture as member and secretary.

Qualified members who are farmers must have experience in the conservation, development or exploitation of plant varieties and shall be selected from the nomination made by agricultural groups, clubs, associations, farmers' groups or agricultural co-operatives of all regions, and there shall be at least one member from each region.

Qualified members from non-governmental organisations not seeking profit and whose activities are related to agriculture and natural resource conservation under paragraph one shall be selected from the nomination made by such non-governmental organisations.

The selection of qualified members shall be in accordance with the rules and procedures prescribed in the Ministerial Regulation.

Section 6. The Commission shall have the following powers and duties

(1) to submit recommendations to the Minister on the Issuance of Ministerial Regulations and Notifications under this Act;

(2) to consider and decide appeal against orders of the Director-General under section 25 and section 26;

(3) to give opinions or advice to the Minister with regard to the execution of this Act;

(4) to prescribe regulations with regard to the studies, experimentation, research, breeding or development of or into plant varieties from local domestic plant varieties, general domestic plant varieties and wild plant varieties or any part thereof;

(5) to prescribe regulations with regard to the management of the Plant Varieties Protection Fund;

(6) to lay down rules and procedures for giving special remuneration to State employees or officials who have bred new plant varieties for the agencies to which they are attached;

(7) to determine agencies or institutions to be authorised to examine and appraise biological and environmental safety impacts;

(8) to perform such other acts as prescribed by law to be under the responsibility of the Commission

Section 7. A qualified member shall hold office for a term of two years.

The outgoing qualified member may be re-appointed but may not serve for more than two consecutive terms.

Section 8. In addition to the vacation of office upon the expiration of the term under section 7, a qualified member vacates office upon:

(1) death;

(2) resignation;

(3) becoming a bankrupt;

(4) being an incompetent or a quasi-incompetent person;

(5) having been imprisoned by a final judgment to a term of imprisonment, except for an offence committed through negligence or a petty offence.

In the case where the qualified member vacates office before the expiration of term, the Council of Minister shall appoint other person to fill the vacancy, but if less than ninety days remain in the term of office of the qualified member, such appointment may be omitted. The person who is appointed to fill the vacancy shall be in office for the remaining term of the person he replaces.

Section 9. At a meeting of the Commission, the presence of not less than one-half of the total number of members is required to constitute a quorum.

If the Chairman is not present at the meeting or is unable to perform the duty, the members present shall elect one among themselves to preside over the meeting.

A decision of the meeting shall be by a majority of votes. Each member shall have one vote. In the case of an equality of votes, the presiding chairman shall have an additional vote as a casting vote.

In the case where a member is directly or indirectly interested in any particular matter, that member shall not attend the meeting.

Section 10. In the performance of duties under this Act, the Commission has the power to appoint a sub-committee for performing such act as entrusted by the Commission.

A sub-committee under paragraph one shall have the same powers and duties as those of the Commission in respect of the matter entrusted.

Section 10 shall apply *mutatis mutandis* to a meeting of a sub-committee.

CHAPTER II Plant Varieties

Section 11. A plant variety under this Act shall be of the following descriptions:

(1) being of uniformity in the particular features of the variety in respect of shape and appearance or in respect of other characteristics resulting from the expression of the genotype specific to such plant variety;

(2) being stable in the particular features of the variety which are capable of expressing such particular features in every cycle of the production of the propagating material of such plant;

(3) having the particular features distinct from other varieties in respect of shape or appearance, or having any characteristic resulting from the expression of the genotype distinct from other plant.

The description of a plant variety under (1) shall not apply to a wild plant variety.

CHAPTER III Protection of New Plant Varieties

Section 12. A plant variety capable of registration as a new plant variety under this Act shall be of the following descriptions:

(1) being a plant variety the propagating material of which has not been exploited, whether by means of sale or distribution in any manner whatsoever, in or outside the Kingdom by the breeder or with the breeder's consent for more than one year prior to the date of filing the application;

(2) being distinct from other plant varieties existing on the date of filing the application, provided that such distinctness is related to the feature beneficial to the cultivation, consumption, pharmacy, production or transformation, including the distinctness from the following plant varieties:

(a) plant varieties already registered and protected, whether in or outside the Kingdom, prior to the date of filing the application;

(b) plant varieties in respect of which application for registration has been made in the Kingdom and which will subsequently have been registered.

Section 13. No registration under this Act shall be made of a new plant variety having a severely adverse impact, directly or indirectly, on environment, health or public welfare.

A new plant variety derived from genetic modification may be registered as a new plant variety only upon a successful result of a safety appraisal with regard to environment, health or public welfare conducted by the Department of Agriculture or other agency or institution designated by the Commission, in accordance with the rules and procedures prescribed in the Ministerial Regulation.

Section 14. The Minister, with the approval of the Commission, may be publication in the Government Gazette designate any particular type of plant as a new plant to which protection is to be afforded and any particular type of plant as being important to national security.

Section 15. An applicant for registration of a new plant variety shall be a breeder with the following qualifications:

- (1) being of the Thai nationality or being a juristic person having a head office in Thailand;
- (2) being of the nationality of a country allowing Thai nationals or juristic persons having head offices in Thailand to apply for protection in that country;
- (3) being of the nationality of a country which is a party to an international convention or agreement on the protection of plant varieties to which Thailand is also a party;
- (4) having a domicile or carrying out real and effective industry or business in Thailand or in a country which is a party to an international convention or agreement on the protection of plant varieties to which Thailand is also a party.

Section 16. The right to apply for protection of a new plant variety the breeding of which was made by an employee or a contractor hired to work under a contract of employment or a contract of hire for the purpose of breeding a new plant variety shall vest in the employer or the hirer, as the case may be, unless otherwise provided in the contract. In this connection, in registering the new plant variety, the employer or the hirer must also possess the qualifications under (1), (2), (3) or (4) of section 15.

The right to apply for protection of a plant variety the breeding of which was made by a State official in the performance of official duties shall vest in the agency to which that official is attached.

If the employer, the hirer or the agency to which the State official is attached receives benefit from the breeding of the new plant variety, that employee, contractor or State official shall be rewarded special remuneration in addition to this normal wages or salaries, as the case may be.

The entitlement to the special remuneration under paragraph three shall be in accordance with the rules and procedure prescribed by the Commission.

Section 17. If several persons have jointly bred or developed a new plant variety, these persons shall have the right to apply for registration thereof jointly.

In the case where any joint breeder refuses to make a joint application for registration or cannot be contacted or does not meet the qualifications set forth in section 15, other joint breeder(s) may apply for registration of that new plant variety jointly bred in his or their own names.

The joint breeder who fails to join the application for registration may, at any time before the issuance of a certificate of registration of the new plant variety, submit an application for joining the former application. Upon receipt of the latter application, the competent official shall conduct an inquiry as to the applicant's eligibility therefor. For this purpose, the competent official shall notify the date of inquiry, and furnish a copy of the application to the applicants and the joining applicant.

In conducting the examination under paragraph three, the competent official may summon the applicants and the joining applicant to give statements or explanations or furnish documents or evidence for the purpose of consideration. The competent official shall, upon completion of the examination, submit his opinion to the Director-General. When the Director-General has made a decision, it shall be notified to the applicants and the joining applicant.

Section 18. In the case where several breeders have individually bred or developed a new and identical plant variety without having done so jointly, the person who first files an application for the protection of the new plant variety shall have the right of priority.

If the applications for registration of the new plant variety under paragraph one are filed on the same day, the applicants shall agree as to whether the rights thereto shall vest solely in one applicant or in several applicants jointly. If such an agreement cannot be reached within the time specified by the Director-General, the parties shall bring an action to the Court within ninety days as from the date of the expiration of the time specified by the Director-General. If no such action is brought to the Court within such time, those persons shall be deemed to have abandoned the applications for registration of the new plant variety.

Section 19. The application for registration of a new plant variety shall be in accordance with the rules and procedure prescribed in the Ministerial Regulation.

An application shall have the following particulars:

(1) The name of the new plant variety and particulars of essential features of the new plant variety;

(2) The name of the breeder participating in the breeding or developing the new plant variety;

(3) Details showing the origin of the new plant variety or the genetic material used in the breeding of the variety or in the development of the new plant variety, including its breeding process, provided details enabling clear comprehension of such process shall also be included;

(4) A statement that the propagating material of the new plant variety in respect of which the application for registration has been filed and the genetic material used in the breeding or in the development of the new plant variety under (3) will be furnished to the competent official for the purpose of examination thereof within the time specified by the competent official;

(5) A profit-sharing agreement in the case where a general domestic plant variety or a wild plant variety or any part thereof has been used in the breeding of the variety for a commercial purpose.

(6) Other items of particulars as prescribed in the Ministerial Regulation.

Section 20. The person who has filed an application for registration of a new plant variety outside the Kingdom may, if an application is filed for registration of that new plant variety in the Kingdom within one year as from the date of the first filing of the application outside the Kingdom, make a request for having the date of first filing of the application for registration of the new plant variety outside the Kingdom specified as the date of filing of the application for registration of the new plant variety in the Kingdom, provided that the country in which the first filing of the application has been made grants the similar right to Thai nationals and the applicant is of the nationality of such country.

The competent official may order the applicant under paragraph one to furnish a copy of the application for registration of the new plant variety filed in the foreign country together with its translation into Thai or other evidence within the time prescribed which shall not be less than ninety days.

Section 21. In considering an application for registration of a new plant variety, the competent official shall examine the following:

(1) examination of the compliance of the application with section 19;

(2) examination as to the plant variety's conformity with the description set out in section 11, its being of the descriptions specified in section 12, its freedom from prohibitions under section 13 paragraph one and its having the successful result of the appraisal under section 13 paragraph two.

Provided that this shall be in accordance with the rules and procedure prescribed in the Ministerial Regulation.

If there incurs any cost in the examination of that plant variety, the applicant for registration shall pay the actual cost to the competent official within sixty days as from the date of the receipt of the notification thereof by the competent official. In the case where the applicant fails to make payment within the specified time, the applicant shall be deemed to have abandoned the application.

Section 22. When the competent official has made an examination under section 21, the competent official shall prepare and submit an examination report to the Director-General.

When the Director-General has considered the examination report of the competent official under paragraph one and is of the opinion that the application for registration of the new plant variety is in compliance with section 19, the Director-General shall, within thirty days as from the date of the receipt of the report, make an order for the publication of such application at the actual expense of the applicant in accordance with the rules and procedure prescribed in the Ministerial Regulation.

Section 23. Any person who considers that he has a better right than the applicant for registration of a new plant variety or that the application for registration of a new plant variety is not in compliance with section 12, section 13, section 15 section 16 or section 20 may submit an objection to the competent official within ninety days as from the date of the publication under section 22.

Upon receipt of the objection under paragraph one, the competent official shall furnish a copy thereof to the applicant. The applicant shall submit a counter-objection within ninety days as from the date of the receipt of the copy. If the applicant fails to submit the counter-objection within such period of time, the application for registration of the new plant variety shall be deemed as having been abandoned.

The objection and counter-objection shall be accompanied by supporting documents.

Section 24. For the purpose of the consideration of the objection and counter-objection, the person addressing the objection and the person addressing the counter-objection may give additional evidence or statements, in accordance with the Regulation prescribed by the Director-General.

The Director-General shall have a decision on the objection and counter-objection under paragraph one within sixty days as from the date of the receipt thereof from the competent official.

Section 25. In the case where the Director-General gives a decision that the person addressing the objection has the better right than the applicant for registration of the new plant variety, the Director-General shall give an order rejecting the application for registration thereof. The applicant shall have the right to appeal to the Commission against the order of the Director-General within ninety days as from the date of the receipt of the notification of the Director-General's order.

In the case where the applicant fails to appeal against the order of the Director-General or has made an appeal but the Commission makes a decision affirming the decision of the Director-General, if the person addressing the objection files an application for registration of the new plant variety within one hundred and eighty days as from the date of the receipt of the notification of the Director's order or the Commission's decision, as the case may be, it shall be deemed that the person addressing the objection files the application for registration on the day the initial applicant has filed the application and it shall also be deemed that the publication of the application for registration of the new plant variety filed by the initial applicant is the publication of the application filed by the person addressing the objection.

Section 26. In the case where the Director-General gives a decision that the person addressing the objection has no right in the new plant variety in question, the Director-General shall reject such objection.

