Chapter 3

Historical framework of IP within the global context

3.1 Introduction

The previous chapter investigated various forms of information warfare (IW) and adopted an Information Science approach to this topic. Intellectual property rights (IPRs) are used to protect commoditised information on a global scale. This has led to less emphasis on information access, creating a form of IW. This happens despite the main aim of intellectual property (IP), which is to provide access to information but also to protect the economic interests of the owner. The issue of access is addressed in chapter seven. In order to understand the nature of IW perpetrated through IPRs, it is important to investigate the philosophy of different IP perspectives in the global context. In answering the main research problem statement of this thesis, this chapter answers the following research sub-question:

> *What is IP and the role it plays in globalisation?*

> Hofman et al. (1999:83) define IP as "that branch of the law that protects intellectual creation".

Although this definition does not address the issue of access, it will be used as the basis for an understanding of IP. IP is a legal phenomenon. Its practices are not uniform across the world even though there are efforts, through various international IP conventions, to unify IP practices and protection to ensure consistency among nations. The evolution of IP in most countries owes its shaping to the history of that country. This chapter discusses the philosophy and evolution of IP from the African, Eastern and Western perspectives. It also discusses various types of IP.

The aims of this chapter can be summarised as follows:

- To identify the philosophy and origin of IP and how it can be used as a form of IW
- To determine how IP evolved globally
- To identify various forms of IP

3.2 Philosophy of IP

The main aim of IP is to provide controlled access to commoditised information and to protect the economic interests of its creator. The rewarding of a discoverer or creator who provides society with a useful thing dates back to the fourth century BC. The earliest known example in this regard is Aristotle's philosophical concern that reward for revealing information to the state might give rise to fraudulent claims of discovery on the part of public officials (D'Amato & Long 1997:27; Granstrand 1999:23). For the purpose of this thesis, the philosophical approaches to IP of Locke, Hegel and Marx are used as a basis for discussion. These thinkers' teachings have been studied and interpreted by many philosophers. However, since these interpretations are not required to understand the original intentions of the three philosophers, they will not be featured in this thesis.

John Locke is a philosopher who wrote on the philosophy of property (not necessarily IP). Locke's analysis of property starts with the existence of the commons (common property). His philosophy takes the religious stance that property is a gift from God. Locke was concerned not with IP but with the ownership of physical rather than abstract objects. The relevance of Locke's writings to IP emanates from the link he makes between property and the idea of positive and negative community. Commmunity here refers to a state in which a common is owned by all, in other words, where a common is open to ownership by all. D'Amato and Long (1997:27) mention that Locke states that "if God gave the earth to mankind in common how can any individual have property in any thing?" IP is based on the assumption that abstract objects are the product of mental labour. Locke states that governments have

the power to regulate property. His solution to the problem of God-given commons and private appropriation starts with the assumption that every person has a property in his or her own person. This leads to Locke's claim that an individual's labour belongs to that individual (labour theory). The basis of Locke's theory of property is the special relationship between God and man (D'Amato & Long 1997:49; Drahos 1996:49; Granstrand 1999:23, 26).

In contrast to Locke, Friedrich Hegel is concerned about the evolution of property within the context of a social system. Hegel's analysis of property comprises parts of a metaphysical system. He posits that property is the means by which individuals may objectively express personal will (personality theory) (D'Amato & Long 1997: 35). He further declares that a community plays a pivotal role in the evolution of individual freedom. For him a community is an environment in which an individual aspires to establish a unique place and property is the vehicle by which one's self-identity is acknowledged by others. He sees property as a fundamental mechanism for the survival for individuals (Drahos 1996:8; Granstrand 1999:23).

Karl Marx (1848) offers an explanatory perspective on property forms. The key to understanding Marx is his class definition. He defines a class by the ownership of property. He proposes that ownership accords a person the power to exclude others from the property and to use it for personal purposes. In relation to property there are three great classes of society: the bourgeoisie (who own the means of production such as machinery and factory buildings, and whose source of income is profit), landowners (whose income is rent), and the proletariat (who own their labour and sell it for a wage) (Drahos 1996:8-9). Marx highlights the role of property ownership, whether of land or the means of production, in dominance and power. His understanding of capitalists as individual subjects of the competition assists in understanding the basis of IP (Granstrand 1999:46; Runnel n.d.).

The abovementioned three philosophers who wrote on property did not focus directly on IP. In 1711, the first IP legislation was published in the United Kingdom. By then, knowledge or information was generally used as a common good. Information was used to enable communities to sustain their subsistence and for developmental needs.

Commercialisation graded information into various categories and the law protected such information. The addition of the attributes of access to and protection of information eliminated free access and created a greater need for access to the protected information, resulting in IW against poorer communities. This was the first initiative taken in the existence of IPRs. Many owners of such information were from the developed nations or developed sections within developing nations. Both in the past and currently, those who most require the protected information for survival represent developing countries or developing communities within developed countries (De Castell 2000:369; Granstrand 2000:340; Hoekman & Kostecki 1996:144).

IP can be consumed by more than one consumer. For example, computer software, a website, or a sound recording can be used by many people at the same time. In many respects, the value of IP lies in its ability to be manipulated in identical copies. It is not always possible to place value on a single copy of computer software, a book or a digital photograph by looking at it as a single product (Harris 1998:53; Van Dulken 2000:275).

Developing communities are economically less viable and they cannot always afford to pay for commercialised or protected information. As a result, at times they utilize such information without approval from the developed nations, who are mostly the legal originators of such information. Some of this commercialised information is required for survival needs. Such exclusion from access to protected information by means of IPRs constitutes IW against the developing world. IP regimes originate in Western countries and are later exported to Africa, the Far East or Asia. In the following sections, the evolution and formalisation of IP are investigated in the Western, Eastern and African contexts.

3.3 Perspectives on IP

In the past, standards on property protection were territorial standards. The protection of IP at an international level can be divided into three periods. The first period (the territorial period) was characterised by the absence of intellectual protection. The second period (the international period) began in Europe towards the end of the 19th

century with some countries signing the Berne Convention in 1886 for the protection of the rights of authors in their literary and artistic works. The third part (the global period) has its origin in the links that the US began to make between trade and IP in the 1980s. A linkage emerged at multinational level with the signing of the WTO Treaty on 15 April 1994 (Drahos 1997:202).

Diversity in national innovation systems leads to diversity in national IPR systems. IPR system diversity comes at a price. International harmonisation of IPR systems regarding their key aspects, such as grounds for priority, is highly desirable because of costs that are incurred in the process. Grounds for harmonisation to be agreed upon are issues such as 'first to file versus first to invent'. International harmonisation of IPR is also increasing and is likely to continue. Regional harmonisation has advanced in Europe through the European Patent Office based in Munich. Harmonisation among the regions of Europe, Japan and the USA is progressing. Internationalisation of corporate and national economies is also important (Granstrand 2000:345).

North-South harmonisation is more of an open issue. It might further be argued that the current system of national patent offices could be substantially consolidated on a global basis. Competition among national patent offices is likely to emerge and is already underway in Europe. The national systems of patents have developed over decades. From time to time, they were considerably influenced by national protectionism, which is expected to be a significant hampering force (Granstrand 2000:346).

This section discusses various perspectives of IP based on the third period, namely, the global period. This is because globalisation affects IP and is discussed in detail in chapter four. Various IP perspectives are discussed in the following paragraphs.

3.3.1 Western perspective of IP

In the Western perspective, which is the dominant IPR perspective, IP was initially underlined by moral protection, access and economic interest. It was instituted for the moral protection of the rights and later for the reward of the authors, artists and the producers of knowledge. The protection of moral rights was ensured by regulating access to the produced information. Later, the main aim of IP was to provide access to commoditised information but also to protect the economic interests of the owners of such information. As time went by stricter IP focussed on protection rather than access to information.

People try to establish and protect their self-identity through the exchange of property representing the individual's will. Society is limited in its rights to prevent an individual from accumulating, holding and dispensing property. The need of the society cannot justify taking an individual's property without fair compensation. IPRs lagged behind the evolution of the incorporeal property rights of the European legal traditions. During the Renaissance, patent rights were bestowed by royalty through the ruling of the aristocracy. The European trading powers entered into pacts which provided for mutual recognition of each other's patents. The European tradition of honouring patents was also internationalised through colonialism. It was commonly believed that a state could not grow rich except by a respect for property. This confirms Locke's statement that governments have the power to regulate property (D'Amato & Long 1997:35-6; Drahos 1996:53 & 200).

IP laws in Western economies were founded on policies that were aimed at resolving challenges faced by traders, guilds and governments in different territories. Almost every trade was regulated and controlled by a guild. Their goal was to foster the interest of trade by controlling the activities of their members, and by lobbying for measures which could guarantee their monopoly over the trade. The intention of traders was to protect their goods so that they would be accessed only through their permission (Lehman & Brown 1995:148; Sodipo 1997:25; WIPO 1999:16).

The period after the traders was succeeded first by industrialisation and subsequently globalisation, which emanated from the technological advancement of the Western world. The Western world attributes its economic development to the policies that enable its industries to depend increasingly on the creation, access to and use of the IP system. The digital era, which is characterised by the rapid development of information technologies, has revolutionised the way business is conducted. The Internet has become the most prominent form of communication and piracy is not excluded. This has sparked more interest from the developed world to require IP protection in the developing world in order to protect their registered inventions against infringement. The regimes include various conventions of which the most significant are tabulated in table 3.1 (Graham 1999:502; Idris 2000:63).

Table 3.1 Major international conventions on IP

Agreement	Description	Administrator
Paris Convention (1883; 129 signatories; revised in 1967	Protection of patents, trademarks and service marks, trade names, utility models, industrial designs, indications of sources or appellation or origin and the 'repression of unfair competition'. Allows for compulsory licensing.	WIPO
Berne Convention (1886; 111 signatories; revised in 1971	Basic copyright treaty based on principles of non-discrimination and national treatment (like the Paris Convention).	WIPO
Madrid Agreement (1891; 31 signatories)	Allows imported goods bearing a false indication of origin to be seized on importation.	WIPO
Universal Copyright Convention (1952; 17 signatories)	Copyright treaty accommodating US statutory requirements and based on principles of non-discrimination and national treatment.	UNESCO
Lisbon Agreement (1958; 17 signatories)	Protection of appellation of origin.	WIPO
Rome Convention (1961; 47 signatories)	Protection of neighbouring rights (performers, producers of phonographs, broadcasting organisations).	ILO, UNESCO and WIPO
Geneva Convention (1971; 52 signatories	Protection of producers of phonographs against the manufacture of duplicates in another country.	WIPO, ILO and UNESCO
IPIC Treaty (1989; 8 signatories)	Treaty on Intellectual Property in Respect of Integrated Circuits.	WIPO
TRIPS (1994)	Trade related aspects if intellectual property (TRIPS) adopted the obligations of the Berne Convention and added more protection to cover all aspects of IP.	WTO

Source: Hoekman & Kostecki (1996:150, table 6.1) (adapted)

The increasing interest in the protection of IP prompted the developed world to expand their business across the world. This was highlighted by the United Kingdom when they abandoned autonomous IP systems in some of its colonies and opted for re-registration systems. Under the re-registration system, patents which were already granted in the UK could be automatically registered and enforced in most of the former colonies as if they were directly granted by those nations. The reason for the adoption of the re-registration system was attributed to lack of skilled examiners, and the huge capital outlay required for fully-fledged patent offices. Autonomous patent systems succeeded in other Commonwealth nations such as Australia, Canada, New Zealand and later South Africa (Lehman & Brown 1995:148; Sodipo 1997:30-1; WIPO 1999:16).

Multilateral cooperation in the field of IP dates back more than a century. Although the issue has been of some relevance to the multilateral trading system, largely in terms of the trade in counterfeit goods, cooperation existed long before the creation of the World Trade Organization (WTO). Several international conventions laid down standards for the protection of IP. These include the Paris Convention (on patents and trademarks), the Berne Convention (on copyright) and the Rome Convention on neighbouring rights (see table 3.1). These and other conventions are administered by the World Intellectual Property Organisation (WIPO), a Geneva-based UN body. GATT, which includes TRIPS, is administered by WTO. TRIPS, which was incepted in 1994, imposes upon its members most of the provisions of Berne Convention in addition to imposing quite substantial minimum requirements for patents, trademark and copyright. The next section discusses the international conventions that are of importance to this thesis (Hoekman & Kostecki 1996:149; Miller & Davis, 2000:437; Tikku 1998:97).

3.3.1.1 Origin of copyright

Copyright emerged largely in response to the problems created by the invention of the Gothenburg printing press in 1450. The earliest known infringement of copyright was Hermodorus' theft of Plato's speeches. In the UK, copyright laws date back to 1476

when the first printing press was introduced to England, when the need to control unauthorised reproduction of creative work arose. The production and printing of books in England was carried out by a craft guild known as the Stationers. By 1534, no one could publish without a licence. In 1709 the Parliament of England passed the first copyright statute, the Statute of Anne. By 1711, this was the world's first true copyright law. The growth in literacy and technological change brought a huge demand for books and other publications (Litman 2001; Drahos 1996:22; Gurnsey 1995:7, 10; Harris 1998: 114; Lehman 1995:7; Litman 2001; Morris, Mowatt & Reekie 2001:9; Wallis, Baden-Fuller, Kretschmer & Klimis 1999:13).

The Statute of Anne laid down penalties for infringement, including the forfeiture and destruction of offending material. In the developing world, common law copyright was first introduced to some former British colonies (G1 nations) through ordinances which imported the common law from England. The English Copyright Act, 1911, became the first copyright legislation to be extended to most parts of the Commonwealth. While some G1 nations continue to apply the 1911 Act, others apply the 1956 Copyright Act of the UK. The English Copyright Act of 1991 was primarily aimed at protecting the trade in British books, art, music, films and broadcast. This Act was expected to result in reasonable trade interest in G1 nations as a result of the British culture that had long existed in those countries. However, the low level or absence of piracy by local authorities in G1 nations has led to a failure to appreciate the need to revise or enforce copyright laws (Lehman & Brown 1995:148; Sodipo 1997:26; WIPO 1999:16).