The person addressing the objection shall have the right to appeal to the Commission against the order of the Director-General within ninety days as from the date of the receipt of the notification of the Director-General's order.

The Commission shall have a decision on the appeal within ninety days as from the date of the receipt thereof.

Section 27. When the Commission has made a decision under section 25 or section 26, the applicant for registration of the new plant variety or the person addressing an objection thereto, as the case may be, shall, if dissatisfied with the decision of the Commission, have the right to bring an action before the Court within sixty days as from the date of the receipt of the notification of the decision. If no such action is brought within such period of time, the decision of the Commission shall be deemed final.

In the case where the Court gives a final order or judgment that the person addressing the objection duly has the right in the new plant variety, section 25 paragraph two shall apply *mutatis mutandis*.

Section 28. If it appears that the application for registration of the new plant variety is not in compliance with section 12, section 13, section 15, section 16, section 19 or section 20, the Director-General shall give an order rejecting the application and the competent official shall notify the order to the applicant and to the person addressing the objection in the case where such objection has been made under section 23.

If the rejection of the application for registration of the new plant variety occurs after the publication under section 22, the rejection order shall be published and section 22 shall apply *mutatis mutandis*.

Section 29. When the Director-General has thoroughly considered the examination report of the competent official and the registration process and finds no hindrance to the registration of the new plant variety, the Director-General shall give an order for the registration thereof.

The applicant shall pay the fee for the issuance of a certificate of registration of the new plant variety within sixty days as from the date of the receipt of the notification thereof. If the applicant fails to pay the fee within the specified time, it shall be deemed that the application is abandoned.

Upon payment by the applicant of the fee under paragraph two, the competent official shall effect the registration of the new plant variety and issue a certificate of registration thereof to the applicant within seven days as from the date of the receipt of the fee. If the applicant fails to make payment of the fee within the time specified, the application shall be deemed to have been abandoned.

Section 30. The Director-General shall publish in the Government Gazette new plant varieties registered under this Act.

Section 31. The certificate of registration of a new plant variety shall be valid for the following terms:

- (1) in respect of the plant which is capable of giving such fruits as expected of the specific features of the variety after the cultivation of its propagating material within the period of not over two years: twelve years;
- (2) in respect of the plant which is capable of giving such fruits as expected of the specific features of the variety after the cultivation of its propagating material within the period of over two years: seventeen years;

(3) in respect of the plant which is of tree-based utilisation and capable of giving fruits in accordance with the specific features of the variety after the cultivation of its propagating material within the period of over two years: twenty seven years.

The term of the certificate of registration of the new plant variety under paragraph one shall commence as from the date of filing the application.

Section 32. The person to whom a certificate of registration of a new plant variety is issued is the right holder of such new plant variety.

The right holder of the new plant variety may authorise any person to use his rights in his new plant variety or may assign such rights to other persons.

In the case where several persons are joint-right holders, the assignment of rights or the authorisation of the use of rights may be made only with the consent of all right holders.

The assignment of rights or the authorisation of the use of rights under paragraph two shall be made in writing and registered with the competent official in accordance with the rules, procedure and conditions prescribed in the Ministerial Regulation.

Section 33. The right holder of a new plant variety has the exclusive right to produce, sell or distribute in any manner, import, export or possess for the purpose of any of the said acts the propagating material of the new plant variety.

The provisions of paragraph one shall not apply to the following circumstances:

(1) the act relating to a protected new plant variety without an intention to use it as propagating material;

(2) the education, study, experiment or research relating to a protected new plant variety for the purpose of breeding or developing plant varieties;

(3) the act relating to a protected new plant variety committed in good faith;

(4) the cultivation or propagation by a farmer of a protected new plant variety from the propagating material made by himself, provided that in the case where the Minister, with the approval of the Commission, publishes that new plant variety as promoted plant variety, its cultivation or propagation by a farmer may be made in the quantity not exceeding three times the quantity obtained;

(5) the act relating to a protected new plant variety for non-commercial purpose;

(6) the sale or distribution by any means, importation or exportation of, or having in possession for the purpose of any of the aforesaid activities, the propagating material of the protected new plant variety which has been distributed by the right holder or with the right holder's consent.

Section 34. In a sale or distribution of the propagating material of a new plant variety, the right holder of the new plant variety shall display a mark on the propagating material of the new plant variety, its container or package.

The mark under paragraph one shall be in accordance with the form prescribed by the Director-General.

Section 35. The registration of the transfer of the rights in a new plant variety by way of inheritance shall be in accordance with the rules and procedure prescribed in the Ministerial Regulation.

Section 36. When necessity arises for the prevention of diseases, the promotion of health, the maintenance of public welfare, the preservation and conservation of environment and biological diversity or for other public interest, the Minister, with the approval of the Commission, has the power to issue a Notification prohibiting the production, sale, distribution in any manner, importation or exportation of new plant varieties for the period of time specified in the Notification.

For the purposes of the national security, the maintenance of nutritious stability, the prevention of monopoly or for the purpose of other public interests, the Minister, with the approval of the Commission, has the power to issue a Notification authorising general members of the public to do the acts specified in section 33 paragraph one, provided that appropriate remuneration shall be paid to the right holder of a new plant variety. Such notification shall also specify therein the term of the authorisation and the rates of remuneration.

If, after action has been taken under paragraph two, it appears that the circumstance under paragraph two cannot be effectively prevented or alleviated, the Minister, with the approval of the Commission, may revoke the certificate of registration of that new plant variety.

Section 37. Upon the expiration of three years as from the date of the registration of a new plant variety, other persons may file an application with the Director-General for authorisation of the use of the rights under section 33 paragraph one if it appears at the time of such application that there has been no sale of the propagating material of that new plant variety or the sale thereof has been made in the quantity insufficient for the need of the people within the Kingdom or at exorbitant prices unless the right holder can prove that the lack of sale or the sale in the quantity insufficient for the need of the people within the Kingdom or at exorbitant prices is caused by the circumstance beyond his control or that the new plant variety is a derivative intended to be utilised for the sole production of hybrid seeds provided that the hybrid seeds have been produced in such quantity sufficient to the need of the people within the Kingdom and sold at the prices which are not exorbitant.

The Director-General, with the approval of the Commission, has the power to authorise the use of the rights under section 33 paragraph one upon payment by the applicant of reasonable remuneration to the right holder of the new plant variety.

The application for the authorisation of the use of rights in the new plant variety and the determination of remuneration therefor shall be in accordance with the rules, procedure and conditions prescribed in the Ministerial Regulation.

Section 38. The Director-General, with the approval of the Commission, has the power to revoke a certificate of registration of a new plant variety in the following circumstances:

(1) such plant variety is not in conformity with the descriptions set forth in section 11 and section 12;

(2) the certificate of registration of the new plant variety has been issued inconsistently with section 13, section 15, section 16, section 17, section 19 and section 20;

(3) the particulars stated in the application for registration submitted to the competent official under section 19 are false.

In the case where there exist the circumstances under (1), (2) or (3), any person may invoke it or bring an action to the Court for an order revoking the certificate of registration of the new plant variety.

Section 39. The right holder of a new plant variety shall pay an annual fee at the rate and in accordance with the procedure prescribed in the Ministerial Regulation and shall make such payment within ninety days as from the date of the receipt of the certificate of registration of the new plant variety and within such period of every successive year.

Section 40. The right holder of a new plant variety shall, in the event of his failure to make payment of the annual fee under section 39, be liable to an additional fee in the amount equivalent to thirty percent of the annual fee in arrears.

If the right holder of a new plant variety fails to pay the annual fee and additional fee within ninety days as from the due date for the payment thereof under section 39, the

Director-General, with the approval of the Commission, shall have the power to revoke the certificate of registration of such new plant variety.

Section 41. An application for registration of a new plant variety, an objection to the registration of a new plant variety, a certificate of registration of a new plant variety, an application for registration of the licensing of rights under a certificate of registration of a new plant variety, an application for registration of the assignment of rights under a certificate of registration of a new plant variety, a substitute-certificate of registration of a new plant variety shall be subject to such fees as prescribed in the Ministerial Regulations.

Section 42. In the case where a certificate of registration of a new plant variety is lost or substantially damaged, the right holder of the new plant variety may apply for a substitute-certificate in accordance with the rules and procedure prescribed in the Ministerial Regulation.

CHAPTER IV **Protection of Local Domestic Plant Varieties**

Section 43. A plant variety capable of registration as a local domestic plant variety under this Act shall be of the following descriptions:

- (1) being a plant variety existing only in a particular locality within the Kingdom;
- (2) being a plant variety not registered as a new plant variety.

Section 44. A *sui juris* person, residing and commonly inheriting and passing over culture continually, who takes part in the conservation or development of the plant variety which is of the descriptions specified in section 43 may register as a community under this Act. For this purpose, there shall be appointed a representative who shall submit an application in writing to the *Changwad* Governor of the locality.

The application shall at least contain the following particulars:

- (1) the plant variety jointly conserved or developed and the method of its conservation or development;
- (2) the names of members of the community;
- (3) the landscape together with a concise map showing the boundary of the community and adjacent areas.

The submission of the application and the consideration and approval thereof shall be in accordance with the rules and procedure prescribed in the Ministerial Regulation.

Section 45. When a plant variety only exists in any particular locality and has been conserved or developed exclusively by a particular community, that community shall have the right to submit, to the local government organisation in whose jurisdiction such community falls, a request for initiating an application for registration of the local domestic plant variety in the name of such community.

Upon receipt of the request from the community under paragraph one, the local government organisation shall proceed to apply to the Commission for registration of the local domestic plant variety as from the day documents and information necessary for the registration have duly been obtained.

In the case where the community under paragraph one is formed as a farmers' group or co-operative under the law on co-operatives, such farmers' group or co-operative shall have the right to apply for registration of the local domestic plant variety on behalf of the community.

Section 46. The application for registration, the consideration of the application and the issuance of a certificate of registration of a local domestic plant variety shall be in accordance with the rules and procedure prescribed in the Ministerial Regulation.

Section 47. When registration has been made for the protection of a local domestic plant variety of any locality, that locality shall have the exclusive right to develop, study, conduct an experiment or research in, produce, sell, export or distribute by any means the propagating material thereof. For this purpose, the local government organisation, farmers' group or co-operative to which the certificate of registration of the local domestic plant variety has been granted shall be the right holder of such plant variety in the name of the said locality.

The provisions of paragraph one shall not apply to the following circumstances:

- (1) the act relating to a protected local domestic plant variety without an intention to use it as propagating material;
- (2) the act relating to a protected local domestic plant variety committed in good faith;
- (3) the cultivation or propagation by a farmer of a protected local domestic plant variety from the propagating material made by himself, provided that in the case where the Minister, with the approval of the Commission, publishes that local domestic plant variety as promoted plant variety, its cultivation or propagation by a farmer may be made in the quantity not exceeding three times the quantity obtained;
- (4) the act relating to a protected local domestic plant variety for non-commercial purpose.

Section 48. A person who collects, procures or gathers a local domestic plant variety or any part hereof for the purposes of variety development, education, experiment or research for commercial interest shall make a profit-sharing agreement in relation to the profits derived from the use of such local domestic plant variety.

In authorising any person to carry out the act under paragraph one and in making the profit-sharing agreement, the local government organisation, farmers' group or co-operative to which the certificate of registration of the local domestic plant variety is granted shall make the agreement in the name of the community, provided that approval of the Commission shall first be obtained.

Section 49. Twenty percent of the profits derived from authorising another person to use the rights in the local domestic plant variety shall be allocated to the persons who conserve or develop the plant variety, and sixty percent thereof to the community as its common revenue and twenty percent thereof to the local government organisation, the farmer's group or the co-operative that makes the agreement.

The profit-sharing among the persons who conserve or develop the plant variety shall be in accordance with the regulations prescribed by the Commission.

In the case of any dispute in connection with the allocation of profits under paragraph one, it shall be decided by the Commission.

Section 50. Section 31 shall apply *mutatis mutandis* to the term for which a certificate of registration of a local domestic plant variety is granted.

The term of the certificate of registration of a local domestic plant variety under paragraph one may be extended for each term of ten years if the Director-General considers that such plant variety is still of the descriptions specified in section 43 and such community is still of the description specified in section 44 and section 45.