The first copyright act was not actually concerned with authors, but was primarily concerned with securing the rights of the publishers. Only in 1814 did the Copyright Act of the UK set the copyright term at the author's lifetime. Copyright consists of various aspects, each of which may be owned by a different person, or may be licensed by way of exclusive or non-exclusive licence to people other than copyright owner. A licensee does not transfer copyright in the work, but gives permission only to use and exploit it in a specific manner as described in the licence and only for the duration of the licence. As soon as the licence terminates, such exploitation rights revert to the copyright owner. The invention of new technologies during the twentieth

century led to a new demand for the protection of creative works. Amendments to local legislation were incorporated into international agreements such as the Universal Copyright Convention, the Berne Convention and the TRIPS (De Villiers 2000:40, 43; Gurnsey 1995:9; Litman 2001:18; Lloyd 2000:301; Wallis et al. 1999:13).

3.3.1.2 The Paris Convention of 1883

The Paris Convention of 1883 for the protection of industrial property was signed by 156 states, and has subsequently been amended since its inception. All the European countries are signatories of the Convention which has the effect of harmonising patent law to a considerable degree in Europe. The Paris Convention was the first attempt to adopt a common approach to IP. The fundamental principle of the Paris Convention was that member states were not allowed to discriminate among their own nationals and nationals of other member states. One of the principles of the Convention was that nationals of a country that belonged to the Convention must enjoy the same IP rights in any other member country (D'Amato & Long 1997:17; Bently 1997:30; Tritton, Davis, Edenborough, Graham, Malynicz & Roughton 2002:54; WIPO 2000:101).

The Paris Convention established international patent protections that were not geared to a country's domestic development needs. The Convention enabled the filing of patents for the same invention in more than one country. It also stated that the conditions for filing and registration of trademarks were determined by national laws. WIPO, which is an organ of the United Nations, has a task to administer numerous treaties in the field of IP. The Paris Convention provided the framework to deal with the infringement of IP on an international level. Goods infringing a registered mark can be seized on importation. The same mark can be concurrently used by more than one commercial institution (with some understanding between such institutions) and they shall be considered to be co-proprietors (Bettcher, Yach & Guindon 2000:526; Ganguli 2000:169; Maskus & Lahouel 2000:603; Tritton et al. 2002:192-3).

3.3.1.3 The Berne Convention of 1886

The Berne Convention was adopted in 1886 and has been revised several times to take into account the impact of new technology. It is administered by the WIPO, one of the specialised international agencies of the United Nations. According to the Berne Convention, authors of literary and artistic works shall enjoy the exclusive right of authorising the broadcasting of their works or the communication thereof to the public by any means of wireless transmission. The adaptation into any other artistic form of a cinematographic production derived from literary or artistic works shall remain subject to the authorisation of the authors of the original works. The Berne Convention was created to help harmonise laws and to ensure that copyright owners had protection in all signatory states (Gurnsey 1995:11; Lehman 1995:150; Salokannel 1997:97).

The Berne Convention states that in the case of an alleged infringement of copyright, the extent of protection, as well as the means of redress afforded to authors to protect their rights, shall be governed exclusively by the laws of the country where protection is sought. This creates some confusion when it comes to the cinematographic work where the country of origin of the work differs with the country of registration. The protection of copyright and neighbouring rights covers a wide array of human creativity. The Berne Convention is the most important international copyright convention whose copyright protection covers all literary and artistic works. This term encompasses diverse forms of creativity, such as writings, including both fiction and non-fiction, as well as scientific and technical texts and computer programmes; original databases; musical works; audiovisual works; works of fine art, including drawings and paintings; and photographs. Neighbouring rights protect the contributions of others that add value in the presentation of literary and artistic works to the public. This includes performing artists such as actors, dancers, singers and musicians; the producers of phonograms, including CDs; and broadcasting organisations (Kumar 2002:22; Salokannel 1997:101; WIPO; 2000:19).

The monetary value and huge returns on IP investments are the motivating factors for the countries producing IP to protect their interests by spearheading the establishment of protective organisations. The piracy and counterfeiting of IP cannot be permitted by the countries producing IP irrespective of the moral and humanitarian issues surrounding such infringements. Article 6 of the Berne Convention outlines moral right as the right to have one's name associated with a work, and the right not to have a work manipulated or distorted to the prejudice of the author. The Berne Convention seeks to protect authors based on mutual recognition. In other words, each signatory must protect foreign works and authors to the same extent as it does its own. The protection would be automatic which nullifies re-registration. The Convention also defines minimum standards for the duration and scope of the copyright holder's right. It prescribed the lifespan of a protected material to life plus 50 years after the death of the author (Gurnsey 1995:27-8; Hofman, Johnston, Handa & Morgan 1999:86-7). Since most work is produced by the developed world, this benefits them more than it does the developing countries.

3.3.1.4 World Intellectual Property Organisation

The WIPO was officially established by a convention in 1967. Its origins can be traced to the Paris and Berne Conventions adopted in 1883 and 1886 respectively. IP laws are the laws that governments enact to make these international treaties part of national law. Table 3.1 depicts international treaties that are administered by WIPO. WIPO's primary objectives are (McKeough & Stewart 1997:476; Posey & Dutfield 1996:77):

- to administer international treaties on IP laws
- to provide instances to signatory nations in promulgating IP laws
- to seek harmonisation of national laws, aiming to promote the protection of IP throughout the world

The adoption of subsequent treaties governing performance rights and cyberspace under WIPO auspices suggests that WIPO may continue to play a pivotal role in the

establishment of international IP standards for emerging technologies. In March 2000, the Copyright Council approved WIPO treaties adopted in Geneva in 1996. Such treaties include the WIPO Copyright Treaty and the WIPO Performances and Phonograms Treaty (WPPT). These treaties include new rights of distribution and electronic making available of the provisions on copy-protection devices and unauthorised removal of rights management information. The WIPO treaties represent a significant step in terms of the international protection of copyright and related rights, particularly with regard to the digital agenda (D'Amato & Long 1997:282; Finger & Schuler 2000:513; Seville 2001:715-6).

Patent laws and practices vary widely throughout the world. The consequence of such diversity is that in certain countries a patent application may lead to the grant of a patent, whereas in others, a patent may not be granted for the same invention, or the patent may be invalidated after the grant. The need for further harmonisation beyond the Patent Law Treaty (PLT), concluded in May 2000, arises from the fact that the PLT only harmonises patent procedures relating to national or regional patent application and the maintenance of patents. Member states of WIPO launched discussions on harmonising the substantive requirements of the patent law. The Standing Committee on the Law of Patents (SCP) met in September 2000, and its members agreed that the harmonising of patents was a prerequisite to reducing the cost of obtaining international patent protection (Claus 2001b).

In a country without an early publication system, an applicant may be unaware of earlier applications for identical or similar inventions and might, therefore, duplicate research and development as well as patent filings, leading to unnecessary costs. Sodipo (1997:31) posits that in most developing countries, including the G1 nations, the number of local patents is less than 10 per cent of the total filings in those countries. Another reason for low local level of patent registration is that it is also possible that patents could be erroneously granted for an invention that was not patentable. This makes it necessary to harmonise IP laws, especially those pertaining to patents.

Claus (2001b:90) outlines some advantages of harmosnising substantive patent laws. These benefits include:

- a reduction in direct costs resulting from the need to prepare totally different patent documents for different patent offices
- increased predictability in the process of obtaining and using patents in different countries
- a reduction in the unpredictable risk of losing patent rights
- facilitation of mutual recognition of search and examination results between patent offices

This will avoid duplication of work, reduce the workload at patent offices and eventually lower the costs of patenting for the benefit of users.

One of the most serious problems pertinent to the filing of patents is high filing fees. Consequently, patent registration from poorer parts of the world have dwindled. This has resulted in WIPO member states approving reductions in the filing fees for international patent applications under the Patent Cooperation Treaty (PCT). Member states also approved a proposal to launch a special programme of activities to promote the wider use of the IP system by small and medium enterprises (SMEs). The aim is to enhance the competitiveness of SMEs worldwide and to help them better exploit their niche positions, which includes using electronic commerce. Member states have reviewed WIPO's work in the field of Internet domain names and IP and have noted the success of the WIPO Arbitration and Mediation Center in providing online resolution of Internet domain name disputes. Domain names may be registered in spaces known as generic top-level domains (gTLDs), such as .com, .org or .net, or in the country code top-level domains (ccTLDs), such as .ch (Switzerland), .fr (France) or .za (South Africa) (Claus 2001b; Harris 1998:200-1; WIPO 2000:45).

April 26 has been designated as World Intellectual Property Day. Each year, this day is observed by WIPO and its member states by means of various activities. The day serves as a special occasion to heighten public awareness about the role and contribution of IP in the economic, cultural and social development of all countries. Member states took note of the World Intellectual Property Declaration that was

adopted by the WIPO Policy Advisory Commission (PAC) early in 2001. The declaration, which seeks to expand awareness about the universal value of IP, affirms the universal relevance of IP in today's knowledge-based society. It highlights the importance of strategies to enhance the importance of global cooperation in implementing and further developing the IP system for the benefit of all (Claus 2001b).

The technological advancement of the information age has revolutionised the conventional format of IP. IP needs to be protected to enable WIPO to deal with this advancement. Due to the fact that IP in the information age is preferred in an electronic format, advances in technology lead to advanced ways of infringing IPRs. The next section looks into some global measures implemented to protect IPRs.

3.3.1.5 The General Agreement on Trade and Tariffs

The General Agreement on Trade and Tariffs (GATT) was drawn up in 1947 at Marrakesh to deal with the economic order created by the Second World War. One hundred and eleven countries signed the GATT agreement. GATT was designed to foster a reduction in tariffs and quotas and to arrive at ground rules for an effective trade liberalisation agreement. In the 1970s this agreement expanded to include in its scope and coverage matters such as technical standards and regulations, subsidies, anti-dumping and government procurement. The Uruguay round in 1994 resulted in the formation of the World Trade Organisation (WTO) in 1995, even though its existence could be traced to an earlier period. WTO elaborated on many prior GATT obligations, extended its mandate to service industries (such as banking, securities, telecommunications and insurance) and formulated substantive rules of IP laws (Adeloye 1994:44; Drahos 1995:6; Ganguli 1998:178; Maskus & Lahouel 2000:600).

Since GATT has a dispute resolution mechanism, a proposal to extend GATT to IP led to the introduction of an anti-counterfeiting code at the Uruguay Round in 1986 (see also table 3.1). Contrariwise, there has been significant technological progress in the Far East, where piracy and counterfeiting are rife and where IPRs have been

disregarded. Despite opposition by developing economies, GATT was extended to cover other aspects of IP under the Trade Related Aspects of Intellectual Property (TRIPS) section that came into being in 1995. This section of GATT was concluded on December 15, 1993 and was opened for ratification on April 14, 1994 (Finger & Schuler 2000:519; Hoekman & Kostecki 1996:149; Sodipo 1997:24).

The 1993 GATT negotiation proposed the establishment of global IPRs for technology involving all forms of life, plants, animals and microorganisms. This global framework for IPR calls for a major change in the patent laws that exist throughout the world. Many developing countries currently do not recognise any form of patent on biological resources and related technology. The proposal to introduce IPR into the GATT framework has evoked resistance from many developing countries. They fear that conferring IPRs on generic resources and their derivatives to foreign investors will have adverse economic consequences for themselves in general and for research and development in agriculture in particular (Bhat 1996:205).

However, IPR has been made a component of GATT and countries have no choice but to implement regulations or otherwise face international trade sanctions. Due to increasing population and the scarcity of any given nation's resource endowment, a constant flow of knowledge-based innovation which substitutes human intelligence for scarce resources is essential for steady economic growth. New processes and products created through these innovations provide new opportunities for economic activity, and promote income and employment growth. Modern technology is becoming increasingly intellectual rather than material in nature. The development of new sources of production material, energy substitutes, computers, efficient industrial equipment, chemicals based on renewable resources, and biotechnology are some examples of technologies with a high degree of intellectual content (Bhat 1996:205; Finger & Schuler 2000:511; Ostergard Jr. et al. 2001:644).

Developed nations argue that, due to inadequate IPR protection in the Third World and the resultant intellectual piracy, they lose millions of dollars in trade. Although developed or industrialised countries signed the WTO agreements, the organisation has no enforcement mechanisms against IPR violators. For this reason, the developed

nations resorted to GATT in the Uruguay Round. GATT makes provision for trade sanctions to punish the violators of its agreement. Rules governing international trade are embodied in the GATT agreements and have been refined and developed through successive rounds of negotiations with the ultimate goal of eliminating barriers and distortions to international trade. It is thus argued that all countries in the world must adopt common IP laws (Bhat 1999; Bettcher et al. 2000:527; Doyle 1995:182; Finger & Schuler 2000:520; McCalman 2001:174).

USA was not initially a GATT signatory. After a year of US political discussion and months of media attention, GATT was approved by the US Congress. Proponents of the trade pact argued that hundreds of thousands of new jobs could be created and American IP would enjoy increased protection. Critics of the agreement argue that multinational corporations would shift jobs to low-wage countries, higher US tariffs would increase the budget deficit, and certain industries in the developing world would be crippled (Doyle 1995:182; Wallis et al. 1999:6).

GATT was seen by the US administrators as a vehicle to assist US computer companies and protect US technology. The US computer industry was instrumental in including a provision in the GATT designed to reduce piracy to its lowest levels and generally strengthen IPRs. The provision was designed to enhance copyright, trademark and patent protection for manufacturers of software, semiconductors, and multimedia products in all the signatory countries. GATT as part of the WTO include TRIPS which imposed some substantial requirements for patents, trademarks, and copyright. On the contrary, opponents of the WTO want to ensure that all global citizens are democratically represented in the formulation, implementation, and evaluation of all global social and economic policies of the WTO, the International Monetary Fund, and the World Bank. According to them, the WTO must immediately halt all meetings and negotiations in order for a full, fair, and public assessment to be conducted into the impact of the WTO's policies to date. They propose that the WTO be replaced by a body that is fully democratic, transparent, and accountable to citizens of the entire world instead of a body made by and for corporations with inside access to negotiations (Adeloye 1994:45; Doyle 1995:182; Ten Ways To Democratise n.d, Miller & Davis 2000:437).

GATT was extended to include IPRs using TRIPS as a vehicle for advancing IPR protection in the developing world and for standardising provisions of the IP legislation across the globe. GATT has now been succeeded by WTO (in 1995) and the intellectual property-related issues have been incorporated into and replaced by TRIPS. This makes it important to discuss TRIPS in the next section.