The application for extension of the term of protection and the permission thereof shall be in accordance with the rules and procedure prescribed in the Ministerial Regulation.

Section 51. Section 36 and section 37 shall apply *mutatis mutandis* to a local domestic plant variety.

CHAPTER V

Protection of General Domestic Plant Varieties and Wild Plant Varieties

Section 52. A person who collects, procures or gathers general domestic plant varieties, wild plant varieties or any part of such plant varieties for the purposes of variety development, education, experiment or research for commercial interest shall obtain permission from the competent official and make a profit-sharing agreement under which the income accruing therefrom shall be remitted to the Plant Varieties Protection Fund in accordance with the rules, procedure and conditions prescribed in the Ministerial Regulation.

The profit-sharing agreement shall at least have the following particulars:

- (1) the purpose of the collection and gathering of the plant variety;
- (2) the amount or quantity of samples of the intended plant variety;
- (3) the obligations of the person to whom permission is granted;
- (4) the stipulation as to intellectual property rights in the products which result from the development, study, experiment or research of or into the plant variety and which are derived from the use of the plant variety under the agreement;
- (5) the stipulation as to the amount or rate of, or the term for, the profit-sharing under the profit-sharing agreement in respect of products derived from the use of the plant variety thereunder;
- (6) the term of the agreement
- (7) the revocation of the agreement;
- (8) the stipulation as to the dispute settlement procedure;
- (9) other items of particulars as prescribed in the Ministerial Regulations.

Section 53. A person who conducts a study, an experiment or research of or into a general domestic plant variety or a wild plant variety or any part thereof for a non-commercial purpose shall comply with the Regulation prescribed by the Commission.

CHAPTER VI

Plant Varieties Protection Fund

Section 54. There shall be established in the Ministry of Agriculture and Cooperatives a fund call the “Plant Varieties Protection Fund” to expended for the purpose of assisting and subsidising activities related to the plant varieties conservation, research and development, consisting of the following property:

- (1) income accruing from profit-sharing agreements under section 52;
- (2) money or property received from the registration of plant varieties;
- (3) subsidies from the Government;
- (4) donated money or property;
- (5) fruits or other benefits accruing from the Fund.

Money or other property under paragraph one shall be remitted to the Fund without having to remit the same as State revenue.

Section 55. The money in the Fund shall be expended for the following activities:

- (1) assisting and subsidising any activities of communities in connection with the conservation, research and development of plant varieties;
- (2) serving as expenses of local government organisations for the purposes of their subsidising the conservation, research and development of plant varieties of communities;
- (3) serving as expenses in the management of the Fund.

The management of the Fund and the control of the expenses therefrom shall be in accordance with the Regulation prescribed by the Commission with the approval of the Ministry of Finance.

Section 56. There shall be a Fund Committee consisting of Permanent Secretary of the Ministry of Agriculture and Co-operatives as the Chairman and not less than seven other members appointed by the Commission and the Director-General of the Department of Agriculture shall be the secretary and a member.

Section 57. The Fund Committee shall have the powers and duties as follows:

- (1) to propose to the Commission directions, rules, conditions for as well as priorities of the disposition of the money in the Fund within the objects specified in section 55;
- (2) to prescribe regulations in connection with rules and procedure for the allocation of, and the request for, grants or subsidies from the Fund;
- (3) to consider and allocate the money in the Fund as expenses within the objects specified in section 55, in accordance with the directions, rules, conditions and priorities determined by the Commission;
- (4) to consider and approve the request for the promotion and assistance under section 55;
- (5) to perform any other activities as entrusted by the Commission.

Section 58. Section 7 and section 8 shall apply to the term of office and the vacation of office of the Fund Committee *mutatis mutandis*.

Section 9 shall apply to a meeting of the Fund Committee *mutatis mutandis*

Section 59. The money forming the Plant Varieties Protection Fund and accruing from the exploitation of general domestic plant varieties under profit-sharing agreements under section 52 shall be allocated to the local government organisation which is the source of the exploitation of such general domestic plant varieties, in accordance with the rules, procedure and rate prescribed in the Ministerial Regulation.

Section 60. Within one hundred and twenty days as from the end of a calendar year, the Fund Committee shall present a balance-sheet and the statements showing the revenues and expenses in the Fund during the previous year to the Office of the Auditor-General for its inspection and audit and shall then present them to the Commission.

The Commission shall submit such balance-sheet and statements of revenues and expenses to the Minister and the Minister shall submit them to the Council of Ministers for information and publish them in the Government Gazette.

CHAPTER VII

Protection of Rights of Right Holders of Plant Varieties

Section 61. In the case where there is an infringement of the right of the right holder of a new plant variety or the right holder of a local domestic plant variety under section 33 or section 47, as the case may be, the Court has the power to order the person committing the infringement to pay the right holder such amount of compensation as the Court deems appropriate, having regard to the gravity of the damage and loss of benefits, as well as the costs necessary for the enforcement of rights of the right holder.

Section 62. All plant varieties or articles in possession of the person committing the act infringing the right of the right holder of a new plant variety or the

right holder of a local domestic plant variety under section 33 or section 47, as the case may be, shall be confiscated.

All articles confiscated by the Court shall vest in the State and shall be proceeded with by the Department of Agriculture in accordance with the regulations prescribed by the Director-General with the approval of the Commission.

CHAPTER VIII

Penalties

Section 63. Any competent official, having the responsibility in connection with registration of new plant varieties for protection thereof, unlawfully or without consent of the applicant for registration, uses or allows other persons to use or gives to other persons the propagating material of the new plant variety or the genetic material which has been presented to him as in the statement under section 19 (4) shall be liable to imprisonment for a term not exceeding two years or to a fine not exceeding four hundred thousand Bath or to both.

Section 64. Any person who commits any act under section 33 or section 47 without authorisation from the right holder of the plant variety shall be liable to imprisonment for a term not exceeding two years or to a fine not exceeding four hundred thousand Bath or to both.

Section 65. Any right holder of a new plant variety who fails to comply with section 34 shall be liable to imprisonment for a term not exceeding one month or to a fine not exceeding twenty thousand Bath or to both.

Section 66. Any person who fails to comply with section 48 or section 52 shall be liable to imprisonment for a term not exceeding two years or to a fine not exceeding four hundred thousand Bath or to both.

Section 67. Any person who forges or imitates a mark or does any act for the purpose of misleading other persons that a given plant variety is the protected plant variety under this Act shall be liable for imprisonment for a term of six months to five years and to a fine of twenty thousand to two hundred thousand Bath.

Section 68. Any person who, in applying for registration of a new plant variety or local domestic plant variety, gives false statement to the competent official with a view to obtaining a certificate of registration of the new plant variety or a certificate of registration of the local domestic plant variety, as the case may be, shall be liable to imprisonment for a term not exceeding two years or to a fine not exceeding four hundred thousand Bath or to both.

Section 69. In the case where the person who commits an offence punishable under this Act is a juristic person, the persons representing that juristic person shall also be liable to the penalty imposed by the law for such offence unless it is proved that the act of such juristic person has been committed without their knowledge or consent.

Countersigned by:

Chuan Leekpai
Prime Minister

Rate of Fees

- | | |
|---|----------------------|
| 1. An Application for Registration of a New Plant Variety | 1,000 Bath each |
| 2. An Application for an Objection to an Application for Registration of a New Plant Variety | 1,000 Bath each |
| 3. A Certificate of Registration of a New Plant Variety | 1,000 Bath each |
| 4. Annual Fee for the Protection of a New Plant Variety | 1,000 Bath per year. |
| 5. An Application for Registration of Authorisation of the Use of Rights under a Certificate of Registration of a New Plant Variety | 500 Bath each |
| 6. An Application for Registration of the Assignment of Rights under a Certificate of Registration of a New Plant Variety | 500 Bath each |
| 7. Substitute Certificate of Registration of a New Plant Variety | 500 Bath each |

Annex II

Timeline of Right to Food under International Law

- 1948 Universal Declaration of Human Rights (UDHR) recognizes the right to food for the first time (UDHR Article 25).
- 1966 International Covenant on Economic, Social and Cultural Rights (ICESCR) reiterates the UDHR with regards to the right to an adequate standard of living, including food, and specifically recognizes the right to be free from hunger (ICESCR Article 11).
- 1986 United Nations Declaration on the Right to Development also recognized the right to food in Article 8.
- 1993 Human Rights Congress in Vienna, establishment of the Office of the High Commissioner for Human Rights.
- 1993 International Food Security Treaty developed in United States and Canada to address food security.
- 1996 World Food Summit adopted the Rome Declaration on World Food Security.
- 1998 Conference on Consensus Strategy on the Right to Food held in United States
- 1999 General Comment No. 12 of the United Nations Committees on Economic, Social and Cultural Rights.
- 2000 Special Rapporteur on the Right to Food, Mr. Jean Ziegler was appointed
- 2001 As a response to the World Food Summit: Five Years Later in 2001, the Food and Agricultural Organization of the United Nations set up an intergovernmental working group for the drafting of voluntary guidelines to assist member states to achieve the progressive realization of the right to food.
- 2001 African Commission on Human and Peoples' Rights recognizes the right to food under the African Charter on Human and Peoples' Rights.
- 2002 Special Rapporteur on the Right to Food, country mission to Niger.
- 2003 Special Rapporteur on the Right to Food, country mission to Brazil.
- 2004 The Voluntary Guidelines to Support the Progressive Realization of the Right to Adequate Food in the Context of National Food Security.
- 2004 Special Rapporteur on the Right to Food, country mission to Bangladesh and Occupied Palestinian Territories.
- 2005 Special Rapporteur on the Right to Food, country mission to Ethiopia and Mongolia.
- 2006 Special Rapporteur on the Right to Food, country mission to Guatemala, India, Niger and Lebanon.
- 2007 Special Rapporteur on the Right to Food, country mission to Bolivia and Cuba.
- 2008 Special Rapporteur on the Right to Food, Mr Oliver De Schutter was appointed.
-

Annex III

Lists of Crops registered under Plant Variety Plant Act B.E.2542 of Thailand

Field Crops

Name of Field Crops	References
Rice	Plant Variety Protection Division
Soybean	Plant Variety Protection Division
Sugarcane	Plant Variety Protection Division
Maize	Plant Variety Protection Division
Cassava	Plant Variety Protection Division
Mug bean	Plant Variety Protection Division

Fruit Crops

Name of Fruit Crops	References
Mango	Plant Variety Protection Division
Jack Fruit	Plant Variety Protection Division
Pamelo	Plant Variety Protection Division
Durian	Plant Variety Protection Division
<i>Averrhoa Caramdoia</i>	Plant Variety Protection Division
Litchi	Plant Variety Protection Division
Logan	Plant Variety Protection Division
Papaya	Plant Variety Protection Division
Lime	Plant Variety Protection Division
<i>Annona Squamosa</i>	Plant Variety Protection Division
<i>Bousa species</i>	Plant Variety Protection Division
<i>Psidium Species</i>	Plant Variety Protection Division
<i>Muas species</i>	Plant Variety Protection Division
Citrus	Plant Variety Protection Division
Tamarind	Plant Variety Protection Division
Rambutan	Plant Variety Protection Division

Vegetables

Name of vegetables	References
Bitter Gourd	Plant Variety Protection Division
Chilli	Plant Variety Protection Division
Chinese Kale	Plant Variety Protection Division

Name of vegetables (Cont.)	References
Cucumber	Plant Variety Protection Division
Cucumis melo	Plant Variety Protection Division
Pak tsoi	Plant Variety Protection Division
Tomato	Plant Variety Protection Division
Water convolvulus	Plant Variety Protection Division
Water melon	Plant Variety Protection Division
Yard long bean	Plant Variety Protection Division

Woody trees and others

Name of trees varieties	References
<i>Eucalyptus</i> spp.	Plant Variety Protection Division
<i>Tectona grandis</i>	Plant Variety Protection Division
<i>Acacia auriculaeformis</i>	Plant Variety Protection Division
<i>Hevea brasiliensis</i>	Plant Variety Protection Division
Vetiver grass	Plant Variety Protection Division