3.3.1.6 Trade Related Aspects of Intellectual Property (TRIPS)

Trade Related Intellectual Property Rights (TRIPS), a subsection of GATT, was finally concluded in 1995. It is integrated into the international trading system. It outlines the minimum standards for protection and enforcement of IPR in the member countries of the WTO. The agreement leaves scope for the member nations to develop their IPR laws (but staying within the spirit of the agreement) to promote their national interests. The basic approach of any IPR system is to balance interest between various contrasting parameters. One of the major grievances from the developing countries was that the Paris Convention established international patent protections that were not geared to their domestic development needs (Adeloye 1994:45; Bettcher et al. 2000:526; Ganguli 2000:169; Maskus & Lahouel 2000:603).

The pre-TRIPS era (i.e., before 1995) saw the world divided into groups:

(1) a set of nations allowing product and process patents in all fields of technologies without discrimination
(2) another group with restrictive and discriminatory patent laws providing for process patents in all fields of technologies but not for product patents in selected fields such as foods, agrochemicals, drugs and pharmaceuticals, chemical entities, specialty materials, and so on

Other features related to the term of patents, conditions for compulsory licensing, and clauses such as whether importation would be considered as infringement of patents, varied at the national level. TRIPS brought such issues into focus. The scope of the

TRIPS agreement is much broader than any previous international agreement in the IP field (Bettcher et al. 2000:526; Ganguli 2000:168-9).

There is a need to improve the existing legal, administrative and judicial processes. This can be done by simplifying ways of doing business on a global scale, encouraging cross-border investments, and creating a positive climate for diffusion of technology. Harmonisation and the enforcement of laws to protect IPRs, and simultaneously creating effective international competition policies, would strengthen IP protection. Ganguli (1998:173) posits that the areas of IP covered by TRIPs are the following:

- copyright and related rights (i.e., the rights of performers, producers of sound recordings and broadcasting organisations)
- trademarks, including service marks
- geographical indications, including appellations of origin
- industrial designs
- patents
- protection of new varieties of plants
- protection of the layout designs of integrated circuits
- protection of undisclosed information including trade secrets and test data
- control of anti-competitive practices in contractual licences

Essentially, the main features of TRIPS, among others, are:

- the extension of patents to all inventions irrespective of areas of technology
- a minimum of a 20 year period for patents
- criminal sanctions against infringements
- the principle of national treatment
- the possibility of exempting moral rights
- the payment of reasonable fees for compulsory licences
- the protection of neighbouring rights
- a better dispute resolution and enforcement mechanism

Anti-TRIPS lobby groups urge that the WTO's dispute panels, which rule on whether domestic laws are barriers to trade and should therefore be abolished, consist of trade bureaucrats (which include the US) who are not screened for conflict of interest (Finger & Schuler 2000:521; Sodipo 1997:24).

Issues concerning property rights on global biological resources are becoming increasingly important to international policy. The negotiations on the UN Convention on Biological Diversity and the WTO agreement on TRIPs have demonstrated that the respective implementation and revision activities continue to show that large companies such as ICT and pharmaceutical companies depend on the protection of IP to ensure innovation (Bettcher 2000:526; Janssen 1999:313).

Corporations are reluctant to invest in biotechnologies discovered in developing countries due to poorly defined and enforced IP laws. This deficiency in IPR protection is currently being addressed by several nations who have signed two major international agreements: the Convention on Biological Diversity and the TRIPS. These agreements call for the establishment of a set of suitable IP laws in each nation, depending on the type of intellectual material in question and the economic and technological background of the nation itself. This is considered important even though such measures may lead to a monopoly (Bhat 1999:392).

Monopolists earn profits that exceed the ordinary rate of return on an investment. These monopoly profits are the inventor's reward supplied by the patent system. However, monopolies impose social costs in that too few of the monopolised goods are produced and the prices are too high. Specifically, a patented good typically sells at a higher price and in lower quantities as long as the patent lasts. The price falls and the quantity increases as soon as the patent expires. Hence patents create a temporary monopoly which rewards invention and product distribution. Developing countries are characterised by small markets and elastic demand (Janssen 1999:318; Maskus & Lahouel 2000:606).

Domestic and foreign pressure convinced some developing countries to agree to grant product patents in advance of the GATT treaty. Two other considerations affect the timing of the availability of legal protection for pharmaceutical innovations. The first is the extent to which new patent legislation includes so-called pipeline protection. Pipeline protection stipulates that during the phase-in period of a new product patent regime, innovations which have not been marketed in the country are eligible for protection even if they have been patented, and sometimes even marketed, elsewhere. Pipeline protection is not, however, required under the TRIPs agreement, and many countries, such as India, will not grant pipeline protection. In these countries, only innovations which have followed the treaty agreement are eligible for protection. Opponents of TRIPS argue that it lacks the flexibility and sensitivity to make major contributions in the publishing area (Gurnsey 1995:32; Lanjouw & Cockburn 2001; Tikku 1998:97).

The second feature of the TRIPS agreement that affects timing is that developing country signatories have been allowed a 10-year grace period to adjust to the regulations, and are not required to grant product patents until January 2005. They must, however, accept applications (the "mailbox" provision) and, beginning in 2000, they must offer "exclusive marketing rights" to any inventor with a patent in a WTO member country and marketing approval for the new drug in the inventor's home market. Exclusive marketing rights are very similar to patents in offering monopoly marketing rights to the inventor. Protection for product innovations has been available in all member countries since the end of 1999. TRIPS clearly states that original ownership of rights in literary and artistic works belongs to the physical persons who create the works (Lanjouw & Cockburn 2001; Salokannel 1997:114; Tikku 1998:106).

TRIPS is a vehicle used by WTO to monitor and manage IP. The protection of IP started in the developed world and later expanded to the developing world. The developed world tried to standardise all the IP laws across the world and implemented trade sanctions against countries that did not comply.

3.3.2 Summary

The Western perspective of IP is a fairly internationalised one. Philosophers such as Locke, Hegel and Marx have influenced this perspective in their writings on property, although their works did not deal directly with IP. Marx's philosophy of property helps us to understand the transition from the origin of property to IP based on a class structure. The Western perspective of IP was initially mainly based on principles of the moral protection, access and later economic interest of the owner. The main aim of IP was to facilitate access to commoditised information. With the advent of a money-based economy, the emphasis shifted to IP protection rather than access. The creators of innovative information had to be protected by national IP laws. The UK Statute of Anne was the first IP law to be implemented. National laws were not always effective because of various infringements and so a move was initialised to protect IP on a global scale.

This move led to the conclusion of the Paris Convention in 1883 in an attempt to harmonise patent laws. In 1886 the Berne Convention was concluded to harmonise copyright laws. WIPO was conceived in 1967 and inherited tasks of both the Paris Convention and the Berne Convention. GATT was created in 1947 in reaction to the legacies of the world wars to promote trade among nations. In 1995, TRIPS was concluded and it carried over the intellectual property-related aspects of GATT. Globally, more emphasis is being placed on protection of IP.

3.3.3 Evolution of IP in other parts of the world

Many non-European cultures do not assume an adversarial relationship between an individual and society. Islamic and African cultures define self-identity according to the individual's relationship with and contribution to society. In most African countries, many indigenous societies consider tribal land and other economic resources the property of the tribe's ancestors. An individual may become involved in agriculture or other economic activities that benefit the extended families and the community in general. Historically, most non-Western cultures did not have property or knowledge attached to an individual to the exclusion of the rest of the community.

IP was not relevant because most of the information was available for common good. Only specialised information such as healing secrets was exclusive to the individuals who were trained within these fields. After independence from colonial authorities, these nations were faced with managing IP that was not produced locally. Replicating such information was ideal for them because it was viewed as essential for their survival (D'Amato & Long 1997:36; Drahos 1996:172).

Infringement of copyright for the West has always been a problem for publishers, despite the fair dealing in the copyright law. In the developing world, photocopying has been seen as major opportunity for both users starved of information and for prospective piraters, who see it as an opportunity for an easy-to-use replication technology. IW was introduced into IP when access to it focussed more on the protection of products and services, which excluded those economically less able to access and use such information. The greatest generation, protection and commercialisation of IP occurs in the developed world. For various reasons, interest in and demand for protected information from the developing world increased, and the latter felt more marginalised. Some of the developing world went the route of ignoring the international conventions that governed the protection and management of IP (Drahos 1996:200-1; Gurnsey 1995:12).

In the following section, the Eastern and the African perspectives of IP are investigated.

3.3.3.1 Eastern perspective of IP

East Asian economies (the so-called Asian Tigers) have showed remarkable growth since the 1990s. Apart from Japan, these economies include South Korea, Taiwan, Hong Kong and Singapore (first Asian tier); Malaysia, Thailand, and Indonesia (second Asian tier); and China (known as the 'the miracle of East Asia'). Amongst others, the economic advancements of these countries could be attributed to relaxed IP systems (Kumar 2002:4; Tikku 1998:88).

A considerable number of the indigenous plant species with medicinal value in Asian countries has been patented in foreign Western countries. India for instance started preparation of village-wise Community Biodiversity Registers for documenting all IK, innovations and practices. India has 45 000 different plant species, of which 15 000 are medicinal plants mostly used in the preparation of drugs. Some of these are patented in developed countries. Several Asian countries have generally ignored the patents registered in developed countries and continued to exploit available knowledge without having to make huge payments to the patentees. Asian countries thus benefited from IP generated in other developed countries during their development. The Japanese IPR system, for instance, encouraged the improvement or adaptation of imported machinery or imported goods by domestic inventors. The weaker patent system employed by Japan facilitated the absorption, transfer and diffusion of technology that contributed to economic growth experienced between 1960 to 1963 (Kumar 2002:4-5; Shiva 1996:1; Protecting Indigenous Knowledge: 3-4).

3.3.3.1.1 China

China has never been colonised and the evolution of IP in that country has been guided by its development. The Trademark Law of China was enacted in 1982 and came to force in 1985. China enacted its Copyright Law in 1990 and accepted the terms of the Berne Convention and the Universal Copyright Convention in 1992. The Patent Law was amended in 1992 to extend protection to pharmaceutical products. The government of China entered into an agreement with the US regarding the protection of IP rights in China. The agreement allowed US-based companies to enter into exclusive licensing arrangements with publishing houses in China. This makes China an example of a country that has achieved enormous outcomes in science and innovation without really relying on IPRs. The lack of IP management regimes in China fuelled the number of counterfeit products produced in that country. The US continues to closely monitor China's efforts to enforce its IP laws (D'Amato & Long 1997:220-221; Drahos 1996:14; Gutterman & Anderson 1997:262-263).

3.3.3.1.2 India

The context of property in India has been shaped by conquest, feudalism and colonialism. With its traditional forms of land ownership, India had to rely on political dialogue to shape its philosophy of property. Three distinct political ideologies that were commonplace in India defined the relationship between the individual and the state. Such ideologies were Western-style market liberalism, Soviet-style centrally-planned socialism and Mahatma Ghandi's vision of decentralised village-based social reform. Ghandi, as the first postcolonial Indian leader, believed that the alleviation of poverty was more important than the individual right of property. He therefore co-opted property classes to partake in social reforms. India did not have good protection for many kinds of patents, trademarks or even copyrights. As a result, pharmaceuticals and other intellectual property were freely copied in India. This resulted in medicine prices being too low compared to similar drugs produced in countries such as the US because no royalties had to be paid (D'Amato & Long 1997:37).

India proved the idea that piracy is transient. In the 1950s, the Indian market was dominated by book piracy. At various successive international conventions, the Indian government called for and won major copyright concessions with regard to translations and compulsory licensing. The Indian publishing industry benefited from this move and began to impose firmer copyright laws. India later became the eighth largest country in the world and a significant exporter of books and other literary material. India has been challenged to undergo a transition to provide product patents. It has been recognised that the abolition of product patents in chemicals and pharmaceuticals has facilitated the development of local technological capability in the chemicals and pharmaceutical industry. This has encouraged domestic firms to engage in innovative activities. Kumar's (2002:6) quantitative studies have shown that the innovative activity of Indian domestic enterprises was facilitated by the softer patent regime under the 1970 Patents Act. The gradual build-up of technological capability of Indian enterprises is visible from a rising trend of domestic patent ownership (Gurnsey 1995:34; Kumar 2002:6).

India inherited the Patents and Designs Act of 1911 from colonial times. This act provided for the protection of all inventions except those relating to atomic energy. India obtained its independence in 1947 but continued to rely on the developed world for most of its IP. The Indian government of the day (under the leadership of Ghandi) started nationalising major industries and socialising large sectors of the economy. The Western world has always been very interested in India because of its huge market and labour source (its population stands at approximately one billion people). Some domestic chemical and pharmaceutical enterprises that tried to develop their own technology in the 1960s ran into trouble with foreign patent owners. A number of legal cases highlighted the fact that foreign patent owners were neither using their patents for domestic manufacture nor allowing them to be used by local firms. That led to a build-up of pressure in the late 1960s for a new patent law (Kumar 2002:4; Tikku 1998:88).

India was not a signatory to major international treaties regarding patent creation and protection, with the exception of TRIPS. Rather, it entered into bilateral treaties with various nations. A new Patents Act was adopted in 1970 that reduced the scope of patentability in food, chemicals and pharmaceuticals to processes only, and not products. The Indian Patents Act of 1970 continued to govern the IPR regime in India over a number of years except for amendments providing for exclusive marketing rights in tune with India's obligations under WTO's TRIPS agreement. Critics claim that the real independence of India came about in 1991 when it introduced economic reforms that opened its doors to the outside world. Despite this, its laws continued to cater only for the unique needs of India. It joined the Paris Convention and the Patent Cooperation Treaty only in 1999 (Gutterman & Anderson 1997:397; Kumar 2002:6).

3.3.3.1.3 South Korea and Taiwan

South Korea adopted the patent legislation only in 1961. However, the scope of this legislation did not cover the patenting of products and processes to manufacture food products, chemical substances and pharmaceuticals. The South Korean patent law was amended in 1981 to conform to the Paris Convention that provided for multiple claims

for related inventions in a single application. Pressure from the US pushed South Korea to strengthen its IPR regime in 1986 and extend product patent protection to new chemical and pharmaceutical products. After this, South Korea adopted a comprehensive copyright law, and extended the patent term from 12 to 15 years. It also implemented an IPR regime that facilitated adaptations and imitative duplication of foreign technologies by domestic enterprises through utility models and industrial designs. The soft IPR regime adopted initially was a part of a conscious policy by the government to facilitate imitation by domestic enterprises (D'Amato & Long 1997:66; Kumar 2002:24).