Ornamentals

Name of Ornamentals	References
Crown of thorn	Plant Variety Protection Division
Nymphaeacea	Plant Variety Protection Division
<i>Plumeria</i> species	Plant Variety Protection Division
Euphobia	Plant Variety Protection Division
<i>Anthurium</i> spp. - <i>Ongan</i>	Plant Variety Protection Division
<i>Aglaonema</i> spp.	Plant Variety Protection Division
<i>Curcuma</i> spp.	Plant Variety Protection Division
<i>Caladium bicolor</i>	Plant Variety Protection Division
<i>Dendrobium</i> spp.	Plant Variety Protection Division
<i>Vanda</i> spp.	Plant Variety Protection Division
<i>Adenium</i>	Plant Variety Protection Division

Annex IV

Planted Area, Production, and Yield of Major Crops: 1997 – 2004

Crop	1997	1998	1999	2000	2001	2002	2003	2004	Annual Change%
Rice									
Area	10,2070	10,032	10,311	10,639	10,604	10,630	10,625	10,650	4.45
Production (' 000 tonnes)	23,580	22,998	24,171	25,844	28,034	27,992	29,474	28,538	27.78
Yield (kg/ha.)	2,381	2,419	2,425	2,612	2,769	2,900	2,900	2,856	18.39
Maize									
Area	1,397	1,441	1,235	1,248	1,930	1,171	1,111	1,126	-18.75
Production (' 000 tonnes)	3,832	4,617	4,286	4,462	4,466	4,230	4,178	4,216	-6.99
Yield (kg/ha.)	3,200	3,344	3,555	3,675	3,737	3,687	3,856	3,869	12.13
Cassava									
Area	1,265	1,071	1,152	1,185	1,107	996	1,030	1,081	-14.54
Production (' 000 tonnes)	18,084	15,591	16,507	19,064	18,396	16,868	19,718	21,440	18.55
Yield (kg/ha.)	14,700	14,925	15,494	16,856	17,531	17,069	19,294	20,275	37.92
Sugarcane									
Area	1,010	944	918	914	877	1,011	1,139	1,122	11.05
Production (' 000 tonnes)	56,393	43,465	50,332	45,052	49,563	60,103	74,259	64,996	15.25
Yield (kg/ha.)	55,825	46,062	54,856	59,162	56,512	59,350	65,181	59,310	3.77
Soybean									
Area	248	235	232	223	185	181	154	151	-44.28
Production (' 000 tonnes)	338	321	319	321	261	260	231	218	-39.27
Yield (kg/ha.)	1,431	1,462	1,419	1,450	1,475	1,487	1,537	1,487	5.77
Oil palm									
Area	177	205	215	230	243	263	288	302	85.23
Production (' 000 tonnes)	2,578	2,523	3,413	3,343	4,097	4,001	4,903	5,182	98.46
Yield (kg/ha.)	14,519	12,275	15,856	14,531	16,869	15,212	17,031	16,762	6.93
Coconut									
Area	317	314	314	325	326	274	260	254	-21.32
Production (' 000 tonnes)	2,064	2,005	2,110	1,400	1,396	1,877	1,957	1,848	-19.33
Yield (kg/ha.)	6,512	6,394	6,712	4,300	4,281	6,856	7,512	7,262	2.46
Durian									
Area	108	111	112	128	131	132	135	137	27.67
Production (' 000 tonnes)	916	464	781	970	885	962	737	829	-9.69
Yield (kg/ha.)	9,234	4,675	7,687	9,237	7,919	8,337	6,250	6,887	-26.58
Mangosteen									
Area	40	44	48	56	58	58	61	64	66.11
Production (' 000 tonnes)	170	144	161	168	197	245	204	235	58.78
Yield (kg/ha.)	7,618	5,944	6,100	5,619	5,865	6,500	5,194	5,487	-23.31
Pineapple									
Area	85	82	97	98	92	80	81	89	6.71
Production (' 000 tonnes)	2,083	1,786	2,392	2,248	2,078	1,739	1,899	2,101	5.73
Yield (kg/ha.)	24,600	21,819	24,425	23,019	22,612	21,881	23,331	23,606	-0.79
Para rubber									
Area	1,910	1,955	1,985	1,987	1,990	2,004	2,019	2,072	10.07
Production (' 000 tonnes)	2,169	2,663	2,215	2,378	2,561	2,632	2,861	3,008	41.75
Yield (kg/ha.)	1,406	1,394	1,425	1,562	1,681	1,694	1,787	1,812	31.81

Annex V

Planted Area, Production, and Yield of Minor Crops: 1997 – 2004

Crop	1997	1998	1999	2000	2001	2002	2003	2004	Annual Change%
Sorghum									
Area	108	98	89	92	86	74	52	52	-65.26
Production (' 000 tonnes)	156	146	142	148	145	132	96	93	-58.66
Yield (kg/ha.)	1,500	1,506	1,637	1,731	1,737	1,844	1,875	1,812	8.2
Mungbean									
Area	289	303	322	295	303	293	243	187	-40.84
Production (' 000 tonnes)	200	226	249	226	238	216	178	135	-37.2
Yield (kg/ha.)	731	781	812	806	806	794	769	756	6.14
Groundnut									
Area	86	89	90	85	69	72	47	41	-58.31
Production (' 000 tonnes)	126	135	138	132	107	112	76	65	-55.78
Yield (kg/ha.)	1,544	1,562	1,587	1,594	1,619	1,631	1,650	1,625	5.69
Sunflower									
Area	-	-	-	71	37	41	47	51	-27.7
Production (' 000 tonnes)	-	-	-	51	32	29	32	49	-3.92
Yield (kg/ha.)	-	-	-	737	887	769	706	1906	158.47
Sesame									
Area	91	62	62	63	63	64	64	64	3.10
Production (' 000 tonnes)	35	36	37	39	39	40	40	41	20.58
Yield (kg/ha.)	569	581	600	619	612	625	637	644	15.73
Castor bean									
Area	12	13	13	13	13	14	14	13	20.28
Production (' 000 tonnes)	6	7	7	9	9	10	10	10	66.66
Yield (kg/ha.)	519	556	569	656	669	706	712	737	45.67
Kenaf									
Area	67	30	19	18	33	24	21	17	-77.47
Production (' 000 tonnes)	95	47	30	29	56	41	33	25	-77.06
Yield (kg/ha.)	1,469	1,606	1,737	1,750	1,719	1,739	1,631	1,531	0.40
Cotton									
Area	37	30	26	26	45	11	8	11	-80.41
Production (' 000 tonnes)	51	40	35	36	61	14	11	14	-81.33
Yield (kg/ha.)	1,462	1,406	1,362	1,425	1,450	1,325	1,469	1,400	-4.27
Garlic									
Area	27	24	22	22	24	23	21	16	-42.69
Production (' 000 tonnes)	147	119	118	126	132	126	105	96	-34.69
Yield (kg/ha.)	5,462	5,087	5,456	5,794	5,581	5,725	5,037	6,181	13.15
Baby corn									
Area	-	-	-	25	30	37	34	39	59.09
Production (' 000 tonnes)	-	-	-	117	233	259	247	305	72.31
Yield (kg/ha.)	-	-	-	7,844	8,262	7,300	7,306	7,969	1.59
Shallot									
Area	16	15	16	17	17	16	17	18	14.14
Production (' 000 tonnes)	204	176	201	225	199	194	173	233	14.21
Yield (kg/ha.)	13,575	12,469	13,137	13,531	12,294	12,062	10,600	13,044	-3.91

**Planted Area, Production, and Yield of Minor Crops: 1997 – 2004
(Cont.)**

Crop	1997	1998	1999	2000	2001	2002	2003	2004	Annual Change%
Onion									
Area	4	4	4	4	3	3	2	3	-33.33
Production (' 000 tonnes)	112	92	78	90	78	69	38	89	-20.53
Yield (kg/ha.)	28,612	23,594	20,925	27,406	24,750	25,400	19,375	38,906	35.97
Chilli									
Area	22	23	23	23	23	23	24	24	6.47
Production (' 000 tonnes)	33	38	40	37	37	38	39	41	24.24
Yield (kg/ha.)	1,494	1,637	1,719	1,631	1,606	1,361	1,669	1,737	17.79
Tomato									
Area	10	9	11	11	11	11	8	8	-5.88
Production (' 000 tonnes)	165	175	219	236	240	280	176	180	-4.25
Yield (kg/ha.)	16,525	19,812	23,294	23,956	22,969	27,231	24,012	24,050	1.20
Potato									
Area	5	6	7	9	9	8	7	7	33.33
Production (' 000 tonnes)	90	93	90	100	91	97	87	100	11.11
Yield (kg/ha.)	17,125	16,690	12,350	13,075	12,870	12,069	13,006	14,319	-16.38
Banana									
Area	-	-	-	14	14	14	14	14	8.51
Production (' 000 tonnes)	-	-	-	174	234	226	217	218	25.28
Yield (kg/ha.)	-	-	-	17,369	19,150	19,487	18,556	16,619	-4.31
Rambutan									
Area	86	90	93	85	86	86	86	85	19.05
Production (' 000 tonnes)	276	643	569	645	649	631	610	564	-13.49
Yield (kg/ha.)	11,031	9,431	8,219	8,179	8,519	8,229	7,819	7,237	-34.42
Longan									
Area	-	-	-	91	101	127	167	146	59.89
Production (' 000 tonnes)	-	-	-	417	250	430	369	597	43.16
Yield (kg/ha.)	-	-	-	6,169	3,256	4,919	3,725	5,487	-11.04
Coffee Bean									
Area	71	71	75	76	78	78	76	74	4.72
Production (' 000 tonnes)	84	78	55	81	86	53	54	62	-26.19
Yield (kg/ha.)	1,244	1,194	831	1,200	1,244	762	762	869	-30.15
Pepper									
Area	2	2	2	3	5	4	4	4	83.33
Production (' 000 tonnes)	5	5	7	7	9	10	13	13	160
Yield (kg/ha.)	3,356	3,350	4,081	3,406	4,162	4,181	4,025	4,106	22.34
Tobacco									
Area	20	19	14	13	11	11	10	10	-45.45
Production (' 000 tonnes)	228	176	161	151	170	165	143	137	-38.28
Yield (kg/ha.)	11,681	9,481	11,700	11,650	15,856	14,731	13,962	14,269	13.13
Orchid									
Area	2,323	2,240	2,262	2,515	2,728	2,961	3,130	3,165	37.38
Production (' 000 tonnes)	26,825	25,200	29,575	33,890	37,602	40,852	43,247	43,932	64.90
Yield (kg/ha.)	11,562	11,250	13,075	13,475	13,787	13,800	13,819	13,881	20.05