Taiwan's IP laws were first promulgated before 1949 when the Republic of China governed both Taiwan and mainland China. Like South Korea, the government of Taiwan also employed a weak IPR policy to facilitate local absorption of foreign knowledge through reverse engineering. In fact, Taiwan's government seemed to openly encourage counterfeiting as a strategy for developing local industries. In the mid-1980s it is alleged that an estimated 60 percent of the world's pirated or counterfeit goods originated in Taiwan (Gutterman & Anderson 1997:282-283; Kumar 2002:25).

The lax treatment of IPRs in Taiwan attracted the attention of the US government. In March 1983, the US government initiated bilateral consultations on IPRs with Taiwan. As a result of growing US pressure, Taiwan amended its copyright law in 1985 to strengthen penalties for piracy. They provided some criteria for recognising foreign firms' standing before the Taiwanese judiciary in copyright cases, and extended protection specifically to new media, including software. This followed the enactment of a new patent law in 1986 which provided protection for chemicals and pharmaceutical products. However, this legislation and its enforcement were considered inadequate by the US government. Under heavy pressure from the US, Taiwan passed its new Patent Law on January 21, 1994. This allowed patents on food, beverages, micro-organisms, and new uses for products, all of which were previously excluded under the government's social policy. In addition to this, the duration for new patents was extended from 15 years to 20 years (D'Amato & Long 1997:68-69; Kumar 2002:25).

In conclusion, the East Asian countries, namely, Japan, Korea and Taiwan, absorbed a substantial amount of technological learning under weak IPR protection regimes during the early phases of IP introduction in those countries. These patent regimes facilitated the absorption of innovation and knowledge generated abroad by their indigenous firms. They also encouraged minor adaptations and incremental innovations on foreign inventions by domestic enterprises and developed a patent culture through utility models and design patents.

3.3.3.2 African perspective of IP

African countries had indigenous law-making and enforcement institutions long before the arrival of the colonial powers. IP was not relevant for the African context because the African tradition had no need for it. European patent laws were introduced to most of the African continent during colonialism. This move was largely viewed as serving the interests of European companies. After independence, most of the former British colonies discarded their inherent British-style patent laws and adopted new ones based on principles more consistent with their traditional values. The Nigerian patent law, for instance, was adopted in the 1970s and excludes biological products and processes from patent protection. Some products were deemed not patentable by decree in the interest of society as a whole (D'Amato & Long 1997:37).

The developing countries, majority of which are situated in Africa, have been classified into three groups. These include the so-called G1 countries, which comprise developing economies with a common-law background, namely, the former colonies of Great Britain; the G2 countries, made up of developing economies with a civil-law background, consisting of the former colonies of European countries with civil-law regimes; and the G3 countries, which make up developing economies which were never colonised. The developing countries are characterised by having their profitable IK systems, especially plants with medicinal value, patented in the developed world. Most of the developing countries have insisted that there should be no patenting of plants without prior informed consent of the government and communities in the

country of origin (Blakeney 2000:14; Lehman & Brown 1995:148; Sodipo 1997:25; WIPO 1999:16).

The African Industrial Property Organisation (ARIPO) was established on 9 December 1976. The objective of ARIPO was to establish a common information service for the coordination, harmonisation and development of industrial property affecting its members. Members were mostly English-speaking African countries. The African Intellectual Property Organisation (OAPI), made up mainly of former French colonies, was established at Bangui on 22 March 1977. The member states undertook to subscribe to all international conventions in IP. The IP groupings (OAPI and ARIPO) that emerged in sub-Saharan Africa had the undisguised objective of maintaining the interests of colonial powers, and did not transform into vehicles for indigenous economic and technological transformation. (Endeshaw 1996:162, 164, 175; Gutterman & Anderson 1997:412; McKeough & Stewart 1997:474–475). Consequently, they will not be discussed in depth in this thesis.

African countries offer IPR protection in particular patent rights, not so much to encourage inventions in their countries, but rather as incentives to the development of trading advantages. When these countries do grant IP protection for items not available in their countries, the socioeconomic burdens incurred outweigh the benefits. Five countries, Kenya, Tanzania, Uganda, Zambia and Zimbabwe, started a regional collaborative initiative called Farm-level Applied Research Methods for Eastern and Southern Africa (FARMESA). Other countries associated with this initiative included Botswana, Malawi, Mozambique and South Africa. The FARMESA initiative aims at improving food security, incomes and resource management of farm families in the region (Torkelsson & Anandajayasekeram 2000). The initiative did not achieve much and thus will not be discussed further here.

To explore the African perspective on IP in more detail, the situations in South Africa and Nigeria are selected for this discussion. The reason for this choice is that South Africa holds the biggest IP market in Africa, followed by Nigeria.

3.3.3.2.1 South Africa

Property protection in South Africa is entrenched in both the Bill of Rights and the country's constitution. The South African property law is based on the Roman-Dutch law that conceptualises property as a legal relationship between persons and corporeal things. However, the South African Bill of Rights makes no mention whatsoever of IP. By implication then, IP is not considered a basic human right in South Africa, and disputes depend on the interpretation of the courts. The position of the Bill of Rights on property is that individuals must be given constitutional assurance that their property will not be nationalised, confiscated or have its value destroyed by the state in the name of economic reform without compensation (De Waal, Currie & Erasmus 2000:382).

South African IP laws are statutory and are based mainly on the British model. The South African patent law, the Patents Act No. 57 of 1978, was modelled on the British Patents Acts. South Africa is a signatory of the Paris Convention. The principal law governing copyright in South Africa is the Copyright Act No. 98 of 1978. South Africa is a signatory of both the Paris Convention and the Berne Convention. The South African Trademark Act, enacted in 1993, supplemented the Trade Marks Act of 1963 (Gutterman & Anderson 1997:414-418).

The majority of information in digital format is transmitted through digital technologies. This includes IP. This fact prompted the South African government to pass legislation in an attempt to protect information in electronic format, the Electronic Communications and Transactions Act 25 of 2002 (ECTA). The ECTA and other related legislation, such as the Promotion of Access to Information Act (PROATIA), have ushered a new age of maturity and sophistication for the law as it applies to electronic business. This has had profound implications for businesses which own websites or which use electronic media. Proprietary websites mostly contain information which is IP in nature (Electronic law consultancy 2003).

South Africa will have to make do with its existing legislation to deal with its Internet-related problems. This legislation includes the Copyright Act 98 of 1978, the

Trade Marks Act 194 of 1993, the Patent Act 57 of 1978 and the Designs Act of 1993. Although the Internet can be seen as another medium of communication, it does present unique problems, and most of the IP legislation was not drafted for the digital age (De Villiers 2000:39).

The South African parliament passed the National Environmental Act: Biodiversity Bill in 1998. The Act was passed for the management and conservation of South Africa's biodiversity, and the protection of species and ecosystems that warrant national protection. It also catered for the sustainable use of indigenous biological resources, and the fair and equitable sharing of benefits arising from the bioprospecting of genetic material derived from indigenous biological resources. The South African National Biodiversity Institute was established to deal with matters connected to indigenous resources (South Africa, 2003).

3.3.3.2.2 Nigeria

The Registration of United Kingdom Patent Ordinance Act of 1925 was applicable to most of the former British colonies in Africa (G1 nations), including Nigeria. Despite the sovereignty of the G1 nations, they could not grant compulsory licences under the re-registration system of the UK patent system. After independence, Nigeria adopted the Patent and Designs Act of 1970. Although this Act was passed, it was accompanied by limitations on its budgetary and policy formulation powers. The absence of qualified examiners and trained patent attorneys created a serious limitation in the Nigerian IP system (Azmi, Maniatis & Sodipo 1997:141; Sodipo 1997:33).

Nigeria agreed to honour patents issued in member states of the Organisation of African Unity, predecessor of the African Union, as well as in member countries of the Commonwealth of Nations and certain nations such as the USA. The Nigerian Trade Mark Act came into effect in 1967. Nigeria is also a signatory of the Paris Convention. Registered trademarks in Nigeria are valid for seven years (Gutterman & Anderson 1997:414-418).

3.3.4 Summary

This section explored some of the IP perspectives that emanate from the East and Africa. The discussion of the Eastern perspective included the evolution of IP in countries such as China, India and South Korea. All these countries implemented lax IP laws that led to industries which flourished in part because of the manufacture of counterfeit products.

In terms of IP in Africa, it was noted that both the South African and Nigerian IP laws are based on the British IP laws because they are former British colonies. South Africa has gone a step further by passing a bill on the protection of biodiversity. The Western perspective is dominant in the field of IP, which is strengthened by the fact that almost all the other perspectives discussed emanated from it.

3.4 Forms of IP

IP can be said to be information with a commercial value. IPRs can be defined as a mix of ideas, inventions, and creative expressions on which there is a public willingness to bestow the status of property. IPRs comprise industrial property as well as copyright and related rights and other forms of IP. IP principally concerns the protection of inventions through patents and trademarks. The greatest problem experienced by the developing world is the issue of access to protected IP which is required for their survival needs (De Castell 2000:369; Granstrand 2000:340; Hoekman & Kostecki 1996:144).

Woodward (1990:14) defines the right of access to information as:

> "the [right of access] to the intellectual efforts of others and a right to distinguish one's own intellectual efforts. This right is especially valued in democratic societies. It implies not only freedom of expression, but also other people's intellectual products. The

assumption is that knowledge is a common good, which must remain accessible for the benefit of society."

There are some limitations to this interpretation because various types of IP apply only within the borders of the country in which the rights have been granted. For instance, the holder of a US patent can preclude others from using, making or selling the inventions only in USA, because protection in foreign countries may not be derived from a US patent grant if such a country is not a signatory to the IP conventions. If a foreign country has established a patent regime that covers the subject matter of the invention, the inventor may be able to apply for a patent in that country. IP laws across the world are not uniform. This reflects the differences and inconsistencies that exist between developed and developing countries regarding the benefits and perceived dangers of imbalances in property rights (Gutterman & Anderson 1997:4-5; Lloyd 1997:353).

Lack of access to IP by the developing nations has led to piracy and counterfeiting. The statistics from the developed world allege that such practices account for five percent of the world trade. In the following sections, various forms of IPRs, which are also required for development, are discussed. Such rights are: copyright, trademarks, inventions/patents, designs, and plant breeder's rights (Clare & Detore 2000:286; Finger & Schuler 2000:519; Lloyd 1997:353; Sodipo 1997:9).

3.4.1 Copyright

The term copyright is usually used to denote the right that a creator vests in his or her work. In cases of joint authorship involving multiple authors, each author or artist owns copyright to the work. With the advent of the digital age, corporations (e.g., publishers) became the copyright holders. In the context of the digital age, copyright comes into existence when work has been written down, recorded, represented in digital data or signals or otherwise reduced to a material form, except in the case of a broadcast or programme-carrying signal, which must have been broadcast or

transmitted via satellite. Documents written on patented IP are also copyrighted (De Villiers 2000:41; Klopper & Van der Spuy 2000:10; Lloyd 1997:299).

The recognition of copyright means that authors are granted a restricted monopoly to exploit their original work provided that such original work is of a recognised category. For copyright to exist, a work has to be original. Hard work alone does not necessarily produce an original work. Copyright is also said to serve as an incentive to employ the patentee's talent and mental labour to create more and better works. The Western view of copyright is that it is a qualified monopoly that is instrumental in making it more attractive for the author to be creative, which in time will benefit society in the sense that society is enriched. It also ensures that existing knowledge and technology are expanded (De Villiers 2000:41; Hofman et al. 1999:84-86; Klopper & Van der Spuy 2000:10; Lloyd 1997:299; Search 1999:192).

The underlying philosophy of copyright is to protect the economic interests of authors and to provide the recognition that will inspire people to create IP. The categories or neighbouring rights of work covered by copyright are: literary works, musical works, artistic work, sound recordings, cinematograph films, broadcast, programme-carrying signals, published edition and computer programmes. There is no uniformity regarding the duration of copyright protection, although the Berne Convention establishes a copyright term of the life of the author plus fifty years. The protection of originators was incorporated into international conventions such as the Universal Copyright Convention, the Berne Convention and the TRIPS agreement (D'Amato & Long 1997:4; De Villiers 2000:42; Hofman et al. 1999:84; Lloyd 1997; Morris et al. 2001:10; Search 1999:193; Smith 1995:5).

3.4.2 Trademark

A trademark is a mark used by a person in relation to goods or services for the purpose of distinguishing it. Thus, a trademark is a mark, sign or symbol applied by entrepreneurs to distinguish their products or services from those of other traders. A mark may be any sign, including a device, name, signature, word, letter, numeral, shape or design, configuration, mottoes and slogans, packaging, ornament, colour or

container for goods or any combination of the aforementioned (De Villiers 2000:71; Doyle 1995:184; Klopper & Van der Spuy 2000:1; Williams, Calow & Highman 1998:92).

Trademarks are an important tool in commerce. A trademark enables consumers to identify or link the product with its manufacturer in widely distributed markets. The exclusive right to the use of the mark enables the owner to build goodwill and reputation in the expression of its identity. It is also used to prevent others from misleading consumers into wrongly associating products with an enterprise from which they do not originate (Sodipo 1997:35; Williams et al. 1998:92; WIPO 2000:38).

The fact that a trademark distinguishes one product from another makes it possible for a consumer to prefer one product to the other. Because a trademark creates a custom, it enhances the ability of the entrepreneur to attract even more customers and in this manner it strengthens goodwill. For this reason a trademark is economically valuable, and because of this value, the law affords entrepreneurs protection against the unlawful use of their trademark by other entrepreneurs (De Villiers 2000:74; Doyle 1995:184; Klopper & Van der Spuy 2000:5).

There is a growing international consensus that trademark protection should extend to the Internet. The existing national or regional legal systems would apply, together with the relevant international treaties. Before a trademark can be protected by the law, such a mark should be registered as a trademark. Trademark protection lasts as long as either the registration or use of the mark on the goods or services is in force (Klopper & Van der Spuy 2000:2; WIPO 2000:38).

3.4.3 Patents

Inventions are characteristically protected by patents. The invention is one of the acknowledged types of IP. The three characteristics of a patent are novelty, utility and non-obviousness. A patent is an exclusive right granted for an invention, which is a product or a process that provides a new way of doing something, or offers a new

technical solution to a problem. The earliest known patent on an invention was awarded in Florence in 1421 to Filippo Brunelleschi for a barge with hoisting gear capable of transporting marble. Patents and inventions are associated with each other and thus the law regulating inventions is referred to as the law of patents. A patent may be granted for any new invention which involves an inventive step and which is capable of being used or applied in trade, industry or agriculture (Klopper & Van der Spuy 2000:1; Lloyd 1997:247; Miller & Davis 2000:40; Morris et al. 2001:6; WIPO 2000:34).

The use of the word patent as a nomenclature denoting the right of an inventor is due to historical reasons. In England in 1632, the Statute of Monopolies was passed by which the monarch afforded protection to an invention by means of a 'letter patent'. Eventually patents and inventions were associated with each other and thus the law regulating inventions was referred to as the law of patents (Klopper & Van der Spuy 2000:1; Lloyd 1997:247; WIPO 2000:34).

Patented inventions have pervaded every aspect of human life, from electric lighting (patents held by Edison and Swan) and plastic (patents held by Baekeland), to ballpoint pens (patents held by Biro) and microprocessors (patents held by Intel). Inventors may apply for a patent jointly even though they did not physically work together or at the same time, and even though each did not contribute an equal amount of work, perform the same kind of work or make an equal contribution to the subject matter of every claim of the patent. Countries may exclude inventions from patent eligibility for the purposes of maintaining public order, national defence, and environmental protection. They may exclude therapeutic, surgical, and diagnostic techniques and patents need not apply to discoveries of nature, scientific principles, and mathematical formulas and algorithms. Patents need not pertain to higher life forms, and plant varieties may not be patented if they are protected by another system (Haile 2000:7; Maskus & Lahouel 2000:602; Spruill 2000:4).

In order to be eligible for patent protection, an invention must fall within the scope of patentable subject matter. Article 27.1 of the TRIPS agreement provides that, subject to certain exceptions or conditions under that agreement, patents shall be available for

any inventions. This applies to any products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application. The Internet has become an important marketing tool (which is self-evident in the right of the proprietor to use a domain name) which incorporates trademark. Trademark is very important for any business that the proprietor intends to conduct on the Internet. A domain name is a business asset. The basis for the recognition of a right to inventions to be found in the notion that it is to the advantage of society and public interest that industrial invention be improved. In order to encourage improvement, inventors are granted restricted monopoly or exclusive rights in respect of their inventions for a limited period. When this period elapses, the invention becomes public domain (De Villiers 2000:71; WIPO 2000:34).

The term of patent protection varies. TRIPs established a patent term of at least twenty years from the date of filing. In the event of an existing patent being improved by the amendment of or addition to such an existing patent, the patentee may apply for such addition or amendment to be patented. The patent of addition will lapse together with the original patent. WIPO and GATT have attempted to harmonise patent laws internationally (D'Amato & Long 1997:4; Klopper & Van der Spuy 2000:21-22; Lloyd 1997:246; Maskus & Lahouel 2000:602; Morris et al. 2001:6; Williams et al. 1998:99; WIPO 2000:36).

3.4.4 Plant breeders' rights

The granting of plant breeders' rights affords the creator (breeder) of a new plant variety protection irrespective of the method of the creation of such a new plant variety. Because a patent is only available in respect of the method of production of a new plant variety, a need arose in the 1930s to protect breeder's rights in respect of new plant varieties. This development initially had its origin in the USA and Europe. The law provides for the acknowledgement and protection of the rights of breeders/nursery workers in respect of new plant varieties (plant breeders' rights). In order for such rights to be protected, the law must be complied with, irrespective of whether the method of creation of the new plant had been previously patented. A

breeder can also issue licences to others to exercise the entitlements of a plant breeders' right (Drahos 1996:210; Ducor 1998:144; Klopper & Van der Spuy 2000:3).

In order to determine the nature of a plant breeders' right, an understanding of three concepts is essential, namely, plant, variety and prescribed kind of plant. A plant includes a tree, shrub, vegetable and any living part of the aforementioned. The distinctiveness of the variety will not be detrimentally affected by the fact that the breeder's own variety is common at the time of the application for plant breeders' rights. Variety means any plant growing within a single botanical taxonomy of the lowest known classification, irrespective of whether or not the conditions for the grant of a plant breeder's rights are met. Prescribed kind of plant refers to plants that are eligible for the creation of new varieties for the purpose of the recognition of plant breeder's rights. Both the US Plant Patent Act (PPA) and the Plant Variety Protection Act (PVPA) of 1970 are examples of IPRs created to protect the generation of new plant varieties (Ducor 1998:145; Klopper & Van der Spuy 2000:3-4).

In the event of two applications being received for the registration of the same variety, the application that is received first has priority except where one of the applications is in respect of a variety previously registered in a convention country. The duration of plant breeders' rights is linked to the kind of plant in respect of which the new variety has been developed. The patent period for plants in the US is 20 years, except in the case of vines and trees where the period is 25 years, calculated from the date on which the certificate of registration was issued (Ducor 1998:145; Klopper & Van der Spuy 2000:3-4).

Most IPR laws have developed to a reasonable extent to deal with non-living materials and the processes which produce them; however, to date few laws have been established for living organisms. The laws governing proprietorship and trade of knowledge related to animate or biological matter such as genes and DNA, microbes and biodiversity are still considered by many to be very rudimentary and to need further refinement. Nations have been intensely debating the ownership of national biodiversity, traditional knowledge of communities and the rights associated with such ownership (Ducon 1998:38; Ganguli 2000:168). Similarly, communication

using cyberspace and a range of novel storage and transfer media for information and knowledge, coupled with high performing robotics, have already posed unforeseen and difficult issues for IPR.

3.5 Summary

This chapter investigated the philosophy and various perspectives of IP, namely, the Western, Eastern and African perspectives. Different forms of IP were also discussed. It was found that IP laws exist in both the developed and developing countries. This chapter answered the following research sub-question:

What is IP and the role it plays in globalization?

In an attempt to answer this research sub-question, it was discovered that various international conventions on the harmonisation of IPRs were concluded. These conventions were geared to harmonise IP laws across the globe, and were heavily influenced by the developed world. This is the reason why the IP laws adopted by the developing world resemble those in the developed world. Colonialism also contributed to the Western influence on the IP laws adopted by the developing world. Because developed countries never had legislation on IK, this has until recently not enjoyed protection in developing countries.

It is very expensive for the developing world to register an international patent or to acquire a product protected by an internationally registered patent. This is due to higher fees linked to patent registration. The initial intention of IP was to provide access to products and information but also to protect the economic interests of the creator. The advent of the monetary economy created a shift towards a focus on protection of IP, and less emphasis on access to it. Increased IP protection curtails access to IP by the developing world, increasing the economic disadvantage faced by these nations. IK has begun to fall within the realm of IP because there are several patents registered on IK resources.

Consequently, the following chapter (chapter 4) will discuss various forms of IK systems to better understand IW faced by the developing world.

Chapter 4

IK within the global IPR context

4.1 Introduction

The previous chapter investigated the origin of intellectual property (IP) and the evolution of various forms of intellectual property rights (IPRs) and their influence on various societies. This chapter determines what indigenous knowledge (IK) is, its various types and its contrast with Western science. The influence of IP on IK is also investigated. This chapter does not seek to identify a universally acceptable definition of IK, nor does it distinguish between IK and IK systems. Rather, this chapter aims to understand what IK is in a global context. The concepts of IK and IK systems are used interchangeably.

Various communities have their own forms of IK. This chapter concentrates only on IK within developing communities. In an attempt to answer the main research question, this chapter addresses the following research sub-question:

What constitutes IK and how is it treated in the global IP regimes?

The main purpose of this chapter is to determine what IK is and to identify the various factors that shape its evolution. The impact of IP regimes on IK is also investigated.

Consequently, the main aims of this chapter are to:

- understand the concept of IK and its relationship with Western science
- determine the value of IK in various communities
- assess the influence of various forms of IP and related international conventions on IK
- determine the current status of IK

4.2 The concept of indigenous knowledge

The dilemma facing the concept of IK and what it means to the millions of indigenous people of the world is central to the postmodern and postcolonial debates on the origin of this knowledge. The concept of IK has often been associated in the Western context with the primitive, the wild and the natural. Some, especially within the Western context, have called it the native way of thinking. This elicited little appreciation for the insight and understanding IK might have provided. For the millions of indigenous people of Africa, Latin America, Asia and Oceania (non-Western people), IK is about understanding themselves in relationship to their natural environment, and concerns the way that people organise the folk knowledge of flora and fauna, cultural beliefs, and history, to enhance their lives. IK has been assembled by past generations and passed down to following generations. IK can be defined as "the knowledge that people in a given community have developed over time, and continue to develop based on experience, often tested over centuries of use, adapted to local culture and environment" (Semali & Kincheloe 1999:3). It is dynamic and changing (Greaves 1996:26; Le Roy 2000).

It is argued that IK should not be confined to tribal groups or the original inhabitants of an area. It is thus proposed that any community possesses IK, including rural and urban, settled and nomadic, original inhabitants and migrants. Other names for IK or closely related concepts are local knowledge, indigenous technical knowledge, lay beliefs, common sense beliefs, and traditional knowledge. These terms are used to denote the knowledge that evolved in a particular societal context and which is used by lay people in the daily course of their lives. For the purpose of this thesis, IK refers to unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area. It is noted that this type of knowledge must also exist in all communities, including within Western settings (IIRR 1996; George 1999:80; Grenier 1998:1).

The World Bank defines IK as being local knowledge that is unique to every culture or society. It is said to be the basis for local-level decision making in agriculture, healthcare, food preservation, education, natural resource management and a host of other activities in communities. It is also said to provide problem solving strategies for local communities, especially for the poor, and it represents an important contribution to global development knowledge. IK systems are at risk of becoming extinct. It is relevant for development processes but is said to be an underutilised resource in the development process (World Bank 2002). The characteristics of IK discussed by the World Bank represent the essence of this chapter.

IK evolved as a result of the people's interaction with nature in a common territory. Indigenous people have a fairly common history of colonisation by Western culture. The result of this was a constant regeneration of IK. The basis of regenerating IK is that it is local, holistic and *agrapha*. IK is local because it is the result of the daily interaction in indigenous peoples' territories. These interactions occur among families, communities and indigenous people through various means such as daily oral stories in indigenous language, in the daily agrarian work on the land, and in daily medicinal treatment with indigenous plants. The essence of IK is that it is alive in the culture of indigenous people. Property exists as a communal property in indigenous communities. What is considered proprietary in the developed world is considered communal in indigenous communities (D'Amato & Long 1997:36; Maurial 1999:62-3; Mays et al. 1996:266). This has a profound impact on the difference in thought patterns and worldview between IK and Western societies.

One important basis of an indigenous worldview expressed through IK is holism. Ideas and practices are one. There is no division among disciplines of knowledge. What Western thinking calls religion, law, economics, arts, and so on, in indigenous communities are united as whole entity within their worldview. Oral tradition expresses this holistic worldview, especially through indigenous people's mythical narration, in which the complexity of this view becomes understandable. Dividing intellectual, cultural, and scientific property into three separate areas is strange and unwelcome to indigenous people who see these areas as part of a whole. The holistic basis of IK is produced and reproduced within human relationships as well as in

people's relationship with nature. Therefore, a real understanding of IK occurs in its cultural wholeness. This has been supported by studies conducted in Swaziland of linking science to everyday life (Maurial 1999:66; Rains 1999:309).

IK is basically transmitted through oral tradition in societies that are *agrapha*, not written down. *Agrapha* is a word used in Hispanic anthropology. It refers to societies that did not invent or incorporate originally written expression in their culture. These societies maintained a complex oral tradition which was recreated daily from parents to children and from elders to youngsters. Through oral tradition, indigenous people transmit their holistic culture to their fellow human beings. According to the current IP regimes or legally defined systems, IK exists in the public domain. Those who wish to use it owe nothing to those from whom it was learned. Western IP protection does not only fail to protect IK, it in fact protects its appropriation by others (Greaves 1996:26; Maurial 1999:66-7).

The definition of IK remains dictated by the context within which it is studied. Most of the formal definitions of IK are described outside the scope of normal IK practices. Some research currently being undertaken within indigenous communities is guided by the scope of such studies in terms of what to include and what to exclude. A uniform approach and definition of IK should be standardised by the existing intercollegiate IK institutions. The appendix to this thesis contains a list of some of the IK institutions that may assist in standardising its definition. In order to best understand the concept of IK, it is important to discuss various types of IK that exist.

4.3 Types of indigenous knowledge

Shared knowledge is held by many but not all community members, for example, villagers who raise livestock will know basic animal husbandry. Specialised knowledge is held by a few people who might have had special training or an apprenticeship. For example, only a few villagers will become healers, midwives, or blacksmiths. The children within a rural developing community who have had very little or no contact with Western modes of thought are perceived to have the most

privileged exposure to authentic, relevant, and functional science as far as IK is concerned. Every day they witness the hatching of lizards, snakes, birds, cockroaches, and so on. In some cases their relationships with parents or grandparents who are village doctors, medicine men or women, or midwives give them unparalleled exposure to and hands-on experience in medicine. Among other daily chores, children participate in the local fabrication of hunting and farming implements, and help their grandmothers mix ash and palm oil for soap making. These chores can be said to introduce the children to engineering and technology although they are not performed in a formal laboratory context (IIRR 1996; Jegede 1999:128).