Annex VI

Edible Plants in Limestone Areas in Thailand

No	Scientific Name	Common Name	Plant part used
1	<i>Amorphophallus paeoniifolius</i> (Denntts) Nicolson	Stanley's water-tub	Corm
2	<i>Acacia concinna</i> (Wild.) DC.	Shikakai	Apical, young leaf
3	<i>Acacia pennata</i> (L.) Wild ssp. <i>insuavis</i> (Lace) I.C. Nielsen	Cha-om	Young apical
4	<i>Aganonerion polymorhum</i> Pierre ex Spire	Som lom	Young apical
5	<i>Aganosma marginata</i> (Roxb.) G.Don	Mok khrua	Young apical
6	<i>Archidendron jiringa</i> (Jack) I.C.Nielsen	Djenkol bean	Seed
7	<i>Albizia lebbek</i> (L.) Benth.	East Indian walnut	Young apical
8	<i>Aeginetia indica</i> Roxb.	Ye gu	Flower
9	<i>Aeginetia pedunculata</i> Wall.	Dok din	Flower
10	<i>Arenga pinnata</i> (Wurmb) Merr.	Sugar Palm	Seed
11	<i>Atherolepis pierrie</i> Costa var. <i>glabra</i> Kerr	Op choei	Young fruit
12	<i>Ardisia fulva</i> King & Gamble var. <i>fulva</i>	Hua khwan	Young apical, young leaf
13	<i>Amaranthus caudatus</i> L.	Love-lies bleeding	Young apical, young leaf
14	<i>Amaranthus spinosus</i> L.	Spiny pigwood	Young apical, young leaf
15	<i>Amranthus tricolor</i> L.	Chinese amaranth	Young apical, young leaf
16	<i>Amaranthus viridis</i> L.	Slender amaranth	Young apical, young leaf
17	<i>Asparagus acerosus</i> Roxb.	Chan din	
18	<i>Asparagus racemosus</i> Wild.	Sam sib	Storage root
19	<i>Aegle marmelos</i> (L.) Correa ex Roxb.	Bael	Young apical, fruit
20	<i>Antidesma acidum</i> Retz.	Mao soi	Young apical, fruit
21	<i>Aseculus assamica</i> Griff.	Ma niang nam	Young fruit
22	<i>Bombax ceiba</i> L.	Cotton tree	Flower
23	<i>Basella rubra</i> L.	Pak plang	Young apical, young leaf
24	<i>Barringtonia acutangula</i> (L.) Gaertn.	Chik na	Young flower, young leaf
25	<i>Barringtonia asiatica</i> (L.) Kurz	Sea putat	Young flower, young leaf
26	<i>Bambusa</i> spp.	Bamboo	
27	<i>Bauhinia variegata</i> L.	Mountain ebony	Young apical, flower
28	<i>Baccaurea bracteata</i> Mull.Arg.	Ramai pa	Fruit
29	<i>Baccaurea ramiflora</i> Lour.	Mafai	Fruit
30	<i>Brassaiopsis ficifolia</i> Dunn	Tang duea	Young flower
31	<i>Cratoxylum formosum</i> (jack) Dyer	Tio khao	Young apical
32	<i>Castanopsis</i> spp.	Chinquapin	Seed
33	<i>Caesalpinia furfuracea</i> (Prain) Hattink	Nguam	Fruit
34	<i>Caesalpinia mimosoides</i> Lam	Cha rueat	Young apical
35	<i>Clausena exavata</i> Burm f.	Saen sok	Young apical, young leaf
36	<i>Clausena harmandiana</i> (Pierre) Pierre ex Guillaumin		Young, young leaf
37	<i>Clausena lansium</i> (Lour.) Skeels	Song fa dong	Fruit
38	<i>Careya sphaerica</i> Roxb.	Tummy-wood	Young apical, young leaf
39	<i>Curcuma aeruginosa</i> Roxb.	Wan mahamek	Young apical
40	<i>Curcuma parviflora</i> Wall.	Krachiao khao	Young apical
41	<i>Dimocarpus longan</i> Lour. Ssp. <i>longan</i> var. <i>longan</i>	Longan	Sarcocarp
42	<i>Dolichandrone serrulata</i> (DC.) Seem	Khae khao	Flower
43	<i>Dendrocalamus</i> spp.	Bamboo	Young apical, young leaf
44	<i>Dioscorea alata</i> L.	Water yam	Corm

Edible Plants in Limestone Areas in Thailand (Cont.)

No	Scientific Name	Common Name	Plant part used
45	<i>Dioscorea esculenta</i> (Lour.) Burkill	Yam	Corm
46	<i>Dioscorea hispida</i> Dennst. Var. <i>hispida</i>	Intoxicating yam	Corm
47	<i>Dioscorea pentaphylla</i> L.	Fiveleaf yam	Corm
48	<i>Emilia sonchifolia</i> (L.) DC.	Emilia	Young apical, young leaf
49	<i>Erythrina variegata</i> L.	Variegated coral tree	Young apical, young leaf
50	<i>Eryngium foetidum</i> L.	False coriander	Young apical, young leaf
51	<i>Fernandoa adenophylla</i> (Wall. ex G. Don) Steenis	Khae nang khang	Flower
52	<i>Ficus virens</i> Aiton var. <i>virens</i>	Phak lueat	Young apical, young leaf
53	<i>Flacourtia indica</i> (Burm.f.) Merr.	Ta khoppa	Fruit
54	<i>Flacourtia jangomas</i> (Lour.) Rausch	Ta khopkhwai	Fruit
55	<i>Flacourtia rukam</i> Zoll. & Moritzi	Rukam	Fruit
56	<i>Garcinia cowa</i> Roxb. ex DC.	Cha muang	Young apical, young leaf
57	<i>Hydnocarpus ilicifolia</i> King	Kra baoklak	Fruit
58	<i>Hydnocarpus wrayi</i> King	Chaulmoogra	Fruit
59	<i>Hypoxis aurea</i> Lour.	Ya dok kham	Fruit
60	<i>Houttuynia cordata</i> Thunb.	Phak khao tong	Young apical, young leaf, root
61	<i>Hydrocotyle siamica</i> Craib	Phak nok	Young apical, young leaf
62	<i>Irvingia malayana</i> Oliv. ex A. W. Benn.	Krabok	Seed
63	<i>Kaempferia galangal</i> L.	Galanga	Young apical
64	<i>Kaempferia rotunda</i> L.	Wan hao non	Young apical
65	<i>Kaempferia parviflora</i> Wall. ex Baker	Krachai dam	
66	<i>Lasia spinosa</i> (L.) Thwaites	Livid Flower	Young apical, young leaf
67	<i>Melientha suavis</i> Pierre	Phak wan	Young apical, young leaf
68	<i>Millettia brandisiana</i> Kurz	Kra phi chan	Young apical, young leaf
69	<i>Millettia leucantha</i> Kurz var. <i>leucantha</i>	Kra cho	Young leaf, fruit
70	<i>Morus alba</i> L.	Mulberry tree	Young leaf. Fruit
71	<i>Morus macroura</i> Miq.	Mon laung	Young apical, young seed
72	<i>Oroxylum indicum</i> (L.) Kurz	Damocles Tree	Young apical, young leaf
73	<i>Paederia linearis</i> Hook. f.	Tot mu totma	Seed
74	<i>Phoenix humilis</i> Royle	Peng doi	Fruit
75	<i>Phyllanthus emblica</i> L.	Malacca Tree	Petal
76	<i>Rhododendron lyi</i> H. Lev.	Dok sam si	Petal
77	<i>Rhododendron arboretum</i> Sm ssp. <i>delavayi</i> (Franch.) Chamb.	Kham daeng	Petal
78	<i>Radermachera ignea</i> (Kurz) Steenis	Tree Jasmine	Flower
79	<i>Siphonodon celastrius</i> Griff.	Maduk	Fruit
80	<i>Syzygium gratum</i> (Wight) S.N. Mitra	Samet chun	Young apical, young leaf
81	<i>Schleichera oleosa</i> (Lour.) Oken	Ceylon oak	Fruit
82	<i>Sauropus androgynous</i> (L.) Merr.	Phak wan pa	Young apical, young leaf
83	<i>Sarcostemma secamone</i> (L.) Bennet	Chamuk pla lot	Young apical, young leaf, flower
84	<i>Spondias pinnata</i> (L.f.) Kurz	Makok	Young apical, young leaf, fruit
85	<i>Saraca indica</i> L.	Asoka Tree	Young apical, young leaf
86	<i>Saraca thaipingensis</i> Cantley ex Prain	Yellow Saraca	Young apical, young leaf
87	<i>Syzygium cumini</i> (L.) Skeels	Jambolan Plum	Fruit, Young leaf
88	<i>Toddalia asiatica</i> (L.) Lam	Khrua ngu hao	Young apical, young leaf
89	<i>Tiliacora triandra</i> (Colebr.) Diels	Thao yanang	Young apical
90	<i>Trachycarpus oreophilus</i> Gibbons & Spanner	Kho doi	Young apical

Edible Plants in Limestone Areas in Thailand (Cont.)

No	Scientific Name	Common Name	Plant part used
91	<i>Tetrastigma quadrangulatum</i> Gagnep. & Craib	A ngun pa	Fruit
92	<i>Trevesia palmate</i> (Roxb. ex Lindl.) Vis.	Tang luang	
93	<i>Telosma minor</i> Craib	Cowslip Creeper	
94	<i>Vitex glabrata</i> R.Br.	Khai nao	Fruit
95	<i>Xantolis siamensis</i> (H.R. Fletcher)	Fern tree	Fruit
96	<i>Zanthoxylum limonella</i> (Dennst.) Alston	Kamchat ton	Seed coat
97	<i>Ziziphus oenoplia</i> (L.) Mill. var.	Lep yiao	Fruit

Annex VII

List of Some Economic Wild Fruit Tree Species and Their Distributions in 47 National Parks in Thailand

Location of National Parks in Thailand	Wild Fruit Tree Species		
	<i>Mangifera</i> sp.	<i>Garcinia</i> sp.	<i>Nephelium</i> sp.
Northern	<i>M calneura</i>	<i>G. coronaria</i>	<i>N. hypoleucum</i>
	<i>M indica</i>	<i>G. cowa</i>	<i>N. maingayi</i>
	<i>M latifolia</i>	<i>G. hombroniana</i>	
	<i>M pentandra</i>	<i>G. merguensis</i>	
	<i>M sylvatica</i>	<i>G. rostrata</i>	
		<i>G. sootepensis</i>	
	<i>G. speciosa</i>		
	<i>G. xanthochymus</i>		
Central/Western/Eastern	<i>M Caloneura</i>	<i>G. cow</i>	<i>N. foramosana</i>
	<i>M indica</i>	<i>G. speciosa</i>	<i>N. hypoleucum</i>
	<i>M latifolia</i>	<i>G. hanbury</i>	<i>N. appaceum</i>
	<i>M pentrandra</i>	<i>G. turgida</i>	<i>N. melliferum</i>
		<i>G. collinsae</i>	<i>N. maingayi</i>
		<i>G. ostata</i>	<i>N. hypoleucum</i>
		<i>G. mangostana</i>	
		<i>G. speciosa</i>	
		<i>G. hanbury</i>	
		<i>G. dulcis</i>	
Northeastern	<i>M caloneura</i>	<i>G. cowa</i>	<i>N. hypoleucum</i>
	<i>M latifolia</i>	<i>G. speciosa</i>	
	<i>M longipetiolata</i>		
Southern	<i>M foetida</i>	<i>G. costata</i>	<i>N. hypoleucum</i>
	<i>M caloneura</i>	<i>G. cowa</i>	<i>N. lappaceum</i>
	<i>M oetida</i>	<i>G. hombroniana</i>	
	<i>M indica</i>	<i>G. merguensis</i>	
	<i>M longipertiolata</i>	<i>G. obtusifolia</i>	
	<i>M. sylvatica</i>	<i>G. speciosa</i>	
	<i>G. tubifera</i>		

Annex VIII

List of Interviewees

	Name of Interviewees	Affiliations	Reasons for Interview	Date of Interview
1	Mr Chirasak Kiratikunakon	Officer at Plant Variety Protection Division, Thailand	Government official who is directly dealt with plant variety protection issues	October, 2011
2	Government officials at Plant Variety Protection Division, Thailand	Plant Variety Protection Division of Thailand	Research and information gathering on plant variety protection issues governed by Plant Variety Protection Division	October, 2011
3	Government officials at Department of Agriculture, Thailand	Department of Agriculture of Thailand	Research and information gathering on plant variety protection issues led by Department of Agriculture	October, 2011
4	Ms Natthanicha Lertphilibert	Legal Officer, Office of the Council of the State, Thailand	Legal issues and matters relating to Plant Variety Protection Act led by Ms Lertphilibert	May, 2012
5	Mr Siri Lertthammatavee	Deputy-Secretary at the Secretariat of the Cabinet, Thailand	Legal issues and matters concerning plant variety protection law led by Mr Lertthammatavee	May, 2012
6	Dr Jakkrit Kuanpoth	Senior Lecturer in the faculty of law at University of Wollongong, Australia	He was a member of PVP Bill drafting committee in 1997.	-
7	Dr Somsak Jeamteerasakul	Assistant Professor at Thammasat University, Thailand	Prominent NGO activist working on communities' rights in Thailand	-
8	Dr Tanit Changtavorn	Members of Plant Variety Protection Commission	The proposal for reform of PVP Act was also led by Dr Tanit Changtavorn	May, 2012
9	Mr Khemthong Tonsakulrungruang	Lecturer in the faculty of law at Chulalongkorn University, Thailand	Academic who is working on communities' rights in Thailand.	May, 2012

Annex IX

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BILL

TO

Amend the Plant Variety Protection Act B.E.2542 (1999) to make consequential amendments to the Act.