IK encompasses more than just technologies and practices. The following are examples of various types of IK (IIRR 1996):

Information

- Trees and plants that grow well together
- Indicator plants (plants that show the soil salinity or that are known to flower at the beginning of the rains)

Practices and technologies

- Seed treatment and storage methods
- Bone-setting methods
- Disease treatments

Beliefs

Beliefs can play a fundamental role in people's livelihood and in maintaining their health and the environment. Beliefs may entail the following practices:

- Holy forests are protected for religious reasons
- Religious festivals provide an important source of food for people who otherwise have little to eat

Tools

- Equipment for planting and harvesting
- Cooking pots and implements

Materials

- Housing construction materials
- Materials for basketry and other craft industries

Experimentation

- Farmers' integration of new tree species into existing farming systems
- Healers' tests of new plant medicines

Biological resources

- Animal breeds
- Local crop and tree species

Human resources

- Specialists such as healers and blacksmiths
- Local organisations such as kinship groups, councils of elders, or groups that share and exchange labour

Education

- Traditional instruction methods
- Apprenticeships
- Learning through observation

Communication

- Stories and messages carved on palm leaves
- Folk media
- Traditional information exchange mechanisms

Enthusiasm for IK has grown rapidly in recent years. This enthusiasm is unfortunately not reflected in an increased understanding of indigenous cultures. Since ethnic diversity corresponds to habitat diversity, each group of people has developed an individual understanding of the natural world. The important task facing ethnic groups is to ensure accurate recording, sorting and synthesis of this vast body of knowledge. IK includes both explicit and implicit knowledge, some of which is intuitively practised through cultural rituals or revealed through stories and legends. Local knowledge may not be apparent to outsiders or explicitly articulated by local residents, making it difficult for outsiders to understand, record, interpret, or apply (Blench 2001:3; Goodchild 2000:344; Patel 1996:307).

IK is often contrasted with Western science. However, this is not always done with an understanding or knowledge of all essential factors. It is imperative to compare these concepts to clarify any misconceptions or untrue assumptions that might exist between them. The following section therefore presents a comparison of IK and Western science.

4.4 Indigenous knowledge versus Western knowledge

Many of the challenges of IK interpretation relate directly or indirectly to the difficulty of studying IK using the Western scientific approach. Most IK practitioners interact with people from the Western world and the influence brought by such contact necessitates this discussion. Although the two knowledge systems are considered worlds apart, they share similarities that suggest that they may in fact be closer than they seem. Agrawal (in Grenier 1998:49) states that the critical difference between IK and scientific knowledge lies in their relationship to power. Western knowledge is said to be self-contained, self-sustaining, handy, convenient, and even embellished with a sense of righteousness. IK on the other hand is expressed in the existence of a whole set of knowledge that has been disqualified as inadequate to the task or insufficiently elaborated (Grenier 1998:49; Rains 1999:317).

IK is often contrasted with scientific, Western, international or modern knowledge. IK is generated by indigenous people in seeking to find solutions to problems in their day-to-day lives. They draw on existing societal wisdom and other local resources that may be available, and by using a fair amount of intuition and creativity. Modern knowledge is developed by universities, research institutions and private firms using a formal scientific approach. IK has been portrayed as closed, pragmatic, utilitarian, value laden, and content driven. This implies that IK may not have the same authority and credibility as science because its localness is restricted to the social and cultural circumstances of its production (George 1999:80; IIRR 1996; Watson-Verran & Turnbull 1995:116).

In reality, there is a lot of overlap between indigenous and Western knowledge, and in a certain sense and in terms of certain aspects it can be very difficult to distinguish between them. Because some aspects of IK change over time, it is sometimes difficult to decide whether a technology or practice is indeed indigenous, adopted from outside, or a blend of local and introduced components. For a development project, however, it does not matter whether a practice is really indigenous or already mixed up with introduced knowledge. Instead of only looking for technologies and solutions from outside the community, it is important to first look at what is in the community. IK is said to be more concrete while Western, modern knowledge, is built on more general abstractions (IIRR 1996; Rains 1999:317).

IK is more than science. If science is just a small part of knowledge, treating IK as a science diminishes its breath and value. Science and IK interact in certain subject areas, such as technology, resource management, ecology, and the classification of living organisms. IK did not evolve on its own into the modern IP system. The IK system has functioned satisfactorily and has met the needs of the society in general. IK has been developed over millennia and has been dismissed by those with the dominant intellectual authority of the time (Grenier 2000:47-48; Rains 1999:319; Sodipo 1997:47).

The West has disqualified IK as a category. The magnitude and extent of the conflict resulting from the interaction between Western and indigenous people is

immeasurable. The American conflict for example, began some five hundred years ago, with the first encounter the West with the American Indian civilisation. In Africa and elsewhere, Europe imposed completely different worldviews, languages, political, religious, and economic ways of living, despite the resistance of the indigenous people to their Western conquerors. Far from being static, however, indigenous people and their knowledge have continued to evolve between conflict and dialogue with Western people (Maurial 1999:67; George 1999:80).

The indigenous system is based on communal or group ownership whereas the Western system is based on individual ownership. No other society could have copied the laws of medieval Europe without knowing the laws or appreciating how systems had succeeded in Europe. This has been done by the modern day indigenous communities. The evolution of IP regimes within the developing world was not a voluntary exercise; it was forced down on them by governments in the developed world through international IP conventions. A modern copyright system could not have emerged in the absence of local technological advances, like printing, which gave rise to copyright in medieval Europe. In traditional communities, most artistic works were not produced for sale or export. For example, it was not until the first contact with the Portuguese in Benin that blacksmiths and sculptors began to make goods for sale. Before then, it was compulsory to make such things only for the king or for religious festivities or rituals. Most of such activities declined because of Christian beliefs against idolatry (Drahos 1996:171; Mays et al. 1996:267; Sodipo 1997:48).

According to Maureal (1999:63), the difference between indigenous and Western knowledge is that IK is developed or found neither in archives nor in laboratories. It is not separated from practical life. Thus, indigenous people are the actors of their knowledge and there are no positive repositories of knowledge separate from people's everyday lives. Table 4.1 presents a comparison between these two types of knowledge.

Table 4.1 A comparison of indigenous and Western systems of thought

Indigenous	Western
Anthropomorphic	Mechanistic
Monistic-metaphysical	Seeks empirical laws and principles
Cosmology with religion as an important focus	Public property minus religion
Oral tradition predominates	Documented
Sage practice	Truth can be challenged
Learning is communal	Learning is an individual enterprise

Source: Jegede, 1999:125, table 1 (adapted)

IK has been classed as inferior to Western knowledge within the Western world and its institutions of power (State, Academy, market, etc.). Those institutions of power have certainly interacted with indigenous communities. IK has managed to survive in spite of the different forms that have resulted from the interaction between indigenous and Western knowledge. All knowledge systems have their limitations, and IK is no exception. For instance, IK is passed on from one generation to the other in an oral mode. This can lead to some distortion over the course of time. Neither IK nor modern science will be appropriate and accurate in all circumstances. IK may also be scientifically less precise than Western science, as the latter can measure or statistically verify phenomena to a high level of precision (George 1999:80; Grenier 1998:55; Maurial 1999:62-3).

In summary, IK was not accorded the recognition it should have been given during colonial times. This led to a poor understanding of what it entails. It is seen to be different from Western knowledge, and although it is considered by the West to be inferior, this is an unfounded assumption. It does not distinguish between disciplines, as all disciplines are holistically integrated. Western science on the other hand categorises disciplines separately. Points of convergence between the two disciplines exist, but they are separated by the issue of power, usually because Western knowledge is regarded as precise and accurate as opposed to the vague and unscientific nature of IK. This is due to the fact that Western knowledge is generally

accepted worldwide, whereas IK is rejected to some extent even by the élite in indigenous communities who become influenced by the Western way of thinking. This is to a larger extent the result of globalisation. IK thus needs to be understood within a global environment.

4.4.1 Globalisation and its impact on IK

Avgerou (1998:20-21) defines globalisation as "processes operating on a global scale, which cut across national boundaries, integrating and connecting communities in new space-time combinations, making the world in reality and in experience more interconnected". Globalisation is therefore a process of denationalisation of markets, politics and legal systems. This is also called the rise of the so-called global economy. The consequences of this political and economic restructuring on local economies, human welfare and environment are the subject of an open debate among international organisations, governmental institutions and the academic world. Globalisation is thus concerned with the endeavour of business practices and processes to take a business or a product to a global level (Globalization.com (See http://www.globalization.com/)).

IK does not exist in a vacuum. It is part of the globalised world because most indigenous communities who practise IK interact with people in various parts of the world, especially since colonisation. The trend towards a "global village" has influenced the evolution of IK. This makes it important to discuss IK within the global context. One of the more uncomfortable and seldom discussed consequences of globalisation is the erosion of ethnic diversity. It is paradoxical that the levels of resources that can be mobilised for the conservation of biological diversity far exceed those for human cultures. Biodiversity and indigenous people's knowledge are inherent in the idea of indigenous territory (Blench 2001:2; Viergever 1999:335).

IK systems can be complex. For instance, maintaining biodiversity at the farm level includes maintaining the different varieties and the management processes to which these activities are subject. Attempts to 'scientise' IK by removing it from its owners

will tend to compromise the subtle nuances of this knowledge. International agreements such as GATT and TRIPS have been concluded by various national governments. This makes such treaties global. Development agencies, especially bilateral donors, have historically displayed limited interest in indigenous peoples. They gave low priority to the preservation of traditional cultural values (because of their oral nature) compared to the conservation of biological resources. The United Nations, perhaps because of the internal diversity it represents, is more advanced in this area; it initiated the *International Decade of the World's Indigenous People* in 1995 and is about to create a permanent forum on indigenous rights. The World Bank, under pressure from indigenous organisations and NGOs, especially in South-Central America, has adopted a policy on the rights of indigenous peoples (Blench 2001:2; Grenier 2000:47; Hoekman & Kostecki 1996:10).

IK from the developing nations, especially the healing properties (medicinal value) of their flora and fauna, are being patented by multinational pharmaceuticals located in the developed world. Various interests emerged in the area of IK and it faced appropriation into patents by those involved in bioprospecting. Bioprospecting means searching for commercially viable genetic and biological resources, with particular reference to pharmaceutical, biotechnological, and agricultural industries. Companies patent the procedures or properties of such medicine without rewarding the indigenous population for such knowledge. In fact, they are expected to purchase such medication at a high price. This could, to a certain extent, be regarded as modern biotechnological colonisation. Over the years, the interest in IK systems has grown beyond the anthropological documentation of cultures. This is clear by the increasing amount of literature on the subject published in fields outside of the discipline of anthropology. Recently, attempts have been made to document and store IK. This could be related to the growing concern regarding environmental decay (Blench 2001:3; George 1999:79; Reynar 1999:287; Viergever 1999:333).

Environmental management is one of the areas in which good use can be made of IK. Interest in IK in this field may be purely academic, but is also sparked by the possibility of application in the field. The knowledge of traditional and indigenous communities concerning characteristics of plants and herbs, particularly medicinal

plants, is considered useful in promoting sustainable use of biological resources. The exploitation of biotechnology for commercially valuable genetic and biochemical resources is a possible key to biodiversity conservation. IK is said to acquire more value when it is taken out of its natural setting and commercialised in a proprietary manner (George 1999:79; Mays et al. 1996:266; Reynar 1999:287; Viergever 1999:333).

Indigenous communities have recently tried to protect this knowledge from appropriation by others. Most strategies for protection of IK concentrate on documentation rather than patenting. Documentation of IK is one means of giving recognition to knowledge holders. But mere documentation is unlikely to result in the sharing of benefits arising out of the use of such knowledge, unless it is backed by some kind of mechanism for protecting the knowledge. Documentation of traditional knowledge may only serve the purpose of preventing the patenting of this knowledge in the form in which it exists. This is a direct consequence of the fact that most scientists do not acknowledge IK as a product of a dynamic and creative system to resolve perceived problems. Most scientists and policy makers perceive the collected information of indigenous communities to be the result of passive, even accidental, accumulation. They assume that indigenous communities have gathered knowledge in about the same way as they would gather stones (Protecting IK 2002:5; Viergever 1999:338).

A number of universities and large multinational corporations have recently engaged in a huge effort to find new products through traditional knowledge. In terms of this initiative, for instance, a shaman is no longer considered a witchdoctor, but is someone who possesses knowledge valuable to business. Within traditional societies, certain forms of knowledge are restricted to certain sectors of the population, such as healers, men who have been initiated into a certain position, or women only. Various agreements have been drawn up between indigenous communities and industries such as pharmaceuticals in the hope that some of the IK held by indigenous people may lead to commercial applications. As soon as the corporations are granted patent to indigenous products, they automatically obtain exclusive rights to the products and procedures to process them. As soon as these corporations patent products in multiple

countries, the possibility exists that indigenous groups will be prohibited from using their own cultural heritage and knowledge. The fact that IK is of critical importance to the survival of indigenous communities is often ignored (Carruthers 1996:1017; Greaves 1996:29; Haile 2000:7; Maskus & Lahouel 2000:602; Mays et al. 1996:266-7; Ostergard 2001:650; Shah 2001; Spruill 2000:4; Viergever 1999:333).

Donors have few frameworks for funding projects relating to indigenous activities. In addition, the funds available are small and often discretionary, in marked contrast to the large sums available for the infrastructure projects that act to erode ethnic minority culture. There are two possible explanations for this. The first is that most donor countries have limited experience in managing ethnic diversity, as in Europe, which has strikingly low ethnic diversity. Secondly, donor countries generally have a poor record of managing their own diversity, as has been seen in Australia, the United States and Japan (Blench 2001:3; Nabhan et al. 1996:190).

The dilemma of indigenous peoples should be well known amongst international audiences, especially as it has been raised in the UN. Issues relating to culture, tradition and IP have acted as a catalyst for those who seek support from international forums for their local goals. Information technology is now an essential component of self-determination and development. It is the new and hidden tool for colonisation as IK and IP are increasingly misappropriated. Access to infrastructure, skills, and a voice in global dialogues and debates are crucial for indigenous people across the globe. Within the global context, it is important to discuss the importance of IK for both indigenous and Western people because it is through globalisation that both communities are brought into contact with IK. This also renders IK important for sustainable development.

4.5 Importance and value of IK for the world

Knowledge and traditional resources are central to the maintenance of indigenous people's identity. IK is the basis for self-sufficiency and self-determination because indigenous people are familiar with indigenous practices and technologies. Before the expropriation of IK or any form of IW against IK may be discussed, it is important to first consider how IK is valued by both indigenous and Western people. Indigenous people can understand, handle, and maintain IK better than introduced Western practices and technologies. IK can provide effective alternatives to Western know-how. It gives local people and development workers extra options when designing projects. Instead of searching only among Western technologies for feasible solutions, they can choose from IK or combine indigenous and Western technologies. Indigenous technologies and practices are often cheaper than Western options as they rely on locally available skills and materials (IIRR 1996; Rains 1999:317).

In traditional societies, the right to livelihood resources, such as trees, crop species, and medicinal plants, are not usually exclusive. Such rights are considered inalienable; they cannot be transferred, either as a gift or through a commercial transaction. Today, indigenous societies find themselves poked, probed and examined more than ever before. IK is the cultural heritage that gives indigenous people their identity. It has been subjected to potential assault from people who gather it up, strip away its honoured meanings, convert it to a product and sell it. Each time this happens, the cultural heritage dies a little. To a certain extent, some forms of IK have been an open treasure box for unfair appropriation by Western civilisation. When IK is appropriated, it is transformed into a constituent of the commercial process. As such, IK has been acknowledged as a resource and is exploited for economic growth. This constitutes a form of IW against indigenous communities because they do not actually benefit from the appropriation of their heritage (Reynar 1999:293; Greaves 1996:25; Posey & Dutfield 1996:54). This will be discussed in greater depth in chapter five.

The creators of IK are a chain of people who are linked through a shared oral transmission of their collective observation, trial and error tests and informal

experiments. Governments, corporations and others have deemed the traditional lifestyles, knowledge and biogenetic resources of indigenous or local people to be of commercial value. This renders IK a kind of property that might be bought and sold. IK itself is a commodity and it needs to be protected. It has been suggested that the existing legal regimes, the IPRs, should protect it. Chapter three discusses in detail the applicable IPRs and the problems associated with using these in an indigenous context. Filing for a patent, for instance, involves extensive paperwork that would be too expensive for a tribe to afford. Indigenous communities fear that documenting IK may ultimately lead to their control by others. The limitations of existing mechanisms of IPR therefore outweigh their potential for protecting IK. Should monopoly rights be granted to an individual or organisation for traditional information, the common benefit derived from its exploitation would be lost (Nabhan et al. 1996:190-2; Viergever 1999:338). As such, the common benefit denominator inherent in IK is ignored or discarded.

IK is not only important to indigenous communities. Within the global context, IK has been reshaped by the influence of the global role players who interact with it. As such, IK is not static, but has evolved so that it no longer reflects its original form. The changing dynamics of IK are discussed in the section that follows.

4.5.1 Dynamics of indigenous knowledge

Indigenous communities have always reinvented technologies useful for their daily needs and production systems. They should be supported and given opportunities to experiment and adapt what is most appropriate for themselves. IK research can foster local empowerment. Host governments might view local empowerment as a subversive challenge to existing political structures. Schools as an institution can create cultural change in a community. Schooling, if thoughtlessly administered, can undermine IK in three different ways. Firstly, it can fail to present IK as worthwhile subject matter for the learning process. Secondly, it can limit children's exposure to the local knowledge of their communities. Thirdly, it can create attitudes in children that militate against the acquisition of IK. On the other hand, the effect of exposure to

formal education might help households generate the most appropriate knowledge to solve their problems (Mwadine 1999:259; Rains 1999:309).

Figure 4.1 Factors in the generation of new indigenous knowledge

Resource availability	Perceived problem	Ecological factors
	New indigenous knowledge	
Formal education	Changing perceptions & desires	Cultural/social networks & beliefs
Access to relevant information and technology	Historical experiences and knowledge	

Source: Mwadine 1999:259, figure1

Figure 4.1 shows that IK can be used in problem identification and prioritisation, identification of (perceived) causes of the problem(s); resources available in the community; generation of alternative solutions to common problems and sources of alternative technology; management and implementation of programmes; and monitoring and evaluation. IK is considered to be confined to a small area, and limited to what rural people can sense, observe, and comprehend using their own terms and concepts. Care must be taken when intending to transfer the information to other locations as it may not be applicable elsewhere. That is why schools are not considered to be ideal institutions for teaching and researching IK if they are poorly administered. IK needs to be managed with sustainable development in mind.

4.5.2 IK for sustainable development

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable agricultural and natural resource development means utilising, managing and conserving natural resource bases. It involves the orientation of technological change to ensure that human needs, such as food, water, shelter, clothing and fuel, are obtained and maintained for the present and future generations. According to the World Commission on Environment and Development, sustainable development has the following objectives (Grenier 1998:8):

- reviving growth
- changing the quality of growth
- meeting essential needs for jobs, food, energy, water and sanitation
- ensuring a sustainable level of population growth
- conserving and enhancing the resource base
- reorienting technology and managing risk
- merging environmental considerations and economics in decision making
- reorienting international economics relations
- making development more participatory

Sustainable development can be measured by means of productivity and yield. Productivity is defined as the capacity to produce, and yield is the amount produced. The spread of a monoculture of high yielding varieties and fast-growing species in forestry and agriculture has been justified on grounds of increased productivity. Knowledge about biodiversity and agricultural practices is often the basis of the indigenous people's food security, health care and livelihood. At an international level, there is no consensus on the criteria and indicators for sustainable development. There is agreement, however, on the need to develop country-, region-, and sector-specific indicators and criteria for sustainable development (Grenier 1998:8; Viergever 1999:333).

Development of such indicators would assist developing countries which have a rich variety of plant species to exploit the medicinal value found in such plants. This may be possible should these countries obtain some economic and technological capacity for exploiting and profiting from the transformation of such plant species into a profitable commodity. When IK resources are exploited, the notion of sustainable development and the sustenance of future generations must be kept in mind (Drahos 1996:65; Posey & Dutfield 1996:14). In this instance, it seems that sustainable development may only be achieved if IK is regarded as a part of IPRs. Even though current IPRs do not protect IK as it is deemed to be in the public domain, it is important to investigate the existence of the link between the two.

4.6 Links between IK and IPRs

IP laws vary from country to country but international treaties like the Paris and Berne Conventions give them a common basis. In some cases, IK is regarded as a property in the public domain. The problem facing IK is not only that it is not adequately protected. It is also that protection can lead to the exclusion of the people to whom the knowledge belongs. There are some registered patents that originate from the IK-based resources (originally from the developing nations) and this justifies the need to investigate the link between the existing IP regimes and IK products. In essence, there are four forms of IP, as discussed in chapter three: patents, plant breeder's rights, copyright, and trademarks. The mainstream IPRs and their conventions do not explicitly include IK as a form of IP but products derived from IK are protected by IP regimes. This makes it important to discuss the way IK is perceived under the well-established IP regimes. Patents and plant breeder's rights are the two common forms of IP most relevant to IK. Some existing IPRs are not geared to recognise IK contributions but legalise the rights of inventors and innovators of modern technology. The fact that most of the inventors and innovators who have registered their discoveries hail from the Western world increases the inequalities between the developed and developing countries. Inequalities in IPRs have been aggravated by the TRIPS provisions and GATT in general. The provisions of these conventions run

counter to the hopes enshrined in the Convention on Biodiversity adopted in 1992 (Grenier 1998:13; Le Roy 2000; Patel 1996:306).

In the 1800s, most national patent laws in Europe excluded living materials, food, and medicines from protection. Much has changed since then. Groups of living things first came under IP with the US *Plant Patent Act* of 1930, which targeted some asexual plants. In the early 1960s, the United States passed a law granting plant breeders the right to patent seeds, preventing others from selling the same variety. Since 1980, when the US Supreme Court ruled that an oil-eating microbe was patentable, a trend has been established to extend patent law to many life forms. The US Patent and Trademark Office ruled in 1985 that a plant could qualify for a patent under industrial laws and in 1987 animals became patentable. Currently, there are a number of IPR regimes in operation that cover life forms in Europe, the United States, and elsewhere. The newer laws tend to cover a broad spectrum of life forms and grant an astonishing degree of ownership to the patent-holder. Moreover, when IPR laws are amended, the scope of protection and the degree of parent holders tend to be extended (Grenier 1998:13; Lanjouw 2001:2).

At the international level, the question of what is patentable is both unsettled and controversial. On 18 June 1997, the European Parliament Legal Affairs Committee voted to allow industry to patent living organisms, overturning its previous patent law. Concerned groups are lobbying against the proposal, arguing that the proposal addresses only the interests of the biotechnology industry. Corporations are well aware of how cost-efficient it is to tap the knowledge of communities that live with and depend on biodiversity for survival. Multinational pharmaceutical corporations have taken plant samples from tropical forests to use as raw materials in developing new drugs. Agricultural companies took disease resistant seeds identified by indigenous peoples and genetically manipulated the seeds. After some modifications, this genetic material was patented, mainly in the United States, and the resulting seed or product was marketed. Corporations have realised enormous benefits from their free access to genetic materials, especially in the case of crop plants from developing countries. The indigenous people who contributed to the drug discovery process have

largely remained without compensation for their contribution (Grenier 1998:13; Mays et al. 1996:263).

Countries such as Brazil, Argentina, and India have allowed patents on processes but not products and have compelled patent holders to make socially useful products available in the domestic market. The US Utility Plant Patent is the most powerful protection available for plant and related protection. A single application may cover multiple varieties or even an entire genus or species. These applications can cover biological material, processes, genes, protein, recombinant processes, culture techniques, plant parts, and seeds. The Utility Plant Patent is often used to cover genetically engineered materials, whether whole organisms, tissue cultures, cells, or DNA sequences, and transgeneric materials (D'Amato & Long 1997:36-37; Grenier 1998:13).

TRIPS and GATT confer creators exclusive rights over the use of their creation for usually 17 to 20 years. It does not matter whether or not inventors have used public knowledge for the purpose of their invention. Inventions and knowledge that have collectively been shaped through the years by communities can be appropriated by a single person, eventually changing an originally public good into a private one. The current legal mechanisms for the harmonisation of IP are not in line with the indigenous perceptions of ownership. Some indigenous ownership rights do not translate well into existing IP regimes. This is because most of the underlying indigenous ownership lies in artefacts or oral tradition. IK is thus easily appropriated into the commercial context (Britz & Lipinski 2001:235; Le Roy 2000).

A patent system cannot be developed in the absence of skills for writing, documentation and administration. Competition from foreign goods and works in many instances has led to the demise of local industry; thus there have never been incentives to develop any protection for local industries. Some researchers from the developed world have made discoveries using material or information from the developing world. This led to commercialised IK where trademarks are used by the patentees to market and identify products across the world. This process includes the commercialisation of culture through the manufacture and sale of souvenirs,

entertainment of tourists through bastardised rituals and the use of cultural rituals in commercial endeavours. This commoditisation has resulted to some extent in the dilution of indigenous rights and culture. The majority of patents derived from the commoditisation of IK are registered in the United States, Western Europe and Japan, and profits from patented products generally go to Western industry such as pharmaceutical firms in those countries involved in bioprospecting (Britz & Lipinski 2001:236; Mays et al. 1996:263).

Through this process, IK products become divorced from their original owners and the trademark makes the patentee the only known legal owner of the product. Indigenous communities do not attach monetary value to the indigenous information. Individual discoveries are available for the benefit of humankind. With the advent of the monetary economy, however, information or knowledge has been attributed to individuals or organisations as inventors and owners. A critical dilemma surfaces when one attempts to place some monetary value on IK or its contribution to the pharmaceutical products originating from it. The indigenous communities who owned some of such information were ignored and not recognised as the original owners of that created information. A developing country cannot be expected to protect IK in the way that a multinational pharmaceutical firm can. Financial value has been linked to various categories of information and the financial benefits go to those in the developed world. Figure 4.2 presents a comparison between the IK system and IPRs (Drahos 1996:171; Mays et al. 1996:267).

In traditional societies, trademarks could be used to determine the origin of work because the market structure featured the sale of goods either through markets or middlemen. All inventors had a mark to identify their products. In a sense these marks belonged more to the community than an individual. These marks are comparable to the modern day trademark. Goodwill was attached to the middlemen or markets more than to the marks themselves, thus the role of marks in these communities was different to what it is in modern society today. In traditional communities, the use of a mark belonging to another community was rare. A community would copy the mark after being influenced by its owners as a sign of superiority over the latter. Such marks were regarded as communal property. Most preliterate communities had lost

their sovereignty with the advent of Europeans, so they could not prevent the influx of foreign goods. Discussions on the protection of IK were generated by causes such as fundamental unfairness of the appropriation of IK, and the acceleration of the global pursuit of useful knowledge. This led to a struggle by indigenous communities for their cultural existence. This struggle has fuelled the worldwide concern for human rights (Greaves 1996:26; Sodipo 1997:48-9).

Table 4.2 A comparison between IK and IP systems

IK system	IP system
Preliterate system functioned satisfactorily and met needs of the creator and society.	No evidence that it is better than preliterate system.
Based on communal and or group ownership.	Individual ownership.
Copied modern system from Europe.	Medieval Europe had IP laws.
Modern copyright used is linked to modern technological advances.	Medieval Europe had laws pertaining to copyright.
Artistic works were not produced for sale or export.	Market-driven economies.
Artistic works and activities declined during colonial era.	Exported technology and religion to the preliterate world.
When markets emerged, marks were not used, markets and middlemen identified goods, thus they acquired goodwill.	Goodwill was attached to marks themselves.
Copying of marks was a sign of superiority over the owner. Marks are communal property.	Copying of marks is regarded as IP infringement.
Patent system could not be developed in the absence of writing, documentation and administration.	Comprises about 90 percent of the world's patent filing.
The advent of Europeans and their goods led to the demise of local industry.	European nations prevented competition within national borders.

Source: Sodipo 1997:47- 48 (adapted)

The Convention on Biodiversity and GATT are the most prominent IP regimes relevant to a discussion on IK. TRIPS, which emanated from GATT, serves to protect most IPRs as it stipulates the minimum period for patent protection as being 20 years (Ganguli 1998:173). The Convention on Biodiversity is the only international convention that attempts to protect indigenous resources. These factors make it necessary to discuss the link between IPR conventions with IK, GATT and the Convention on Biodiversity.

4.6.1 General Agreement on Tariffs and Trade (GATT) on IK

IPRs were subject to national legislation before the conclusion of the General Agreement on Tariffs and Trade (GATT) that forged the international harmonisation of IP legislation. International conventions such as GATT and TRIPS are at the forefront of the protection of IP. IK has never been regarded as proprietary, which is why most of the international conventions have not considered its protection. The purpose of discussing the international conventions is to demonstrate that they never included IK in its traditional context in their protection stipulations. Nations were free to determine whether and how they would recognise IP. In 1994, negotiators of the Uruguay GATT agreement agreed that member countries would bring national IPR laws in line with the new agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). Effective 01 January 1995, TRIPS obliges member countries to implement patent coverage for micro-organisms and essentially biological processes for the production of plants (other than non-biological and microbiological processes) (Grenier 1998:13; Hoekman & Kostecki 1996:1).