Be it, therefore, enacted the King, by and with the advice and consent of the National Assembly, in this present Parliament assembled, and by the authority of the same, as follows: –

1 Amendments to the Plant Variety Protection Act B.E.2542 (1999)

- (1) The Plant Variety Protection Act B.E.2542 (1999) is amended as follows.
- (2) In section 3, after the definition of “plant variety” leave out the definition of “local domestic plant variety”.
- (3) In section 6 (powers and duties of Plant Variety Protection Commission) after subsection (4) “to prescribe regulations with regard to the studies, experimentation, research, breeding or development of or into plant varieties from” leave out “local domestic plant varieties”
- (4) After section 6 insert –

“Section 6bis. The Commission shall have additional duties and authorities:

- (1) To set development-related agenda and relevant policies on a regular basis;
 - (2) To establish working groups, standing or ad-hoc committees on matter under subsection (1);
 - (3) To oversee and assist with technical support and other development-related issues;
 - (4) To regulatory monitor compliance with the aforementioned development assistance policies;
 - (5) To institute and supervise plant-related activities, including those of Plant Variety Protection Department;
 - (6) Other relevant authorities as prescribed in the Ministerial Regulation.
- (5) Section 11 is amended as follows.

“A plant variety under this Act shall be distinct, uniform, and stable.

- (1) The variety shall be deemed to be distinct if it is clearly distinguishable from any other variety whose existence is a matter of common knowledge.
- (2) The variety shall be deemed to be uniform if, subject to the variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics.
- (3) The variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle.

The description of a plant variety under (2) shall not apply to a wild plant variety”.

- (6) Section 12 is amended as follows.

“A plant variety capable of registration as a new plant variety under this Act shall be of the following descriptions:

- (1) being a plant variety the propagating material of which has not been sold or otherwise disposed of to others, by or with the consent of the breeder, for the purpose of exploitation of the variety for more than one year prior to the date of filing the application;
- (2) being distinct from other plant varieties provided that such distinctness is a matter of common knowledge at the time of filing the application.
- (3) being of uniformity in the particular features of the variety in respect of shape and appearance or in respect of other characteristics resulting from the expression of the genotype specific to such plant variety;
- (4) being of stable in the particular features of the variety which are capable of expressing such particular features in every cycle of the production of the propagating material of such plant”.

- (7) Section 31 (duration of protection) is amended as follows.

“The certificate of registration of a new plant variety shall be valid for the following terms:

- (1) In respect of the plant which is capable of giving such fruits as expected of the specific features of the variety after the cultivation of its propagating material within the period of not over two years: fifteen years;
- (2) In respect of the plant which is capable of giving such fruits as expected of the specific features of the variety after the cultivation of its propagating material within the period of over two years: twenty years;
- (3) In respect of the plant which is of vine-based utilisation and capable of giving fruits in accordance with the specific features

of the variety after cultivation of its propagating material within the period of over two years: twenty five years;

- (4) In respect of the plant which is of tree-based utilisation and capable of giving fruits in accordance with the specific features of the variety after the cultivation of its propagating material within the period of over two years: twenty five years.

The term of the certificate of registration of the new plant variety under paragraph one shall commence as from the date of filing the application”.

- (8) After section 31 (durations of protection) insert –

“**Section 31bis.** In case where the issue of certificate under Section 31 is delayed due to the failure of the relevant authorities to issue a certificate after the actual filing date of the application in the Kingdom, it is possible to obtain an extension. Reasons for extension may include:

- (1) Delayed response to an application for plant variety rights;
- (2) Application being considered for more than 3 years;
- (3) Delay due to a secrecy order or appeal; and
- (4) Other reasons as prescribed in Ministerial Regulation”.

- (9) Section 33 is amended as follows.

Subject to Sections 37, the following acts in respect of the propagating material of the protected variety shall require the authorisation of the breeder:

- (1) production or reproduction (multiplication),
- (2) conditioning for the purpose of propagation,
- (3) offering for sale,
- (4) selling or other marketing,
- (5) exporting,
- (6) importing,
- (7) stocking for any of the purposes mentioned in (1) to (4), above.

The breeder may make his authorisation subject to conditions and limitations.

The acts referred to in sub-sections (1) to (7) of paragraph one in respect of harvested material, including entire plants and parts of plants, obtained through the unauthorised use of propagating material of the protected variety shall require the authorisation of the breeder, unless the breeder has had reasonable opportunity to exercise his right in relation to the said propagating material.

The acts referred to in sub-sections (1) to (7) of paragraph one in respect of products made directly from harvested material of the protected variety falling within the provisions of paragraph two through the unauthorised use of the said harvested material shall require the authorisation of the breeder, unless the breeder has had reasonable opportunity to exercise his right in relation to the said harvested material.

Acts other than those referred to in sub-sections (1) to (7) of paragraph one shall also require the authorisation of the breeder.

(10) After section 33 (scope of breeders' rights) insert –

“Section 33bis. The provisions of Section 33 shall not apply in relation to:

- (1) varieties which are essentially derived from the protected variety, where the protected variety is not itself an essentially derived variety;
- (2) varieties which are not clearly distinguishable in accordance with Section 11 from the protected
- (3) varieties whose production requires the repeated use of the protected variety. However, authorisation shall be required where the repeated use of such variety is sought for commercial production of a newly-developed variety.

For the purpose of paragraph one, a variety shall be deemed to be essentially derived from another variety (“initial variety”) when (i) it is predominately derived from the initial variety, or from a variety that is itself predominately derived from the initial variety, while retaining the expression of the essential characteristics that result from the genotype or combination of genotypes of the initial variety; (ii) it is clearly distinguishable from the initial variety and (iii) except for the differences which result from the act of derivation, it conforms to the initial variety in the expression of the essential characteristics that result from the genotype or combination of genotypes of the initial variety.

Essentially derived varieties may be obtained for example by the selection of a natural or induced mutant, or of a somaclonal variant, the selection of a variant individual from plants of the initial variety, backcrossing, or transformation by genetic engineering.

Essentially derived varieties may be registered under this Act provided that such varieties are accompanied by the required documentation.

Section 31(1) shall apply *mutatis mutandis* to a certificate of registration of essentially derived varieties”.

“Section 33ter. The provisions of Section 33 shall not apply to the following circumstances:

- (1) the act relating to a protected new plant variety without an intention to use it as propagating material;
- (2) the education, study, experiment or research relating to a protected new plant variety for the purpose of breeding or developing plant varieties;
- (3) the act relating to a protected new plant variety committed in good faith;
- (4) the cultivation or propagation by a farmer of a protected new plant variety from the propagating material made by himself, provided that in the case where the Minister, with the approval of the

Commission, publishes that new plant variety as promoted plant variety, its cultivation or propagation by a farmer may be made in the quantity not exceeding three times the quantity obtained;

(5) the act relating to a protected new plant variety for non-commercial purpose; and

(6) the sale or distribution by any means, importation or exportation of, or having in possession for the purpose of any of the aforesaid activities, the propagating material of the protected new plant variety which has been distributed by the right holder or with the right holder's consent".

- (11) Section 37 is amended as follows.

"At any time after the expiration of three years from the date of the registration of a new plant variety, any person may apply for a licence if the reasonable requirements of the public for seed or other propagating material of the variety have not been satisfied or that the seed or other propagating material of the variety is not available to the public at a reasonable price.

The Director-General, with the approval of the Commission, has the power to authorise the use of the rights under paragraph one".

- (12) After section 37 (compulsory licensing) insert –

"Section 37bis. Where a compulsory licensing is granted under Section 37, the right holder of protected plant variety shall be entitled to remuneration".

"Section 37ter. In an application for a licence made under Section 37, the applicant shall set forth the amount of remuneration, the conditions for the exploitation of the protected variety and the restrictions on the rights of the right holder and a request for a licence".

"Section 37quater. Where it is decided by the Director-General that a licence shall be granted to the applicant under Section 37, the Director-General shall set forth the royalty and the conditions for the exploitation of the protected variety and the restrictions on the rights of the right holder. If no agreement has been reached by the parties within the period prescribed by the Director-General, the Director-General shall fix the royalty and prescribed the conditions and restrictions as he deems appropriate subject to the following requirements:

(1) the scope and duration of the licence shall not be more than necessary under the circumstances;

(2) the right holder of protected variety shall be entitled to further licence others;

(3) the licence shall not be entitled to assign the licence to others, except with that part of the enterprise or goodwill particularly of the part under the licence;

(4) the licensing shall be aimed predominately for the supply of the domestic market;

(5) the remuneration fixed shall be adequate for the circumstances of the case.

The decision of the Director-General made under the first paragraph of the Section is appealable to the Commission within sixty days from the date on which such decision is received.

The issuance of a licensing certificate shall comply with the form, rules and procedures prescribed in the Ministerial Regulations”.

(13) Leave out Chapter IV (Protection of Local Domestic Plant Varieties) (Sections 43 – 51).

(14) After section 52 (protection of general domestic plant varieties and wild plant varieties) insert –

“Section 52bis. All general domestic plant varieties or wild plant varieties shall be registered and listed in a database under this Act.

A request for registration under paragraph one of this Section shall be submitted to the Department of Plant Variety Protection with the rules and procedures prescribed in the Ministerial Regulation”.

“Section 52ter. Any person who collect, procures or gather general domestic plant varieties, wild plant varieties, or any part of such plant varieties may be exempted from the permit licence requirement under Section 52.

Rules and procedure to determine exception to the licence under paragraph one shall be made in line with individuals’ income level and shall comply with the rules and procedures prescribed in the Ministerial Regulation”.

(15) After section 55 (Plant Variety Protection Fund) insert –

“Section 55bis. Non-governmental organisations or local government bodies may apply for benefit-sharing rewards through the Plant Variety Protection Fund under Sections 54 and 55 on farmers’ behalf in accordance with rules and procedure as prescribed in the Ministerial Regulation”.

(16) In section 66 after “any person who fails to comply with” leave out “section 48”.

(17) In section 61 after “In the case where there is an infringement of the right of the right holder of a new plant variety” leave out “or the right holder of a local domestic plant variety”; after “under Section 33” leave out “or Section 47, as the case may be”.

(18) In section 62 after “the act infringing the right of the right holder of a new plant variety” leave out “or the right holder of a local domestic

plant variety”; and after “under Section 33” leave out “or Section 47, as the case may be”.

(19) In section 64 after “any person who commits any act under Section 33” leave out “or Section 47”.

(20) Section 66 is amended as follows.

“Subject to Section 52*bis*, any person who fails to comply with Section 52 shall be liable to imprisonment for a term not exceeding two years or to a fine not exceeding four hundred thousand Baht or to both”.

(21) In section 68 after “registration of a new plant variety or” leave out “local domestic plant variety”.

2 Department of Plant Variety Protection of Thailand

The Plant Variety Protection Division shall be replaced by the Department of Plant Variety Protection. The responsibilities and authorities of the Department shall be provided in the Royal Decree.

3 Short title and commencement

(1) This Act may be cited as the Plant Variety Protection (Amendment) Act (Issue No...) Year...

(2) This Act shall come into force as from the day following the date of its publication in the Government Gazette.