TRIPS provides for a 20-year product protection period, after which protection for the manufacturing process is extended for another 20 years if the process is new. The South (predominantly the developing countries) was given until 2000, and the least-developed countries until 2004 to either adopt an existing international IPR convention or develop their own IP legislation. However, IK in its traditional context did not form part of most of the international conventions and issues regarding IK were relegated to the Convention on Biological Diversity. It is now sold for pharmaceutical products in some instances.

The Convention on Biological Diversity was called following pressure from lobby groups for the protection of the environment, which encompasses IK. The United States has interpreted the provisions of the Convention on Biodiversity as being subordinate to those of GATT. How the GATT provisions are interpreted and implemented is important. The World Trade Organisation (WTO) panel rules on whether member states are complying with the rules, with other issues being subordinate to their ruling. Environmental and human rights groups will therefore

have to make significant lobbying efforts to steer the discussion toward a more sustainable future that includes IK protection (Grenier 1998:13; Gutterman & Anderson 1997:18):

GATT and, more recently, TRIPS are dependent on the ruling of WTO. This allows the strong and developed nations to dominate the direction during decision making. Neither of these agreements makes specific reference to the protection of IK and the reimbursement of indigenous communities. The issue if IK was dealt with chiefly through the Convention on Biological Diversity. For this reason, the following section discusses this agreement in more detail.

4.6.2 The Convention on Biological Diversity

The term biological diversity (biodiversity) is used to describe a variety of living organisms such as genes, species, ecosystem and others. Most of our planet's plant resources (two thirds of all plant species) are located in developing countries; these regions' tropical forests in particular are known to be rich in biodiversity. It is very important to determine the place of IK within the provisions of this convention because it is the only international convention that recognises the existence of IK as a form of property owned by the people in the developing world. The Convention on Biological Diversity, a legally binding international agreement, was concluded at the United Nations Conference on Environment and Development in 1992. It came into force in December 1993. The 150 signatories to the Convention made a commitment to the conservation of biological diversity, the sustainable use of its components and fair and equitable sharing of the benefits arising from the utilisation of generic resources. The convention is not explicit on how the local people should be compensated for the commercialised IK. It only espouses the equitable sharing of the benefits of resources (D'Amato & Long 1997:86; Grenier 1998:16; Le Roy 2000).

Botanists, biologists and others with technical taxonomic training seek out specific plants based on information provided by indigenous people or traditional healers whose knowledge of the use of certain plants derives from unrecorded knowledge

handed down orally from generation to generation. Only a few drug companies have started to make payments to some research institutes or governments, in other words, the owners of IK. No benefits have been returned directly to indigenous communities. Although the Convention recognises the importance of biological IK, more often than not this knowledge has been used without the approval and involvement of the holders of such knowledge. National governments should adopt legislation specifying patentability criteria in order to ensure the protection of real inventions and to ensure a balance of rights and obligations of the patent holders and the end-users. These criteria should be applied strictly (Grenier 1998:16; Mays et al. 1996:265).

According to the Convention, farmer's rights are privileged for being plant breeders, conservers and consumers. In addition, national interests take priority, namely, the sovereign rights of states to their biodiversity. The Convention encourages developing countries to preserve their diminishing rain forests, wilderness areas and wetlands. It also calls for equitable sharing of the economic benefits from patented processes using rare plant and animal species found in developing countries. Generic resources like minerals and oil resources are subject to national legislation, meaning that nation states have a right to set conditions and limitations on access to generic resources. Although the Convention on Biological Diversity affirms the sovereignty of nations over their biological resources, it encourages bilateral arrangements between those who want access to resources, knowledge and local government. The Convention does not define protection at the level of the community. Overall, the Convention lacks teeth, it has no mechanisms to control outsiders' access to indigenous bioresources (for example, a binding code of conduct) and no mechanisms to determine the equitable sharing of benefits (D'Amato & Long 1997:84; Grenier 1998:13; Thomas 1999:228).

There is a strong correlation between the maintenance of ethnic diversity and the conservation of biodiversity, as well as a reservoir of IK about the environment which remains largely untapped. Ideas about the rights of ethnic minorities, especially in relation to control over natural resources, remain undeveloped and it is in the interest of powerful majorities that this should be the case. National resource centres (see the appendix for the most prominent national institutions around the world) also serve to

protect IPRs that could be used for the benefit of the country (Blench 2001:2; Greaves 1996:27; Semali & Kincheloe 1999:3).

The Convention on Biological Diversity does not address the problem of the unfair appropriation of IK. Domestic IP laws supersede the provisions of the convention, which allows countries to continue with their IK-unfriendly legislation. It does not bring a solution to the information warfare (IW) experienced by developing countries in terms of their biodiversity. Both GATT and the Convention on Biodiversity do not actually protect IK from exploitation. Consequently, it is important to discuss the current status of IK, especially within the broader research community.

4.7 Exposure of IK to Western researchers

Researchers such as anthropologists, archaeologists, and biologists may be involved in scientific or cultural investigations. They may be employed by companies, governments, universities, botanical gardens, NGOs, or conservation organisations. Some multinational companies invest enormous amounts of money in research activities such as bioprospecting. The most prominent and common way through which IK is appropriated is though the research endeavours of the research institutions of the world. Commercialised IK is well-researched before being processed into final products. As such, the exposure of Western researchers to IK is an important feature of understanding the current status of IK (Goodchild 2000:344; Ostergard 2001:644; Posey & Dutfield 1996:11).

Companies investigate the useful attributes of the biological substances known to a traditional community. Although normally a product patent cannot be obtained for a naturally occurring organism, chemical or gene, patents can be obtained in some industrialised countries for one that has been altered in some way. For instance, research identifies plant varieties used by the locals and analyse the properties of such species in the laboratory. Discoveries with profit potentials are transformed into commercial products that are protected by IP regimes such as patents. The sudden interest in IK is caused by the fact that most IK has been ignored by researchers and

much knowledge remains unexplored. It is also assumed that medication for incurable diseases such as cancer and AIDS could lie in the unexplored biodiversity of the developing world. This makes it important to investigate the exposure of Westerners to IK (Goodchild 2000:344; Ostergard 2001:644; Posey & Dutfield 1996:79).

Because knowledge is power, individuals are not always willing to share knowledge among themselves or with outsiders. Knowledge is a source of status and income and is jealously guarded. A related issue is that some indigenous people fear that their IK will be misused, and lacking power to prevent such abuses, they choose to keep quiet. The quality and quantity of information resulting from a particular research activity depends on the trust established between researchers and participants. IK research presents a challenge to researchers to be patient, sensitive, open-minded, and cautious. A commitment to positive social change and to conducting enriching research is needed. Extractive research provides information to outsiders, whereas enriching research benefits local communities. Enriching research is infinitely preferable for IK research than extractive research (Grenier 1998:46-8).

Indigenous people have tried to formulate their own definitions of IK in order to identify strategies to conserve the social structure through which IK is generated. For some years, the definition of IK has preoccupied the members of the Inter-institutional Consortium for Indigenous Knowledge (ICIK) based in Pennsylvania State University. ICIK is one of over 50 growing networks of national IK resource centres that serve as local clearinghouses. (See appendix for various national IK institutions around the world.) Most of the efforts applied to indigenous IPRs are expended by non-indigenous individuals (Greaves 1996:27; Semali & Kincheloe 1999:3; Viergever 1999:333).

Foreign scientists who conduct IK research do not always understand IK from the viewpoint of the indigenous communities. Some are only interested in information about their specific areas of interest. IK must not be used as a source of information which, in the long run, does not economically and politically benefit the indigenous populace in whose environment it originates. Proponents of IK are already becoming biased to research elements that are based on methodologies, analysis techniques,

theories, and preconceived solutions that are similar to established Western research techniques. A good sampling strategy or an effective way to identify knowledgeable individuals is needed. It may also be difficult to differentiate traditional knowledge from random local views. If IK is to be used or replicated, there is a need for critical analysis of the situation in which it originated. IK will also face competition from more acceptable and better financed models promoted by international institutions, bilateral agencies or multinational companies (Mwadime 1999:265; Nabhan et al. 1996:193).

International scientific methods are too simple to capture the complexity of an IK system. IK research must capture both the tangible and the invisible. Despite the methodological challenges for IK research, very little attention has been given to the specific requirements of IK research. Whelan (in Grenier 1998:53) captures the core values associated with doing IK research in terms of three Rs: respect, reciprocity, and relationships. Values for IK research can be outlined as the following:

- *Appropriate attitude* – IK researchers need to be self-critical and must recognise their own bias toward formal scientific, urban, high-tech knowledge. It is the responsibility of the researchers to remember that IK systems may be just as valid or useful; as Western systems; and that a low-tech solution can be highly appropriate.
- *Appropriate methods* – The researcher must ensure that the research methods are tailored to people's cultures, abilities, and requirements and effectively represent local people's point of view.
- *Multiple methods* – IK research requires a mixture of techniques that together facilitate the collection of different types of data and help confirm or reject findings through a process of cross checking or triangulation. A good combination of methods can access knowledge concealed in cultural norms or political factors.
- *Broad participation* – Participation means involving women, men and children of all classes and requires both the researchers and the informants to do more than merely attending or answering questions.

One way to elicit the IK of a community is by participating in its work and leisure activities over a period of time. It would then be important to diligently observe the interaction of all factors that are at play. This leads to a need to understand the current status of IK.

4.8 The current status of IK

Researchers are generally the most important agents in investigating and improving an existing knowledge base. Their attitudes and research methods need to be appropriate when conducting research into IK. It is therefore very important that researchers understand the current status of IK in a global context.

IK is dynamic and influenced by environmental changes. The issues on IK discussed above warrant an analysis regarding the current status of IK on a universal context. Foreign institutions, such as powerful governments and their multinationals, influence the way IP is perceived and this necessitates an investigation of this issue. To identify strategies for the conservation of IK, there should be consensus on the importance of IP in terms of its role for the world as a whole and for the livelihood of indigenous communities. The decisions by the US Patent and Trademark Office to grant monopoly rights over plant, animal, and human generic materials have led to a rush to collect, map, and patent genes, based largely on their future profit potential. Despite the pressure from trade agreements such as GATT, few governments endorse the IPR system accepted by US courts. Meanwhile, the US has accused the developing world of engaging in unfair trading practices when they fail to recognise US patents within their own national boundaries. For example, there has been a strong US lobby to force all countries to recognise patents on seeds (Grenier 1998:19; Viergever 1999:338).

The corporate demand for IPRs on biodiversity is based on the premise that only their investments need to be rewarded. The existing IPR agreements fail to recognise the rights of indigenous and local communities to their own knowledge base and innovations. There are various ways of compensating indigenous communities for their contribution to IK-related research and discoveries. Individuals or tribes can be

compensated through material means that may include (but are not limited to) royalties, partnership in production, packaging or sale ventures. Compensation can also be made to the descendents of knowledge creators through scholarships. Various compensation mechanisms are discussed in chapter six (Grenier 1998:19; Nabhan et al. 1996:191).

Developing countries have strongly argued that some multinationals from the industrialised world exploit their biological wealth and then sell the patented products back to them at high prices. With the growth of the biotechnology industry, in combination with the loss of biotechnological diversity worldwide, the access to and control of genetic resources have attracted the attention of governments, corporations and others, mainly because of the tremendous potential for commercial profit. The traditional lifestyles, knowledge, and biogenetic resources of indigenous peoples have become commodities to be bought and sold. TRIPS and the Convention on Biological Diversity have made it clear that IPR is an important issue for all, and particularly indigenous people, to consider. If corporations can secure IPR protection for their inventions, then indigenous peoples, too, should be entitled to protection for their IP (D'Amato & Long 1997:87; Grenier 1998:20).

For example, within the US regime, farmers have to pay royalties on patented seeds, even they themselves were the source of the original stock. Under GATT rules, these farmers may not market or use their seeds. Commercial plant breeders, in the employ of a few multinational corporations, control all the significant gene banks. Multinationals are developing plants that respond to their own agrochemicals. The cost and administrative implications of adopting some of the new IPR systems for each patent are significant. The Convention on Biological Diversity found the following issues to be significant (Grenier 1998:21-2):

- How can a country restrict access to its genetic resources?
- If access is granted, how can traditional IK genetic resources be protected?
- If access is granted, how can law and policy be used to ensure that a fair share of the benefits from any products derived from genetic resources is returned to local communities?

If access is granted, one approach to protecting people's genetic resources is to have governments prohibit multinationals from patenting materials found on indigenous people's land. Indigenous peoples around the globe have made their position clear on many of these complex IPR questions and issues. Appropriate arrangements need to be made for the recording, storage, application and transfer of local IK within and between national and international communities (Grenier 1998:21; Semali & Kincheloe 1999:3). Most of the pharmaceutical companies come into contact with indigenous people through their researchers. In order to better understand the current context of IK, the way in which these researchers interact with indigenous people and with IK needs to be discussed.

4.9 Summary

The definition and various characteristics of IK were investigated in this chapter. It was discovered that IK is also affected by the global influence that resulted from contact between the locals and the rest of the world. IK solutions and products can be applied to appropriate situations irrespective of whether these are modern or traditional. It is also argued that Western science is not superior to IK. This chapter answered the research sub-question:

What constitutes IK and how is it treated in the global IP regimes?

International IP regimes such as TRIPS were investigated to determine how they influence IK. Due to the effects of globalisation, IK has evolved and undergone various metamorphic stages and is no longer reflects its original form. It should be appropriately used to ensure sustainable development. The current IPR regimes have proven to be insufficient to protect IK. This has led to the ownership and control of some IK products by those who have the potential to register patents for them. In some cases, these patents render it illegal for the locals to use the traditional products that they have employed for centuries. Some Western researchers see IK as an

unexplored area and conduct their research in accordance with Western principles that are not always applicable to IK.

Chapter five investigates various cases of IK infringement perpetrated against indigenous communities and how these communities could be compensated for their IK resources.