Annex X

Comparison of the current PVP Act and PVP (Amendment) Act

Plant Variety Protection Act B.E.2542 (AD1999)	Plant Variety Protection Act (Issue No...) Year ...	Remarks
<p>Plant Variety Protection Act B.E.2542 (AD1999)</p> <p>..... Bhumibol Adulyadej, Rex. Given on the 14th Day of November B.E.2542 Being the 54th Year of the Present Reign</p> <p>His Majesty King Bhumibol Adulyadej is graciously pleased to proclaim that:</p> <p>Whereas it is expedient to have the law on plant variety protection;</p> <p>Whereas this Act contains certain provisions relating to the restriction of rights and liberties of the people, which section 29 in conjunction with section 48 and section 50 of the Constitution of the Kingdom of Thailand allow to be done by virtue of law;</p> <p>Be it, therefore, enacted by the King, by and with the advice and consent of the National Assembly, as follows:</p>	<p><i>Plant Variety Protection Act (Issue No...) Year...</i></p> <p>..... Bhumibol Adulyadej, Rex. Given on..... Being..... Year of the Present Reign</p> <p>His Majesty King Bhumibol Adulyadej is graciously pleased to proclaim that:</p> <p>Whereas it is expedient to have the law on plant variety protection;</p> <p>Whereas this Act contains certain provisions relating to the restriction of rights and liberties of the people, which section 29 in conjunction with section 48 and section 50 of the Constitution of the Kingdom of Thailand allow to be done by virtue of law;</p> <p>Be it, therefore, enacted by the King, by and with the advice and consent of the National Assembly, as follows:</p>	
<p>Section 1. This Act shall be called the “Plant Variety Protection Act, B.E.2542 (1999)”.</p>	<p><i>Section 1 This Act shall be called the “Plant Variety Protection Act (Issue No...) Year...</i></p>	
<p>Section 2. This Act shall come into force as from the day following the date of its publication in the Government Gazette.</p>	<p>Section 2. This Act shall come into force as from the day following the date of its publication in the Government Gazette.</p>	
<p>Section 3. In this Act, “plant” means a living organism in the kingdoms of plants and shall include mushroom and seaweed but exclude other micro-organisms;</p> <p>“plant variety” means a plant grouping of similar or identical genetic and botanical characteristics, with particular features which are uniform, stable and distinct from other grouping in the same species of plant and shall include trees the propagation of which is conducive to the plant grouping of the aforesaid features;</p> <p>“local domestic plant variety” means a plant variety which exists only in a particular locality within the Kingdom and has never been registered as a new plant variety and which is registered as a local domestic plant variety under this Act;</p> <p>“wild plant variety” means a plant variety which currently exists or used to exist in the natural habitat and has not been commonly cultivated;</p> <p>“general domestic plant variety” means a plant variety originating or existing in the country and commonly exploited and shall include a plant variety which is not a new plant variety, local domestic plant or a wild plant variety;</p> <p>.....</p>	<p><i>In section 3, after the definition of “plant variety” leave out the definition of “local domestic plant variety”</i></p>	<p>No local domestic plant variety exists in Thailand</p>

.....		
Chapter I Plant Variety Protection Commission	Chapter I Plant Variety Protection Commission	
<p>Section 6. The Commission shall have the following powers and duties:</p> <p>(1) to submit recommendations to the Minister or the issuance of Ministerial Regulations and Notifications under this Act,</p> <p>(2) to consider and decide appeals against orders of the Director-General under Section 25 and Section 26;</p> <p>(3) to give opinions or advice to the Minister with regard to the execution of this Act;</p> <p>(4) to prescribe regulations with regard to the studies, experimentation, research, breeding or development of or into plant varieties from local domestic plant varieties, general domestic plant varieties and wild plant varieties or any part thereof;</p> <p>(5) to prescribe regulations with regard to the management of the Plant Variety Protection Fund;</p> <p>(6) to lay down rules and procedures for giving special remuneration to State employee or officials who have bred new plant varieties for the agencies to which they are attached;</p> <p>(7) to determine agencies or institutions to be authorised to examine and appraise biological and environmental safety impacts;</p> <p>(8) to perform such other acts as prescribed by law to be under the responsibility of the Commission.</p>	<p><i>In subsection (4) of Section 6 (powers and duties of the Commission) after “to prescribe regulations with regard to the studies, experimentation, research, breeding or development of or into plant varieties from” leave out “local domestic plant varieties”</i></p>	
	<p><i>After Section 6 (powers and duties of the Commission) insert –</i></p> <p>Section 6bis. <i>The Commission shall have additional duties and authorities as follows:</i></p> <p><i>(1) To set development-related agenda and relevant policies on a regular basis;</i></p> <p><i>(2) To establish working groups, standing or ad-hoc committees on matters under (1);</i></p> <p><i>(3) To oversee and assist with technical support and other development-related issues;</i></p> <p><i>(4) To monitor compliance with the aforementioned development assistance policies;</i></p> <p><i>(5) To institute and supervise plant-related activities, including those of Plant Variety Protection Department;</i></p> <p><i>(6) Other relevant authorities as prescribed in the Ministerial Regulation.</i></p>	<p>To expand the duties and authorities of the Commission, thus strengthening the organisational apparatus governing the area of plant variety protection in Thailand.</p>
Chapter II Plant Varieties	Chapter II Plant Varieties	
<p>Section 11. A plant variety under this Act shall be of the following descriptions:</p> <p>(1) being of uniformity in the particular features of the variety in respect of shape and appearance or in respect of other characteristics resulting from the expression of the genotype specific to such plant variety;</p> <p>(2) being stable in the particular features of the variety which are capable of expressing such</p>	<p><i>Section 11 is amended as follows.</i></p> <p><i>“A plant variety under this Act shall be distinct, uniform, and stable.</i></p> <p><i>(1) The variety shall be deemed to be distinct if it is clearly distinguishable from any other variety whose existence is a matter of common knowledge.</i></p> <p><i>(2) The variety shall be deemed to be uniform if,</i></p>	<p>To amend rules for registration similar to those of the 1991 UPOV Convention, but which develop existing flexibilities in the UPOV model</p>

<p>particular features in every cycle of the production of the propagating material of such plant.</p>	<p><i>subject to the variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics.</i></p> <p><i>(3) The variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle.</i></p> <p><i>The description of a plant variety under (2) shall not apply to a wild plant variety.</i></p>	
<p>Chapter III Protection of New Plant Varieties</p>	<p>Chapter III Protection of New Plant Varieties</p>	
<p>Section 12. A plant variety capable of registration as a new plant variety under this Act shall be of the following descriptions:</p> <p>(1) being a plant variety the propagating material of which has not been exploited whether by means of sale or distribution in any manner whatsoever, in or outside the Kingdom by the breeder or with the breeder's consent for more than one year prior to the date of filing the application;</p> <p>(2) being distinct from other plant varieties existing on the date of filing the application, provided that such distinctness is related to the feature beneficial to the cultivation, consumption, pharmacy, production or transformation, including the distinctness from the following plant varieties:</p> <p style="padding-left: 40px;">(a) plant varieties already registered and protected, whether in or outside the Kingdom, prior to the date of filing the application;</p> <p style="padding-left: 40px;">(b) plant varieties in respect of which application for registration has been made in the Kingdom and which will subsequently have been registered.</p>	<p><i>Section 12 is amended as follows.</i></p> <p><i>“A plant variety capable of registration as a new plant variety under this Act shall be of the following descriptions:</i></p> <p><i>(1) being a plant variety the propagating material of which has not been sold or otherwise disposed of to others, by or with the consent of the breeder, for the purpose of exploitation of the variety for more than one year prior to the date of filing the application;</i></p> <p><i>(2) being distinct from other plant varieties provided that such distinctness is a matter of common knowledge at the time of filing the application;</i></p> <p><i>(3) being of uniformity in the particular features of the variety in respect of shape and appearance or in respect of other characteristics resulting from the expression of the genotype specific to such plant variety;</i></p> <p><i>(4) being of stable in the particular features of the variety which are capable of expressing such particular features in every cycle of the production of the propagating material of such plant.</i></p>	<p>To set a new eligibility standards for new plant variety that can prevent the misappropriation of plant genetic resources and be in line with the 1991 UPOV Convention.</p>
<p>Section 31. The certificate of registration of a new plant variety shall be valid for the following terms:</p> <p>(1) in respect of the plant which is capable of giving such fruits as expected of the specific features of the variety after the cultivation of its propagating material within the period of not over two years: twelve years;</p> <p>(2) in respect of the plant which is capable of giving such fruits as expected of the specific features of the variety after the cultivation of its propagating material within the period of over two years: seventeen years;</p> <p>(3) in respect of the plant which is of tree-based utilisation and capable of giving such fruits in accordance with the specific features of the variety after the cultivation of its propagating material within the period of over two years: twenty seven years;</p> <p>The term of the certificate of registration of the new plant variety under paragraph one shall commence as from the date of its issuance.</p>	<p><i>Section 31 (duration of protection) is amended as follows.</i></p> <p><i>“The certificate of registration of a new plant variety shall be valid for the following terms:</i></p> <p><i>In respect of the plant which is capable of giving such fruits as expected of the specific features of the variety after the cultivation of its propagating material within the period of not over two years: fifteen years;</i></p> <p><i>In respect of the plant which is capable of giving such fruits as expected of the specific features of the variety after the cultivation of its propagating material within the period of over two years: twenty years;</i></p> <p><i>In respect of the plant which is of vine-based utilisation and capable of giving fruits in accordance with the specific features of the variety after cultivation of its propagating material within the period of over two years: twenty five years;</i></p> <p><i>In respect of the plant which is of tree-based utilisation and capable of giving fruits in accordance with the specific features of the variety after the cultivation of its propagating</i></p>	<p>A minimum 20 year-term of protection could be offered to new plant varieties from those stated in the 1991 UPOV Act;</p> <p>A sub-differentiation term of protection could also be offered to varieties.</p>

	<p>material within the period of over two years: twenty five years.</p> <p>The term of the certificate of registration of the new plant variety under paragraph one shall commence as from the date of filing the application”.</p>	
	<p>After Section 31 (terms of protection) insert –</p> <p>“Section 31bis. In case where the issue of certificate under Section 31 is delayed due to the failure of the relevant authorities to issue a certificate after the actual filing date of the application in the Kingdom, it is possible to obtain an extension. Reasons for extension may include:</p> <p>(1) Delayed response to an application for plant variety rights;</p> <p>(2) Application being considered for more than 3 years;</p> <p>(3) Delay due to a secrecy order or appeal; and</p> <p>(4) Other reasons as prescribed in Ministerial Regulation.</p>	Extensions may be provided to counter certain administrative delays.
<p>Section 33. The right holder of a new plant variety has the exclusive right to produce, sell or distribute in any manner, import, export or possess for the purpose of any of the said acts the propagating material of the new plant variety.</p> <p>The provisions of paragraph one shall not apply to the following circumstances:</p> <p>(1) the act relating to a protected new plant variety without an intention to use it as propagating material;</p> <p>(2) the education, study, experiment or research relating to a protected new plant variety for the purpose of breeding or developing plant varieties;</p> <p>(3) the act relating to a protected new plant variety committed in good faith;</p> <p>(4) the cultivation or propagation by a farmer of a protected new plant variety from the propagating material made by himself, provided that in the case where the Minister, with the approval of the Commission, publishes that new plant variety as promoted plant variety, its cultivation or propagation by a farmer may be made in the quantity not exceeding three times the quantity obtained;</p> <p>(5) the act relating to a protected new plant variety for non-commercial purpose;</p> <p>(6) the sale or distribution by any means, importation or exportation of, or having in possession for the purpose of any of the aforesaid activities, the propagating material of the protected new plant variety which has been distributed by the right holder or with the right holder’s consent.</p>	<p>Section 33 (scope of breeders’ rights) is amended as follows.</p> <p>Subject to Sections 37, the following acts in respect of the propagating material of the protected variety shall require the authorisation of the breeder:</p> <p>(1) production or reproduction (multiplication),</p> <p>(2) conditioning for the purpose of propagation,</p> <p>(3) offering for sale,</p> <p>(4) selling or other marketing,</p> <p>(5) exporting,</p> <p>(6) importing,</p> <p>(7) stocking for any of the purposes mentioned in (1) to (4), above.</p> <p>The breeder may make his authorisation subject to conditions and limitations.</p> <p>The acts referred to in sub-sections (1) to (7) of paragraph one in respect of harvested material, including entire plants and parts of plants, obtained through the unauthorised use of propagating material of the protected variety shall require the authorisation of the breeder, unless the breeder has had reasonable opportunity to exercise his right in relation to the said propagating material.</p> <p>The acts referred to in sub-sections (1) to (7) of paragraph one in respect of products made directly from harvested material of the protected variety falling within the provisions of paragraph two through the unauthorised use of the said harvested material shall require the authorisation of the breeder, unless the breeder has had reasonable opportunity to exercise his right in relation to the said harvested material.</p> <p>Acts other than those referred to in sub-sections (1) to (7) of paragraph one shall also require the authorisation of the breeder.</p>	To strengthen the scope of breeders’ exclusive rights
	<p>After Section 33 (scope of breeders’ rights) insert –</p> <p>“Section 33bis. The provisions of Section 33 shall not apply in relation to:</p>	To promote research and development on protected variety by allowing anyone to use a variety for the purpose of creating other

	<p><i>(1) varieties which are essentially derived from the protected variety, where the protected variety is not itself an essentially derived variety;</i></p> <p><i>(2) varieties which are not clearly distinguishable in accordance with Section 11 from the protected</i></p> <p><i>(3) varieties whose production requires the repeated use of the protected variety. However, authorisation shall be required where the repeated use of such variety is sought for commercial production of a newly-developed variety.</i></p> <p><i>For the purpose of paragraph one, a variety shall be deemed to be essentially derived from another variety ("initial variety") when (i) it is predominately derived from the initial variety, or from a variety that is itself predominately derived from the initial variety, while retaining the expression of the essential characteristics that result from the genotype or combination of genotypes of the initial variety; (ii) it is clearly distinguishable from the initial variety and (iii) except for the differences which result from the act of derivation, it conforms to the initial variety in the expression of the essential characteristics that result from the genotype or combination of genotypes of the initial variety.</i></p> <p><i>Essentially derived varieties may be obtained for example by the selection of a natural or induced mutant, or of a somaclonal variant, the selection of a variant individual from plants of the initial variety, backcrossing, or transformation by genetic engineering.</i></p> <p><i>Essentially derived varieties may be registered under this Act provided that such varieties are accompanied by the required documentation.</i></p> <p><i>Section 31(1) shall apply mutatis mutandis to a certificate of registration of essentially derived varieties".</i></p>	<p>varieties, while preventing the premature exploitation of protected variety in the name of research.</p>
	<p><i>After Section 33 (scope of breeders' rights) also insert –</i></p> <p><i>"Section 33ter. The provisions of Section 33 shall not apply to the following circumstances:</i></p> <p><i>(1) the act relating to a protected new plant variety without an intention to use it as propagating material;</i></p> <p><i>(2) the education, study, experiment or research relating to a protected new plant variety for the purpose of breeding or developing plant varieties;</i></p> <p><i>(3) the act relating to a protected new plant variety committed in good faith;</i></p> <p><i>(4) the cultivation or propagation by a farmer of a protected new plant variety from the propagating material made by himself, provided that in the case where the Minister, with the approval of the Commission, publishes that new plant variety as promoted plant variety, its cultivation or propagation by a farmer may be made in the quantity not exceeding three times the quantity obtained;</i></p>	<p>To ensure that farmers' saved seed exemptions and research exemption are allowed under the Act</p>

	<p>(5) the act relating to a protected new plant variety for non-commercial purpose; and</p> <p>(6) the sale or distribution by any means, importation or exportation of, or having in possession for the purpose of any of the aforesaid activities, the propagating material of the protected new plant variety which has been distributed by the right holder or with the right holder's consent".</p>	
<p>Section 37. Upon the expiration of three years as from the date of the registration of a new plant variety, other persons may file an application with the Director-General for authorisation of the use of the rights under Section 33 paragraph one if it appears at the time of such application that there has been no sale of the propagating material of that new plant variety or the sale thereof has been made in the quantity insufficient for the need of the people within the Kingdom or at exorbitant prices unless the right holder can prove that the lack of sale or the sale in the quantity insufficient for the need of the people within the Kingdom or at exorbitant prices is caused by the circumstance beyond his control or that the new plant variety is a derivative intended to be utilised for the sole production of hybrid seeds provided that the hybrid seeds have been produced in such quantity sufficient to the need of the people within the Kingdom and sold at the prices which are not exorbitant.</p> <p>The Director-General, with the approval of the Commission, has the power to authorise the use of the rights under Section 33 paragraph one upon payment by the applicant of reasonable remuneration to the right holder of the new plant variety</p> <p>The application for the authorisation of the use of rights in the new plant variety and the determination of remuneration therefor shall be in accordance with the rules, procedure and conditions prescribed in the Ministerial Regulation.</p>	<p>Section 37 is amended as follows.</p> <p><i>"At any time after the expiration of three years from the date of the registration of a new plant variety, any person may apply for a licence if the reasonable requirements of the public for seed or other propagating material of the variety have not been satisfied or that the seed or other propagating material of the variety is not available to the public at a reasonable price.</i></p> <p><i>The Director-General, with the approval of the Commission, has the power to authorise the use of the rights under paragraph one".</i></p>	<p>To fully allow public interest exception similar to that of Thailand's Patent Act and TRIPS Article 31, while at the same time preventing breeders' interests.</p>
	<p>After Section 37 (compulsory licensing) insert –</p> <p><i>"Section 37bis. Where a compulsory licensing is granted under Section 37, the right holder of protected plant variety shall be entitled to remuneration".</i></p>	
	<p>After Section 37 also insert –</p> <p><i>"Section 37ter. In an application for a licence made under Section 37, the applicant shall set forth the amount of remuneration, the conditions for the exploitation of the protected variety and the restrictions on the rights of the right holder and a request for a licence".</i></p>	
	<p>After Section 37 also insert –</p> <p><i>"Section 37quater. Where it is decided by the Director-General that a licence shall be granted to the applicant under Section 37, the Director-General shall set forth the royalty and the conditions for the exploitation of the protected variety and the restrictions on the rights of the right holder. If no agreement has been reached by the parties within the period prescribed by the Director-General, the Director-General</i></p>	

	<p><i>shall fix the royalty and prescribed the conditions and restrictions as he deems appropriate subject to the following requirements:</i></p> <p><i>(1) the scope and duration of the licence shall not be more than necessary under the circumstances;</i></p> <p><i>(2) the right holder of protected variety shall be entitled to further licence others;</i></p> <p><i>(3) the licence shall not be entitled to assign the licence to others, except with that part of the enterprise or goodwill particularly of the part under the licence;</i></p> <p><i>(4) the licensing shall be aimed predominately for the supply of the domestic market;</i></p> <p><i>(5) the remuneration fixed shall be adequate for the circumstances of the case.</i></p> <p><i>The decision of the Director-General made under the first paragraph of the Section is appealable to the Commission within sixty days from the date on which such decision is received.</i></p> <p><i>The issuance of a licensing certificate shall comply with the form, rules and procedures prescribed in the Ministerial Regulations”.</i></p>	
Chapter IV Protection of Local Domestic Plant Varieties	Chapter IV Protection of Local Domestic Plant Varieties	
Chapter IV (Protection of Local Domestic Plant Varieties) (Sections 43 – 51)	<i>Leave out Chapter IV (Protection of Local Domestic Plant Varieties) (Sections 43 – 51).</i>	No local domestic plant variety exists in Thailand.
Chapter V Protection of General Domestic Plant Varieties and Wild Plant Varieties	Chapter V Protection of General Domestic Plant Varieties and Wild Plant Varieties	
<p>Section 52. A person who collects, procures or gathers general domestic plant varieties, wild plant varieties or any part of such plant varieties for the purposes of variety development, education, experiment or research for commercial interest shall obtain permission from the competent official and make a profit-sharing agreement under which the income accruing therefrom, shall be remitted to the Plant Variety Protection Fund in accordance with the rules, procedure and conditions prescribed in the Ministerial Regulation.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p><i>After Section 52 insert –</i></p> <p><i>“Section 52bis. All general domestic plant varieties or wild plant varieties shall be registered and listed in a database under this Act.</i></p> <p><i>Registration under paragraph one of this Section shall be submitted to the Department of Plant Variety Protection with the rules and procedures prescribed in the Ministerial Regulation”.</i></p>	To legalise protection of general domestic plant varieties and wild plant varieties in Thailand
	<p><i>After Section 52 insert –</i></p> <p><i>“Section 52bis. Any person who collect, procures or gather general domestic plant varieties, wild plant varieties, or any part of such plant varieties may be exempted from the permit licence requirement under Section 52.</i></p> <p><i>Rules and procedure to determine exception to the licence under paragraph one shall be made in line with individuals’ income level and shall be provided in the Ministerial Regulation”.</i></p>	Subsistence farmers should be exempted from the permit licence requirement under Section 52 in order to maintain national welfare and social justice, considering the poverty level of the farming communities in Thailand.

Chapter VI Plant Variety Protection Fund	Chapter VI Plant Variety Protection Fund	
<p>Section 55. The money in the Fund shall be expended for the following activities:</p> <p>(1) assisting and subsidising any activities of communities in connection with the conservation, research and development of plant varieties;</p> <p>(2) serving as expenses of local government organisations for the purposes of their subsidising the conservation, research and development of plant varieties of communities;</p> <p>(3) serving as expenses in the management of the Fund.</p> <p>The management of the Fund and the control of the expenses therefrom shall be in accordance with the Regulation prescribed by the Commission with the approval of the Ministry of Finance.</p>	<p><i>After Section 55 (Plant Variety Protection Fund) insert –</i></p> <p><i>“Section 55bis. Non-governmental organisations or local government bodies may apply for benefit-sharing rewards through the Plant Variety Protection Fund under Sections 54 and 55 on farmers’ behalf in accordance with rules and procedure as prescribed in the Ministerial Regulation”.</i></p>	To distribute the benefit-sharing through the Fund more efficiently and effectively
Chapter VII Protection of Rights of Right Holders of Plant Varieties	Chapter VII Protection of Rights of Right Holders of Plant Varieties	
<p>Section 61. In the case where there is an infringement of the right of the right holder of a new plant variety or the right holder of a local domestic plant variety under Section 33 or Section 47, as the case may be, the Court has the power to order the person committing the infringement to pay the right holder such amount of compensation as the Court deems appropriate, having regard to the gravity of the damage and loss of benefits, as well as the costs necessary for the enforcement of rights of the right holder.</p>	<p><i>In Section 61 after “In the case where there is an infringement of the right of the right holder of a new plant variety” leave out “or the right holder of a local domestic plant variety”; after “under Section 33” leave out “or Section 47, as the case may be”.</i></p>	Provisions relating to protection of local domestic plant varieties have been omitted.
<p>Section 62. All plant varieties or articles in possession of the person committing the act infringing the right of the right holder of a new plant variety or the right holder of a local domestic plant variety under Section 33 or Section 47, as the case may be, shall be confiscated.</p> <p>All articles confiscated by the Court shall vest in the State and shall be proceeded with by the Department of Agriculture in accordance with the regulations prescribed by the Director-General with the approval of the Commission.</p>	<p><i>In Section 62 after “the act infringing the right of the right holder of a new plant variety” leave out “or the right holder of a local domestic plant variety”; and after “under Section 33” leave out “or Section 47, as the case may be”.</i></p>	Provisions concerning local domestic plant varieties have been omitted.
Chapter VIII Penalties	Chapter VIII Penalties	
<p>Section 64. Any person who commits any act under Section 33 or Section 47 without authorisation from the right holder of the plant variety shall be liable to imprisonment for a term not exceeding two years or to a fine not exceeding four hundred thousand Baht or to both.</p>	<p><i>In Section 64 after “any person who commits any act under Section 33 or” leave out “Section 47”.</i></p>	Section 47 is terminated.
<p>Section 66. Any person who fails to comply with Section 48 or Section 52 shall be liable to imprisonment for a term not exceeding two years or to a fine exceeding four hundred thousand Baht or to both.</p>	<p><i>Section 66 is amended as follows.</i></p> <p><i>“Subject to Section 52bis, any person who fails to comply with Section 52 shall be liable to imprisonment for a term not exceeding two years or to a fine not exceeding four hundred thousand Baht or to both”.</i></p>	Section 48 is terminated.
<p>Section 68. Any person who, in applying for registration of a new plant variety or local domestic plant variety, gives false statements to the competent official with a view to</p>	<p><i>In Section 68 after “any person who, in applying for registration of a new plant variety or” leave out “local domestic plant variety” and after “a certificate of registration of the</i></p>	Provisions relating to local domestic plant varieties have been terminated.

<p>obtaining a certificate of registration of the new plant variety or a certificate of registration of the local domestic plant variety, as the case may be, shall be liable to imprisonment for a term not exceeding two years or to a fine not exceeding four hundred thousand Baht or to both.</p>	<p><i>new plant variety” leave our “or a certificate of registration of the local domestic plant variety, as the case may be”.</i></p>	
<p>Countersigned by:</p>	<p>Countersigned by:</p>	
<p>Chuan Leekpai Prime Minister</p>	<p>..... Prime Minister</p>	

Annex XI

Questionnaire

The following questionnaire is to be answered by relevant interviewees.

1. **How effective is the 1999 Plant Variety Protection Act?**
2. **To what extent, has Thailand adopted its clear, coherent and workable legislative framework for plant variety protection?**
3. **Please provide comments or suggestions relating to provisions for the rights of farmers and local communities**
4. **Please provide comments or suggestions relating to provisions for plant breeders' rights**